Document ID: 0.7.1705.65544

From: Cashour, Curtis
</o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=dba510634baa46a085e28c62c254093f-cashour, cu>
To: Sandoval, Camilo J.
</o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=91cab99711134d5898a778ab468532fc-sandoval, c>; Selnick, Darin </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=b42e3e7200d24bc6aeafc5fd36be8d2b-selnick, da>
Cc: Ullyot, John
</o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=c02392d86764480bb90e3854a5f3cbbb-ullyot, joh>
Bcc:
Subject: // approval needed ASAP today // Perlmutter, Moskowitz and Sherman
Date: Mon Nov 26 2018 13:27:51 EST
Attachments:

---

Folks – please see below from ProPublica. Are you OK with the following response?

Although his predecessors may have done things differently, Sec. Wilkie has been clear about how he does business. No one from outside the administration dictates VA policies or decisions – that's up to Sec. Wilkie and President Trump. Period.

Q: Why was Darin Selnick the point person on the Apple collaboration?

A: We refer you to former VA employee David Shulkin for comment since this happened on his watch. We know you are in contact with him.

Q: What ethics official approved of OIT beginning work on Dr. Moskowitz's app, and what was the justification? What ethics official approved of OIT beginning work on Dr. Moskowitz's app, and what was the justification?

A: The premise of your question is false. VA did not begin work on the app.

Q: Why did Selnick introduce Dr. Moskowitz's son to his contacts at Apple?

A: We refer you to former VA employee David Shulkin for comment since this happened on his watch. We know you are in contact with him.

Q: What became of Peter O'Rourke's effort to "salvage" the Apple collaboration, as conveyed in a March 8, 2018, email?

A: We refer you to former VA employee David Shulkin for comment since this happened on his watch. We know you are in contact with him.

Q: What is the current status of the collaboration with Apple on the data exchange?

A: VA is in frequent contact with the private sector on how companies can work together on improving services to our nation's Veterans, but we have no announcements at this time with respect to any particular company or group of companies.

Q: Why did the VA organize a medical device registry summit, even though the VA already had a 99 percent effective system for product recalls, and the FDA already has NEST?

A: VA organized the Medical Device Registry Summit to bring together industry and academic leaders, as well as sister-agency experts to map out a strategy for launching the largest medical device-implant tracking program in the nation. The department is now looking to expand that collaboration to include the Food & Drug Administration and the Centers for Medicare and Medicaid Services, as well as VA's community care partners.

Medical devices are a $170 billion business, accounting for 6 percent of U.S. health spending in 2013, and implantable device sales are projected to reach $74 billion this year.

Given the large and expanding role of medical devices in modern health care, it's important to know what works best for patients.

The next steps for implementing a registry are working to ensure it would incorporate key features that enable quality measurement and outcome comparisons, patient safety monitoring, faulty-device recalls and patient notifications, and overall tracking and clinical follow-up.

Q: In Peter O'Rourke's Feb. 28, 2018, email saying, "I will protect our conversations from yesterday and as instructed by the Secretary last night, not discuss the content with any of the individuals what were mentioned," who and what is he referring to?

A: We refer you to former VA employee David Shulkin for comment since this happened on his watch. We know you are in contact with him.

Q: On Feb. 28, 2018, Dr. Moskowitz wrote, "The emergency 'committee' is mental health and that should be the first one to get right and move ASAP. I need to know all existing committees and initiatives on a chart. I have to pull in a significant number of assets to get boots on the ground to actually give timely care. I will need you to contact besides our academic partners, the following, U of

PENN, U. OfChicago,UCLA, U of SanFrancisco, Stanford, Columbia, the Mack Center of technological innovation, the Bloomberg school of public health and Ondrea Gleason MD head of American Association of Chairs of Psychiatry. This committee will need a direct working relationship with Telemedicine, the Choice Program to get the job done. They will need the authority to seep away any beuqacratic process that slows the initiative." Peter O'Rourke replied, "I will begin a project plan and develop a timeline for action." What initiative were they discussing and what became of it?

A: We refer you to former VA employee David Shulkin for comment since this happened on his watch. We know you are in contact with him.

Q: What was the purpose of the "Requested Names" that Dr. Moskowitz sent to Peter O'Rourke on March 9, 2018?

A: We refer you to former VA employee David Shulkin for comment since this happened on his watch. We know you are in contact with him.

Q: On the tracker circulated by Camilo Sandoval on March 6, 2018, why is CIO listed as one of the topics? Why was Bruce Moskowitz involved in screening applicants for CIO?

A: We refer you to former VA employee David Shulkin for comment since this happened on his watch. We know you are in contact with him.

Curt Cashour

Press Secretary

Department of Veterans Affairs

202-461-7388

Curt.Cashour@va.gov

@curtcashour

From: Isaac Arnsdorf [mailto:Isaac.Arnsdorf@propublica.org]
Sent: Monday, November 26, 2018 10:13 AM
To: Cashour, Curtis <Curt.Cashour@va.gov>
Cc: Snyder, Jill <Jill.Snyder@va.gov>
Subject: [EXTERNAL] Perlmutter, Moskowitz and Sherman

Hi Curt,

Hope you had a nice holiday.

I'm writing a follow-up article about the influence of Ike Perlmutter, Bruce Moskowitz and Marc Sherman based on the additional documents that the agency released last week. My questions are:

1.After meeting Perlmutter, Moskowitz and Sherman for the first time in April, why did Secretary Wilkie email them to say, "No matter how long I am here, there is a template in place based on your efforts to move this institution out of the Industrial Age"? What did he mean by that?
2.How is saying they provided a "template" consistent with the Secretary's repeated assertions of independence from Perlmutter, Moskowitz and Sherman?
3.Why was this sentence redacted under FOIA exemption b5 when the email was originally released to me?
4.Why was Marty Steele at the April meeting at Mar-a-Lago?
5.Why did Perlmutter, Moskowitz and Sherman review the Cerner contract before it was signed? What relevant expertise did they have to offer?
6.What ethics official approved their reviewing the contract, and what was the justification?
7.Why was Darin Selnick the point person on the Apple collaboration?
8.On May 18, 2017, why did Selnick say, "The VA staff has limited knowledge and experience, which is why you and the centers are so important to help the VA move forward"?
9.What ethics official approved of OIT beginning work on Dr. Moskowitz's app, and what was the justification?
10.Why did Selnick introduce Dr. Moskowitz's son to his contacts at Apple?
11.Why did the VA start working on Moskowitz's app even though OIT identified significant problems with its usability, functionality and scalability?
12.What became of Peter O'Rourke's effort to "salvage" the Apple collaboration, as conveyed in a March 8, 2018, email?
13.What is the current status of the collaboration with Apple on the data exchange?
14.Why did the VA organize a medical device registry summit, even though the VA already had a 99 percent effective system for product recalls, and the FDA already has NEST?
15.What was the total cost of the summit?
16.Why did Dr. Moskowitz and Aaron participate in weekly planning calls? What were their roles and tasks?
17.On April 10, 2018, why did SreyRam Kuy say she "owed" Dr. Moskowitz a budget for the medical device registry summit? Why was it appropriate for him to "edit" a government budget?
18.What ethics official approved Dr. Moskowitz's role in the summit and what was the justification?
19.What did it mean that Dr. Moskowitz's foundation was identified as a "private interest" in May 10, 2018, briefing materials for the secretary?
20.In Peter O'Rourke's Feb. 28, 2018, email saying, "I will protect our conversations from yesterday and as instructed by the Secretary last night, not discuss the content with any of the individuals what were mentioned," who and what is he referring to?
21.On Feb. 28, 2018, Dr. Moskowitz wrote, "The emergency 'committee' is mental health and that should be the first one to get right and move ASAP. I need to know all existing committees and initiatives on a chart. I have to pull in a significant number of assets to get boots on the ground to actually give timely care. I will need you to contact besides our academic partners, the following, U of PENN, U. OfChicago,UCLA, U of SanFrancisco, Stanford, Columbia, the Mack Center of technological innovation, the Bloomberg school of public health and Ondrea Gleason MD head of American Association of Chairs of Psychiatry. This committee will need a direct working relationship with Telemedicine, the Choice Program to get the job done. They will need the authority to seep away any beuqacratic process that slows the initiative." Peter O'Rourke replied, "I will begin a project plan and develop a timeline for action." What initiative were they discussing and what became of it?
22.What was the purpose of the "Requested Names" that Dr. Moskowitz sent to Peter O'Rourke on March 9, 2018?

23.Who is the Under Secretary candidate from Mayo who Dr. Moskowitz recommended to O'Rourke on July 16, 2018?
24.Why is O'Rourke back at VA?
25.On the tracker circulated by Camilo Sandoval on March 6, 2018, why is CIO listed as one of the topics? Why was Bruce Moskowitz involved in screening applicants for CIO?

We're planning to publish as soon as tomorrow.

Thanks,

Isaac

Isaac Arnsdorf

ProPublica

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203.464.1409

isaac@propublica.org

Document ID: 0.7.1705.733962

From: None
To: Rippen, Helga E. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=9f4750bb3360412c938e06fa108d9d20-rippen, hel>
Cc: Tibbits, Paul A. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=8c2525e5054a458e9733c5cf6bdec39e-tibbits, pa>; Cussatt, Dominic (SES) </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=1079be15bc2244278f497508d265f041-cussatt, do>; James, Bill </o=va/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=vacojamesb2>; Hume, Charles </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=6213b34d4ae94ee6883292ae3f5cb652-hume, charl>; Evans, Neil C </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=bf3772a111e64e90a4ec5f8191401933-evans, neil>
Bcc:
Subject: FW: [EXTERNAL] Re: Meeting between Dr. Tibbits and Aneesh Chopra to discuss open API pledge
Date: Sun Nov 04 2018 15:47:00 EST
Attachments: VA EHRM Interoperability-Mitre- Report Jan 2018 _Redacted_FINAL.pdf

---

Helga,
Can you lead an internal meeting for us to discuss recommendations below with internal VA stakeholders.

1.FHIR First Policy
2.Apple Health API Rules
3.

From: Aneesh Chopra (b)(6) @carejourney.com]
Sent: Sunday, November 04, 2018 3:18 PM
To: Wine, Marc <Marc.Wine@va.gov>
Cc: Tibbits, Paul A. <Paul.Tibbits@va.gov>; Sartin, Shannon (CMS/OA) <(b)(6) @cms.hhs.gov>; Mugge, Alexandra M. (CMS/CCSQ) (b)(6) @cms.hhs.gov>; Soundararajan, Jude <(b)(6) @ssa.gov>; Worthington, Charles <Charles.Worthington@va.gov>; Sandoval, Camilo J. <Camilo.Sandoval@va.gov>; James, Bill <Bill.James@va.gov>; (b)(6) @ssa.gov
Subject: [EXTERNAL] Re: Meeting between Dr. Tibbits and Aneesh Chopra to discuss open API pledge

Marc, thanks for the summary!

Paul - it was terrific seeing you again, and thanks for hosting all of us! Here's my summary, if useful:

1) "FHIR-first" policy: I'll defer to Shannon/Alex but there is likely more information to come from CMS on how it intends to leverage open APIs to communicate with the care delivery system, and to regulate where appropriate. My suggestion was to establish a policy similar to our "cloud-first" approach back in 2010 whereby all the various sub-departments within the VA know that when starting a new interop project, or investing more in an existing one, that it pursue an "API-first" evaluation to gauge feasibility

before relying on whatever legacy method is under way.

This is the direction of 21st Century Cures, and will likely be the focus of the forthcoming ONC information blocking rules. We know that existing API rules are working with respect to Apple Health's experience. They have published a list of every site where they have established a FHIR-based connection (https://support.apple.com/en-us/HT208647), which means any consumer app can follow without additional burden. As you likely know, Apple pays NOTHING to connect to these sites; the health systems pay NOTHING to connect with Apple (presuming they have "turned on" the 2015 CEHRT edition as required to meet CMS/ONC rules); and the consumer, of course, pays NOTHING to authorize the transmission.

The FHIR Argonaut Project technical specifications allow physician access, but are NOT required in regulation (as of now). The "bulk access" specifications are ready for testing (ONC has funded a project with Boston Children's - https://www.hhs.gov/about/news/2018/09/26/hhs-announces-leap-health-it-winner.html).

2) Execute the Cerner Contract's Open Data Model Provisions: Now that the MITRE report is public, you can see all of the recommendations re: accelerating API standards development (attached). But key provisions that are in the contract have NOT been executed, including:
-publishing Cerner's data model in the NIH/national library of medicine (as Kaiser did with CMT - https://www.nlm.nih.gov/research/umls/cmt/cmt_faq.html)
-engaging the Open API Pledge partners in prioritizing use cases for standards development/acceleration.
-articulating how Cerner intends to make the work it is doing for the VA available to non-VA Cerner clients to lower the costs of future standards adoption/use.

3) Start building SMART Apps: presuming you can adopt/scale up your "Digital Veteran API Gateway" de-coupled from the timeline of the Cerner implementation, then you can do any of the following we discussed:
-Train VA employees for FHIR certification (here's the online course that started last week - http://www.hl7.org/events/fhir_fun.cfm)
-leverage the "micro-purchasing" framework to FHIR-enable popular VISTA apps like the JLV (https://doi.org/10.1007/s11606-018-4708-z), or CART-CL (https://www.hsrd.research.va.gov/for_managers/stories/cart-cl.cfm)
-Direct Leidos/Epic to open up the Scheduling API consistent with the Argonaut Specs so third party apps can build tools to help veterans access community care (https://open.epic.com/Scheduling/FHIR); and in return, API pledgees like Trinity might reciprocate in the Columbus, OH market.

I look forward to our discussion in a couple of weeks!

Regards,
Aneesh Chopra
President
(703) 672-1315 | CareJourney.com

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On Fri, Nov 2, 2018 at 12:12 PM Wine, Marc <Marc.Wine@va.gov> wrote:
Aneesh, Jude, Drew, Alexandra, Shannon, Paul and Bill;

~ A note to say thank you for yesterday's talks on Open API approach with our office.

"The API pledge encourages health-care providers to commit to work collaboratively with VA to increase the mapping pace of health data to industry standards, including the current and future versions of Fast Healthcare Interoperability Resources (FHIR)."

Sharing some highlight points or ideas from discussion, more ahead; plus, feel free to add, comment, further guidance or input.

*VA is Argonaut Project participant. VA Argonaut Project participant.
http://www.hl7.org/documentcenter/public_temp_51339323-1C23-BA17-0C8BC8A7320A4529/wg/argonaut/Argonaut%20Project%20Charter-12%20Dec%202014-v3.pdf
*VA can encourage standards development.
The purpose of the Argonaut Project is to rapidly develop a first-generation FHIR-based API and Core Data Services specification to enable expanded information sharing for electronic health records and other health information technology based on Internet standards and architectural patterns and styles.
*API standards, priority use case with SMART FHIR Vet Suicide Use Case.
*Open API for suicide information can be shared across healthcare in community.
*VA needs to finish the data model, start with a baseline data model.
*Place data model within Library of Medicine repository as open availability.
*VA can encourage standards development.
*API standards, priority use case with SMART FHIR Vet Suicide Use Case.
*Open API for suicide information can be shared across healthcare in community.
*VA needs to finish the data model, start with a baseline data model.
*Place data model within Library of Medicine repository as open availability.
*SSA wants to ensure ongoing sharing clinical data for SSA claims disability determination.
*FHIR Online Scheduling is online on Columbus, Ohio. FHIR questionnaire, online scheduling, Vets shared patient care, VA should adopt FHIR provider directory.
*VA DOD JVL interface cold be provided through app environment.
*Cloud available semantic interoperability tools well available healthcare arena.
*VistA functions easily convertible to FHIR Open Apps platforms. Several Apps could be built from VistA, was mentioned physicians in the private sector Like VistA; suggested train VA programmers who have MUMPS skills, to transform programming, changing EHRM environment.

Again, many thanks.

-----Original Appointment-----
From: Tibbits, Paul A.
Sent: Monday, October 22, 2018 9:41 AM
To: Tibbits, Paul A.; Aneesh Chopra; Wine, Marc; Sartin, Shannon (CMS/OA); Mugge, Alexandra M. (CMS/CCSQ); Soundararajan, Jude
Cc: (b)(6) @navhealth.com; Myklegard, Drew; Worthington, Charles; Sandoval, Camilo J.; James, Bill; Luther, Suzanne
Subject: Meeting between Dr. Tibbits and Aneesh Chopra to discuss open API pledge
When: Thursday, November 01, 2018 12:00 PM-1:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: VACO Room 350, 810 Vermont Avenue, NW, Washington, DC 20420

When you get to the building and check in with security, tell them that you are here to see me, Jonathan McBride. They will call me to come and pick you up. 202-461-4419. thanks! JMcB

.....

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Conference ID: (b)(6) (same as access code above)
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PLEASE NOTE WE HAVE NEW PHONE NUMBERS You might want to make your attendees aware of the change.
[!OC([1033])!]
.....

Jonathan McBride
EHRM for Integration
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Document ID: 0.7.1705.733962-000001
Owner: None
Filename: VA EHRM Interoperability-Mitre- Report Jan 2018 _Redacted_FINAL.pdf
Last Modified: Sun Nov 04 14:47:00 CST 2018

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# Department of Veterans Affairs Electronic Health Modernization

# Request for Proposal Interoperability Review Report

Authors: Jay J. Schnitzer, M.D., Ph.D.
(b)(6)

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**Document Number: MTR180033**
**Authors:** Jay J. Schnitzer, M.D., Ph.D.
(b)(6)

**McLean, VA**
**January 2018**

**Sponsor:**
Department of Veterans Affairs

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# VA EHRM RFP Interoperability Review Report

January 31, 2018

MITRE

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# Executive Summary

This Review Report presents responses to three requests from the Department of Veterans Affairs (VA) to MITRE related to the topic of interoperability within the VA Electronic Health Record Modernization Request for Proposal:

I. Conduct an external Interoperability Review Panel to review the interoperability language in the existing Request for Proposal (RFP),

II. Engage an independent and unbiased legal expert to identify the specific changes to the RFP language necessary to implement the recommendations from the Interoperability Review Panel, and

III. Visit the University of Pittsburgh Medical Center to understand the existing operational multi-vendor solution and interoperability solutions for applicability and scalability to the VA.

## I. Interoperability Review Panel

In support of the Secretary of Veterans Affairs, David J. Shulkin, M.D., The MITRE Corporation convened and hosted a VA Electronic Health Record Modernization (EHRM) Request for Proposal (RFP) Interoperability Review Panel on January 5, 2018, at MITRE's McLean headquarters. The invited external senior electronic health record (EHR) interoperability subject matter experts (the Panel) reviewed the interoperability language in the existing RFP and developed joint suggestions and recommendations for VA to consider for incorporation to support the successful execution of a new commercial EHR contract with industry. The Panel affirmed that the primary goal should be seamless Veteran-centric healthcare achieved through true EHR interoperability. Achieving this goal rests on three overarching principles that should be supported by interoperability language in the RFP: 1) free and open access to data, 2) an ecosystem that provides fair access to third parties by creating a level playing field, and 3) a seamless Veteran and health provider (clinician) experience. Four categories of recommendations from the Panel (the first three to the interoperability language in the RFP, and the fourth for future VA contracts) will enable VA to realize this goal on the basis of the underlying principles: 1) commit to full VA-Department of Defense (DoD) interoperability, 2) leverage current and future standards, 3) commit to open, standards-based application programming interfaces (APIs), and 4) use Care in the Community contracts to foster interoperability.

For the first category (commit to full VA-DoD interoperability), the Panel agreed that the Determination and Findings signed by Secretary Shulkin on June 1, 2017, represented the correct approach to interoperability within VA and between VA and DoD. The Panel strongly endorsed the proposed VA "API Gateway" language. The most important specific recommendations included:

- Define the degree of interoperability the solution will provide, ranging from basic file sharing to fully interchangeable, integrated and functionally identical patient records.



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Suggest that the Contractor conduct an annual Interoperability Self-Assessment against current and future standards that shall be specified by the VA; and

- The contract language should include the following elements:
  - performance measures to hold Cerner accountable for reducing the administrative burden in clinician workflow with the objective of increasing efficiency,
  - ability for bulk data export based on standards, with no proprietary formats (e.g., Flat FHIR [Fast Healthcare Interoperability Resources]), and
  - "push" capability to insert patient data back into the VA EHR / Cerner database.

For the second category (leverage current and future standards), the following specific recommendations were among the most important:

- Require that Cerner implement all standards as defined by VA, current and future,
- Engage Cerner as an advocate of the VA and DoD position in all relevant standards-making bodies, and
- Ensure that VA and Veterans have complete access to data.

For the third category (commit to open, standards-based APIs), the Panel voiced the following recommendations:

- Establish clear publishing and access service requirements,
- Provide a VA application platform that supports APIs from third party providers with no barrier to entry, and
- Require implementation of clinical decision support (CDS) Hooks to invoke decision support from within a clinician's EHR workflow.

The body of this report contains multiple additional specific recommendations.

## II. Recommendations for RFP Changes

MITRE engaged Morrison & Foerster, LLP as the independent and unbiased legal expert to identify the specific changes to the RFP language necessary to implement the recommendations from the Interoperability Review Panel. Appendix C presents all recommended changes to the RFP.

## III. Observations from University of Pittsburgh Medical Center Site Visit

A delegation from VA and MITRE traveled to Pittsburgh, Pennsylvania, on January 19, 2018, for a meeting with representatives from University of Pittsburgh Medical Center (UPMC) Enterprises to discuss aspects of EHR interoperability that UPMC has successfully implemented over the past several years. The report includes an overview of those practices.

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## IV. Closing Thoughts and Suggested Next Steps

The Panelists noted that VA cannot achieve true future EHR interoperability through the Cerner RFP alone, or through technology alone. The state of practice today shares only a small portion of available patient data. For VA to succeed in the future, multiple other components must be present and aligned: innovation, policy, standards, customer buy-in, and legislation, to name a few.

The following next steps are recommended for VA consideration:

1. Complete the RFP revisions, conduct appropriate negotiations with the Contractor expeditiously, and complete the contract process as planned. Stand firm during negotiations to maximize ease of access to data and data models for building third party APIs, applications, and services for future community innovations.
2. Continue to work with other federal government agencies and departments with similar interoperability interests and concerns, including, but not limited to, the White House, DoD, Food and Drug Administration (FDA), Centers for Medicare and Medicaid Services (CMS), Office of the National Coordinator for Health Information Technology (ONC), and other parts of the Department of Health and Human Services, to align approaches to EHR interoperability and the development and support of standards government-wide.
3. Support future innovation approaches, including concepts such as an Interoperability Laboratory and outreach to the broader innovation ecosystem (major medical centers, academia, traditional and non-traditional healthcare providers, startups, individual entrepreneurs, others). It is critical to align the innovations planned in VA's Digital Veterans Platform to the VA EHR innovation efforts to ensure consistent continuous improvements to clinician and Veteran health experiences.
4. Create an External Review Panel to provide expert continuous guidance, review, and feedback over the course of the implementation, to help capture best practices from the expert community going forward. Conduct ongoing demonstrations of end-to-end Veteran use cases requiring data sharing across organizational boundaries to validate improvements in Veteran healthcare and reduction of burden for healthcare providers. VA and Contractor will ensure that Federal Advisory Committee Act (FACA) guidelines are followed in leveraging any external review panels.



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# Table of Contents

Background....1
I. Interoperability Review Panel....2
Introduction....2
Goal....2
Methodology/Approach....2
Topic Area: VA Definition of Interoperability....3
Topic Area: Commit to Full VA-DoD Interoperability....4
Topic Area: Leverage Current and Future Standards....6
Topic Area: Commit to Open, Standards-Based APIs....7
Topic Area: Use Community Care Contracts to Foster Interoperability....9
Topic Area: Additional Contract Changes....11
II. Recommendations for RFP Changes....12
III. Observations from University of Pennsylvania Medical Center Site Visit....13
IV. Closing Thoughts and Suggested Next Steps....16
Appendix A: Interoperability Review Forum Participants....17
Appendix B: RFP Language for Purchasing Extensible Health IT....19
Appendix C: Recommended RFP Interoperability Language Changes....22
Appendix D: Acronyms....42



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## Background

The Department of Veterans Affairs (VA) plans to establish seamless care for Veterans throughout the health care provider market. Seamless care requires interoperability between the Department of Defense (DoD), VA, VA affiliates, community partners, electronic health record (EHR) providers, healthcare providers, and vendors. VA directed The MITRE Corporation to independently review the capability of Cerner's proposed EHR solution to seamlessly transmit health records between EHR systems supporting healthcare providers who both use and contribute patient data to a Veteran's health record, to include Veterans Choice Program (VCP) community-care service providers and VA affiliates. This Review Report presents responses to three requests:

I. Conduct an external Interoperability Review Panel to review the interoperability language in the existing Request for Proposal (RFP),

II. Engage an independent and unbiased legal expert to identify the specific changes to the RFP language necessary to implement the recommendations from the Interoperability Review Panel, and

III. Visit the University of Pittsburgh Medical Center to understand the existing operational multi-vendor solution and interoperability solutions for applicability and scalability to VA.



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# I. Interoperability Review Panel

## Introduction

In support of the Secretary of Veterans Affairs, David J. Shulkin, M.D., MITRE convened and hosted a VA Electronic Health Record Modernization (EHRM) Request for Proposal (RFP) Interoperability Review Panel on January 5, 2018, at MITRE's McLean, VA headquarters. MITRE invited external senior EHR interoperability subject matter experts (hereafter referred to as Panelists) to review the interoperability language in the existing RFP and to develop joint suggestions and recommendations for VA to consider incorporating into the RFP to support the successful execution of a new commercial EHR contract with industry. Eleven Panelists took part in person, and several senior government executives observed the process (see Appendix A for the full list of participants).

## Goal

The Interoperability Review Panel sought to provide Secretary Shulkin and his senior leadership team with insights into key best practices and guidance from national experts regarding EHR interoperability. The Panel evaluated the corresponding language in the draft RFP based on successful business transformations and implementations of a new commercial EHR system across a distributed hospital and provider network. This section of the report summarizes the outcome of the Panel: expert recommendations that will inform VA's interoperability contract language. The document also provides actionable and specific best practice recommendations and rationales to enable successful acquisition and implementation of EHR interoperability.

## Methodology/Approach

The first part of the session, which lasted for five hours, was conducted as a fish-bowl exercise and was guided by Chatham House Rule. The Panelists sat at a center table, with VA and other government observers sitting at surrounding tables. The second part, which lasted two hours, consisted of a summary debrief to the Secretary and senior VA leadership. The Secretary could ask questions and engage with the Panel throughout the second session. MITRE moderated the session to elicit inputs from all Panelists and to drive alignment toward consensus in the recommendations.

The agenda for the first portion of the session was structured to elicit inputs from all Panelists, with notes captured on-screen as redlines to the RFP interoperability language to ensure recommendations accurately reflected the Panelists' contributions. Subsequently, in a facilitated discussion, the Panelists grouped their recommendations into specific categories in real time. The second portion, as noted, provided opportunities for the Secretary to discuss the recommendations in additional detail.

This section of the report summarizes the discussion that took place. It highlights actionable changes to the interoperability language contained in the RFP and additional recommendations and lessons learned that can enable interoperability of the VA EHRM solution. Text boxes



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throughout the report present direct quotations from Panelists. To ensure participant confidentiality, MITRE has destroyed the transcript and event recording used to develop this report.

## Topic Area: VA Definition of Interoperability

> *The key to modernization is creating greater interoperability with Governmental partners, including DoD, in a way that focuses efforts in support of the Veteran's journey, beginning with their military service. We will partner with others to ensure Veterans can get their benefits, care, and services consistently, easily, and with excellent customer service, no matter where they are throughout their lives. VA will work with local communities, and with other Federal, State, Tribal, and Local Government entities to ensure Veterans get what they need. VA will also continue to leverage the private sector where appropriate and needed to deliver the very best outcomes for Veterans.*
>
> – draft VA 2018–2024 Strategic Plan

### Enable data sharing, interoperability, and agility through data standardization

VA needs to allow data sharing among various business applications, such as appointment scheduling and business intelligence, as well as ensure transportability of information between sites. Panelists advised VA to leverage and support the best-in-class innovation currently in use within the VA culture. VA must also enable interoperability as the Department integrates the EHR into other supporting systems, both within the VA network and with external health service providers. Agility is necessary for adoption of future innovative technologies and/or if VA wants to upgrade or change the EHR approach. The Panelists cautioned that the current EHR technology is already 20 years old and, as with all industries and information technology (IT) solutions, many possibly disruptive technologies exist on the horizon.

> "It really optimizes transportability of best practices, because if you are trying to transfer best practices from one site to another and you have the same system where the best practice is going to land, then it is much easier."

The session began with a discussion on interoperability as currently defined by VA (Figure 1). Prior to establishing a roadmap to inform a nationwide plan to advance health data interoperability, VA must first ensure system-wide interoperability across the Department. Throughout the Review Panel session, the Panelists described and referred to this concept as "Level 1 Interoperability" throughout the Review Panel session; it includes migration of Veteran data from ~130 instances of the Veterans Health Information Systems and Technology Architecture (VistA) to one VA platform.



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**Figure 1. VA Definition of EHR Interoperability**

"Level 2 Interoperability," as described in the Panel discussion, addresses the ability for VA to leverage the same Cerner platform used by DoD to ensure seamless care from active service to Veteran status. Once this capability is implemented, the clinical data transformation will allow a true longitudinal view of a Veteran's record as he or she transitions from DoD to VA for care and other critical services such as benefit adjudication.

"Level 3 Interoperability" will allow both VA and DoD to take an important step toward transforming electronic patient data exchange on a national scale. With the utilization of community healthcare providers via the VA Community of Care initiative and DoD's Tricare network providers, VA has the opportunity to drive interoperability between DoD and VA as well as with the extensive network of healthcare providers that serve our Nation's Veterans, active duty service members, and their beneficiaries.

True nationwide EHR interoperability for the entire United States is the ultimate goal, and the Panelists agreed that VA and DoD could reach this goal if the three aforementioned levels of interoperability are achieved. Here, VA has the opportunity to drive clinical transformation and instantiation of a complete EHR for all patients at the national level.

## Topic Area: Commit to Full VA-DoD Interoperability

The Panel focused primarily on reviewing the interoperability language within the RFP for the Cerner contract. However as described in Interoperability Levels 1 and 2, the commitment to the seamless integration of VA and DoD health data represents the foundation required to realize interoperability with private sector

> "You really have to get the basics done first. Let's just make absolutely sure that the interoperability between DoD and VA [is achieved]."



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healthcare providers.[1] It is important to note that the interoperability levels can be addressed simultaneously and should not be separated, as they must be integrated to efficiently achieve the larger future data sharing ecosystem.

## Specify the expectations for interoperability between DoD and VA

During discussions about the expectation that Cerner will provide a single EHR solution to be shared by both DoD and VA, the Panel raised concerns about the lack of specificity in the contract language. Current interoperability data standards address a subset of the Veteran's clinical record and VA has the opportunity to ensure Cerner provides interoperability of all discrete data, at a minimum, between VA and DoD. Adopting the same platform would increase seamless sharing, but the Panel stated that VA should take additional action to ensure that such sharing is realized. The DoD and VA systems should use proprietary database-to-database interoperability if necessary, to maximize interoperability between those two systems. These systems should be configured to meet the distinct needs of each while being connected to each other in a native database-to-database method as necessary, leveraging open interoperability standards wherever possible. As a result, clinicians should experience no differences when they move from a VA system to a DoD system. These data should also be computable, or be made computable according to a specific schedule. VA should consider adding language to the RFP that specifically defines the degree of interoperability the solution will provide, ranging from basic file sharing to fully interchangeable, integrated and functionally identical patient records.

The Panelists also stated that, for VA and DoD collectively, the contractual language should include the following requirements:

- Performance measures to hold Cerner accountable for reducing the administrative burden in clinician workflow with the objective of increasing efficiency
- Capability for bulk data export based on standards, with no proprietary formats (e.g., Flat FHIR [Fast Healthcare Interoperability Resources])
- "Push" capability to insert new patient data back into the VA EHR / Cerner database.

## Pivot the RFP to be Veteran-centric and not system-centric

The Panelists discussed the impact of EHR implementations on clinician workflow, describing the issue as one of approaching the implementation as an IT system implementation rather than the preferred Veteran- or clinician-centric implementation. The current RFP appears to be written in a system-centric way rather than leveraging use-cases to describe the Veteran or clinician experience or workflow to characterize the requirement. The Panelists recommended that VA incorporate use-cases to characterize requirements and amend the RFP language to emphasize the Veteran-centric objectives. In addition, Panelists noted that VA should recognize that EHRs do not currently maximize efficient clinical workflow, and that VA specify that the

[1] Healthcare providers is used to refer to community based physicians/specialist and hospitals.



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solution present clinicians with relevant information where needed with a minimum number of "clicks to find."

## Topic Area: Leverage Current and Future Standards

The integrated EHR platform that DoD and VA are implementing provides the opportunity to significantly influence interoperability standards across the healthcare community, addressing gaps and competition among current standards. The Panel recognized that commercial health systems and technologies would realize only limited business value from making data portable between them, but this would lower the barrier to patient movement among healthcare providers.

### Engage Cerner as an advocate of the VA and DoD position in all relevant standards-making bodies

The Panel recommended increased VA presence and leadership in national health IT standards-making activities, in coordination with the DoD. Additionally, VA should encourage Cerner to serve as an active advocate of the VA-DoD position and to participate actively in the development and/or evaluation of new standards, policy directives, operating procedures, processes, etc. As an integrated voting bloc, VA, DoD, and Cerner will have the potential to act as a strong driver of national standards. Panelists understood that VA is not currently active in the FHIR community or in the Health Level Seven International (HL7) Argonaut Project.

In addition, Panelists identified a need for standards to exchange patient-reported outcome data for integration into the clinician's workflow. The current RFP language seemingly puts the burden on Cerner for the development of standards, and the Panel recommended that VA take a more active position. This will ensure that VA will participate and drive implementation when standards mature. Where standards are immature, VA must participate in efforts to accelerate standardization.

### Require Cerner to implement all standards as defined by VA, current and future

Because it is unclear where health IT is heading in five years, the Panel strongly suggested VA include contract language to address possible future advancements in the form of standards as defined by VA. At a minimum, VA should seek maximum interoperability with community care organizations, using open interoperability standards wherever possible. This flexibility would ensure that VA does not rely on external stakeholders to determine the standards that VA would be required to accept. The Panel recommended that VA pay particular attention to specific categories of standards: real-time data read/write by care providers and Veterans; interoperability tools; seamless DoD and VA vision records; and principles for data normalization and structure. The Panel also recognized Cerner's influence in ensuring that the CommonWell network interoperates at the highest possible levels with other networks including CareQuality—an influence that VA should continue to promote.



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### VA must own its data; clear ownership and access are critical to success now and in the future

The Panel highlighted an important recommendation regarding data rights that was discussed in the prior VA EHRM Listening Forum on September 7, 2017. The Panel recommended that VA define who has what rights from the perspectives of data ownership, access, and sharing (e.g., VA owns the data and all data products vs. community care providers own the patient data vs. each Veteran owns all of his or her data). Determining the authoritative data source for the various elements of a Veteran's health record is an important Veteran-centric component of interoperability, the longitudinal record, and seamless access to data.

> "So, what you need is clear access and clear ownership of your information…you need to have absolutely, undisputed, clear ownership and ability to move the data to any place you want to use it and use it in any way you want to use it when you get there. And not have them [Cerner] be able to say no, that's our data or hinder you in any way or have an unreasonable charge to get it."

VA should define an enterprise-wide policy for all VA data. A suitable policy would include, but not be limited to, EHRM-specific data, and should be issued by the VA Central Office (VACO) or Veterans Health Administration (VHA). VA must have clear ownership of and access to all the information in the EHR and be able to move that information (into new systems or among systems) as needed, now and in the future. Owning the data ensures that it is available regardless of vendor or system. VA must include this in the Cerner contract. Technology innovations occur rapidly in the 21st century, and VA must have full ability to move its data to future systems.

Panelists also recommended that VA publish its data model, for instance to the National Library of Medicine, to further promote commercial interoperability investments. Lastly, Panelists encouraged VA to leverage its investment in the Open Source Electronic Health Record Alliance (OSEHRA) by providing seed money to develop open source connectors between Cerner and Epic, which would encourage other vendors to join in the effort.

## Topic Area: Commit to Open, Standards-Based APIs

A significant technology enabler of seamless interoperability among the community of Veteran healthcare providers is the use of Application Programming Interfaces (APIs). These software intermediaries allow disparate EHR applications to communicate with each other and exchange data using standard, defined forms. The Panel emphasized the need for VA to create an environment that would minimize additional costs to community providers in order to interoperate with VA. VA can accomplish this by requiring the new EHR system to expose APIs that support bi-directional data transactions. The Panel further recommended that VA make a commitment to open, standards-based APIs, including the SMART on FHIR/Argonaut APIs, to facilitate the ready and efficient exchange of data with partners providing care in the community and to support open clinical workflow.



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## Establish clear publishing and access service requirements

The Panel recognized that data access requirements differ depending on who provides or accesses that data. Therefore, the Panel recommended that VA be more specific in defining each level of data publishing and access service that is specific to (1) Veteran access (e.g., use of vets.gov); (2) VA clinician access; (3) partner access; and (4) Health Information Exchange (HIE) access. The RFP should include a clear description of identity and access management requirements, including user population types and the association of specific application permissions with particular roles/positions.

> "The Contractor should provide all of the data that is currently being provided in the Contractor's patient portal to the consumer via an open standards-based API gateway. The Contractor should also provide all of the reporting data required by federal law to the Veteran via an open standards based API framework, accessible via any application or third-party data store of the Veteran's choice, that's number one."

Machine-to-machine access is also critical for efficient sharing of information. The Panel recommended that VA ensure that all significant data stored in the software be accessible through APIs with no requirement for creation of custom applications to specifically access VA data. From a forward-looking perspective, VA should require that the EHR system support the ability to access data elements using open standards-based interfaces, and include the ability to interface with legacy data, patient-generated data, and third-party data that resides outside the EHR system. In addition, Cerner should provide the required utility services to support intermediary or peer-to-peer services (e.g., support Veteran-directed or Veteran-mediated requests, data exchange, and ingestion of data from non-VA providers).

## Provide a VA application platform that supports APIs from third-party providers with no barrier to entry

Currently vets.gov serves as a portal to Veteran services. The Panel recommended that VA consider using such a portal to connect any third-party application to the EHR solution without requiring fees or vendor permissions. VA should have full authority to connect any third-party application through one of the standard open APIs conformant with the vendor's API without pre-registering the application with the vendor. This is a very important authority to have in terms of the ability to innovate rapidly, without constraints.

> "The API Gateway document is awesome … world class and future looking."

The Panelists also reviewed the proposed VA "API Gateway" language provided during the API discussion to anchor the dialogue and concurred that this requirement is fundamental to supporting interoperability. The Panel strongly endorsed the "API Gateway" language. Specifically, the Panelists recommended that VA include a requirement that VA have full authority to connect any third-party application to the Cerner system without requiring prior approval by Cerner. Furthermore, VA should ensure that developers of third-party applications connecting to the VA system via the open standard and VA-defined APIs continue to own their



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intellectual property (IP). From a usability perspective, the Panel also recommended that VA be able to establish the connectivity business rules, such as the ability for applications to remain connected for a reasonable time frame (e.g., 1 year) and to receive automatic notification about patient information updates.

### Require implementation of Clinical Decision Service (CDS) Hooks to invoke decision support from within a clinician's EHR workflow

EHRs are essential to efficient delivery of high-quality care, as they provide the clinician with essential decision data at the time required. However, current EHR systems approach workflow from an IT system perspective rather than a clinician's perspective. The latter workflow should, of course, be paramount in the VA EHR implementation, and should also leverage a recent innovation called CDS Hooks. This technology provides the clinician with context-driven decision support and capability by enabling the EHR to trigger third-party services at key events that include ordering medication and opening a patient face sheet. For example, when the VA clinician begins to prescribe medication, a CDS Hook can call an external service that presents the clinician with the list of medications already prescribed to the patient by clinicians outside VA. The Panelists strongly recommended that VA require Cerner to implement and use CDS Hooks within the clinician workflow.

## Topic Area: Use Community Care Contracts to Foster Interoperability

The new EHR system must be able to communicate with other EHR systems (e.g., Epic, AllScripts, etc.) within the care community. It is critical that VA ensure the Cerner EHR system remain robust for future interoperability with new products. Cerner must commit itself to supporting other forms of interoperability, such as a presentation layer that is common to other systems (e.g., the App store model). The Panel recommended that prior to execution of the Community Care Act contract VA require third-party providers (and Cerner competitors) to commit to supporting the contract as early adopters.

> "Innovations going forward are going to come from multiple directions. And having those interfaces, and going with a general interoperability approach that doesn't fork off from what's happening in the rest of the healthcare system, will allow the Veterans to benefit from technology whether that's coming from Google, from a new company, from an innovative shop within VA -- you end up creating a market with good prices, high value."

### Veterans must be able to access and download a computable form of their health data

Panelists noted that access to data represents the biggest problem today. VA must clearly direct Cerner to expose data so it can be used by third parties. In the contract and in conversations with Cerner and third parties, VA must require specifics regarding how Veterans and providers will

access and share their data. In addition, VA must require that any agreements leave the door open for future standards and technologies.

Panelists believed that VA could achieve this by invoking the principle that the data belongs to the Veteran, rather than by citing specific technologies and standards (given how rapidly they are evolving). Veterans must be able to invoke their right of access to data to support data exchange across all providers (e.g., pull data through an API on their smartphone and push it to their community care provider), now and in the future. Keeping pace with this requirement will drive continual innovation by Cerner and all providers.

## VA must own the API layer

Cerner ownership of the API layer (across every customer) poses a real threat to achieving interoperability, speed of innovation, and cost efficiency throughout the network of community care providers. Panelists stated that it is of utmost importance that VA include specific language stipulating that VA and Veterans be able to use third-party applications without having to register them with Cerner. VA must control the API key, not Cerner.

Additionally, VA should require that Cerner provide access to MPages, a developer toolkit, and a programming interface that will enable innovators and third parties to develop APIs.

## Require that community care contracts include VA EHR standards to support bi-directional data sharing

Panelists agreed that requiring the support and collaboration of community care providers and participating actively in health IT standards bodies would give VA the opportunity to advance the "national" standard for data sharing—closing any gaps and inconsistencies among federal, industry, and inter-industry standards. VA must require every provider in the chain of a Veteran's care to support the same standards for data interoperability in order to ensure seamless, best possible care for Veterans. This includes the requirement that all providers and third-party applications, in exchange for using the VA-provided API gateway, provide bi-directional health information back to VA that can be used for context-driven clinical decisions and informatics.

## Change the data exchange consent model from "opt in" to "opt out"

To encourage seamless interoperability across all entities providing care to Veterans, the consent model for exchanging data between healthcare providers must be modified to follow an opt-out rather than an opt-in policy, which limits participant numbers. This would allow Veterans to invoke their individual right of access under the Health Information Portability and Accountability Act (HIPAA) to move their data as needed. Many states have already adopted an opt-out consent policy as part of their HIE.[2] VA can achieve this by aligning its policy to an opt-

[2] See https://www.healthit.gov/sites/default/files/State%20HIE%20Opt-In%20vs%20Opt-Out%20Policy%20Research_09-30-16_Final.pdf

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out model, supported by the new VA proposed rule[3] to allow HIEs to collect a Veteran's consent and electronically attest to the consent to VA in order to obtain the required EHR.

## Topic Area: Additional Contract Changes

In addition to the recommendations in the prior sections, the Panelists encouraged VA to add further definitions and clarity in the following areas:

- Require Cerner to provide VA with full read and partial write access to all data elements within the EHR, at VA's sole discretion.
- Require Cerner to make the VA data model, standards, and other similar interoperability changes available in all other non-VA Cerner instances of its EHR platform.
- Clearly define "enabling security framework" so that users know if this means a specific security framework such as those provided by the National Institute of Standards and Technology (NIST), HITRUST, etc.
- Amend "national Common Trust Framework" to specifically refer to the intended source. The Panelists suggested that VA replace this wording with "Trusted Exchange Framework and Common Agreement (TEFCA)" as specified in the 21st Century Cures Act.
- Amend RFP Performance Work Statement (PWS) Section 5.10.4(i) to clarify if the "provider collaboration via secure e-mail using Direct standards" is limited to the Direct protocols and just the Cerner platform.
- Incorporate the model RFP language necessary for Cerner to support the API and SMART on FHIR platform and SMART-enabled applications, as described in Appendix B.

[3] See https://s3.amazonaws.com/public-inspection.federalregister.gov/2018-00758.pdf



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# II. Recommendations for RFP Changes

MITRE engaged Morrison & Foerster, LLP, as the independent and unbiased legal expert to identify the specific changes to the RFP language necessary to implement the recommendations made by the Interoperability Review Panel. MITRE provided Morrison & Foerster, LLP, with the summary recommendations and a copy of the RFP.[4] In addition, MITRE collected specific ideas for contract language from the Panel. Appendix C presents all recommended RFP changes.

[4] *Performance Work Statement for the VA Electronic Health Record Modernization System*, Final Version 1.7, Amendment 03, December 4, 2017, Department of Veterans Affairs. File name: 001 - VA EHRM IDIQ PWS (Amended 12.04.2017) - Copy.docx



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# III. Observations from University of Pennsylvania Medical Center Site Visit

A delegation from VA and MITRE traveled to Pittsburgh, Pennsylvania, on January 19, 2018, for a meeting with representatives of UPMC Enterprises to discuss aspects of EHR interoperability that UPMC has successfully implemented over the past several years. The VA team, led by John Windom, included Dr. Ashwini Zenooz, (b)(6), John Short, and (b)(6). The MITRE group included Richard Byrne, Jay Schnitzer, (b)(6) (b)(6), and (b)(6). The hosts at UPMC included Dr. Rasu Shrestha, C. Talbot Heppenstall, Jr., Ed McAllister, Dr. Robert Bart, Adam Berger, Diane Michalec, Phyllis Szymanski, and Dr. Amy Urban, as well as additional staff.

The meeting was broken into four parts. Following introductions, Session 1 described the structure of UPMC. Session 2 covered UPMC's last decade of interoperability, and Session 3 centered on the road ahead for UPMC and industry.

Dr. Rasu Shrestha began the meeting by making the introductions and setting the agenda. He stated that UPMC's approach had followed a best-of-breed strategy, as opposed to a best-of-suite strategy, with the intention of failing fast and succeeding often. The overall UPMC structure has four parts: provider services, insurance services, international activities, and enterprises.

During the discussion of interoperability, the UPMC team described its approach to interoperability, called Connected Healthcare, which is based on the commercial product dbMotion of AllScripts. UPMC has created an entity titled ClinicalConnect HIE (CCHIE) that uses HL7. ClinicalConnect exists as a separate 501c(3) company, of which UPMC is a member. CCHIE contains 90 live interfaces. This HIE went live in June 2012; its members consist of 10 hospitals. It competes with three other HIEs in Pennsylvania. The repository contains data on 8.3 million patients, and, in terms of patient consent, CCHIE uses an opt-out model. It currently has connections to four EHRs: Cerner (two versions), Epic, and Varian. Data available within CCHIE spans allergies, clinical documents, diagnosis, encounters, immunizations, labs, medications, problems, and procedures. Much of this data is in the form of documents (Continuity of Care Document (HITSP C32 CCD format, including problems, allergies, and medications); unstructured clinical documents (HITSP C62 format); Consolidated Clinical Document Architecture (C-CDA CCD, including problems, allergies, medications, immunizations, procedures, and insurance); and HL7 Interface (ADT: encounters, documents, imaging documents, and labs only).

At the point of care dbMotion allows multiple views for the CCHIE: 1) a clinical view, 2) a newer view titled EHR agent, and 3) a Cerner MPage integration view. The next phase of the UPMC work in this regard will consist of integration with CommonWell. Figure 2 shows the architecture of the system. Figure 3 depicts the data feeds.



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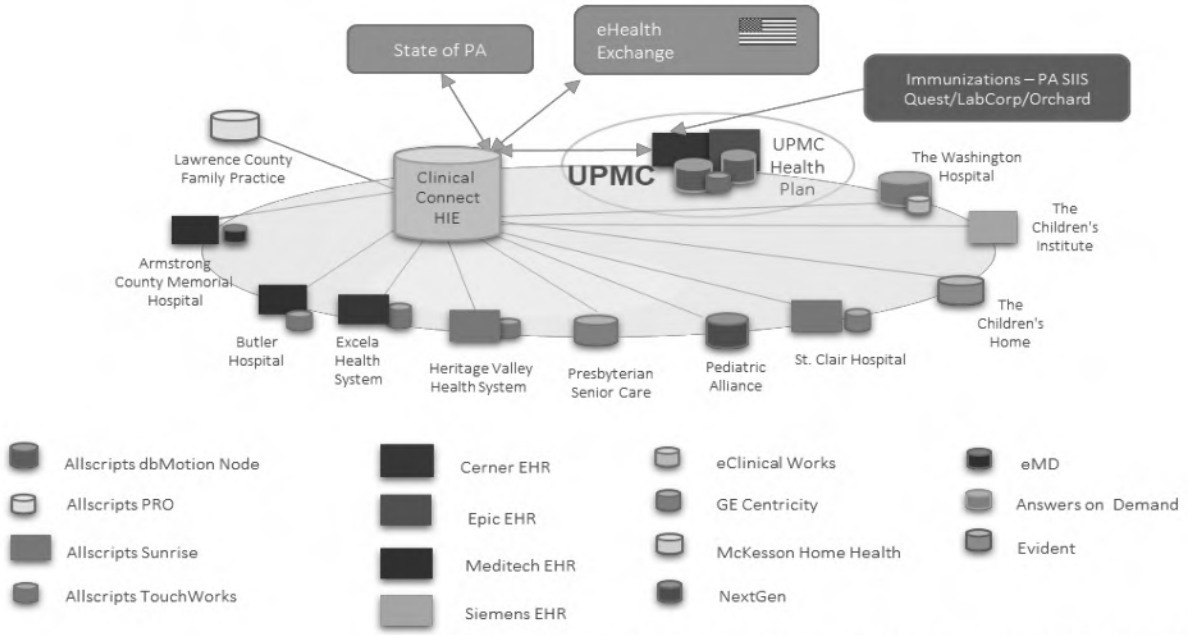


Source: From UPMC Enterprises, used with permission, for VA use only

**Figure 2. ClinicalConnect (Western Pennsylvania) Health Information Exchange**

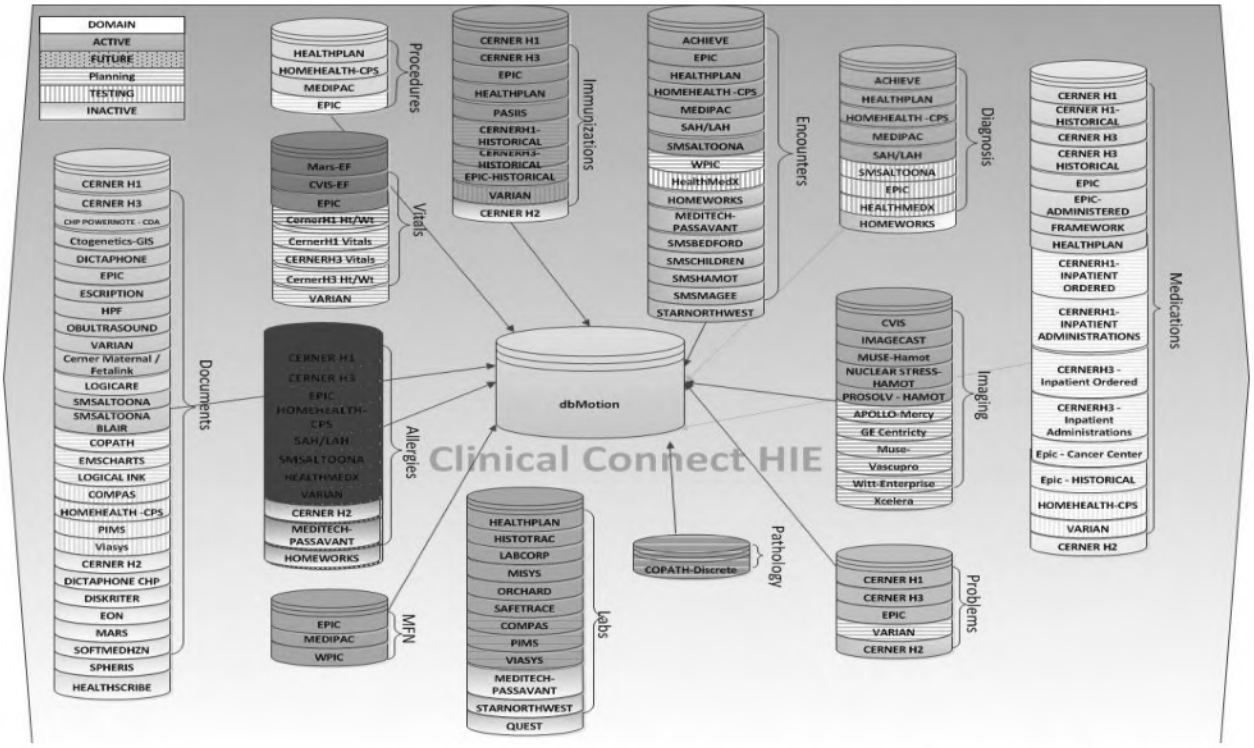


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**Figure 3. Interoperability Data Integration**

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When asked whether UPMC, or anyone else in the country, has a point-to-point Cerner-to-Epic interoperability solution that does not use an HIE, UPMC representatives responded "No." Furthermore, UPMC representatives noted that about 10 percent of the total available individual patient data is currently transferred with UPMC's interoperability system. This is complicated by an ongoing data explosion that doubles the amount of data in UPMC's system about every 18 months.

Following the presentations and lunch, MITRE Chief Technology Officer Jay Schnitzer saw a live demonstration of CCHIE by Dr. Amy Urban and Dr. Rasu Shrestha. The live demonstration confirmed that all of the documents listed above are visible with equal fidelity and a very similar format from both the UPMC end and the community provider end and perspective. The system requires clinicians to know and understand where documents can be found, and sometimes requires multiple mouse clicks, but all documents can be accessed from the same EHR entry page with one single log in. Additionally, some data elements, including vital signs and labs, can be viewed in the form of graphs as a function of time, including data elements from multiple sources.



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# IV. Closing Thoughts and Suggested Next Steps

The Panelists noted that VA cannot achieve true future EHR interoperability through the Cerner RFP alone, or through technology alone. The state of practice today shares only a small portion of available patient data. For VA to succeed in the future, multiple other components must be present and aligned: innovation, policy, standards, customer buy-in, and legislation, to name a few.

The following next steps are recommended for VA consideration:

1. Complete the RFP revisions, conduct appropriate negotiations with the Contractor expeditiously, and complete the Contract process as planned. Stand firm during negotiations to maximize ease of access to data and data models for building third-party APIs, applications, and services for future community innovations.
2. Work with other federal government agencies and departments with similar interoperability interests and concerns, including, but not limited to, the White House, DoD, Food and Drug Administration (FDA), Centers for Medicare and Medicaid Services (CMS), Office of the National Coordinator for Health Information Technology (ONC), and other parts of the Department of Health and Human Services, to align approaches to EHR interoperability and the development and support of standards government-wide.
3. Support future innovation approaches, including concepts such as an Interoperability Laboratory and outreach to the broader innovation ecosystem (major medical centers, academia, traditional and non-traditional healthcare providers, startups, individual entrepreneurs, others). It is critical to align the innovations planned in VA's Digital Veterans Platform to the VA EHR innovation efforts to ensure consistent, continuous improvements to clinician and Veteran health experiences.
4. Create an External Review Panel to provide continuous expert guidance, review, and feedback over the course of the implementation and help capture best practices from the expert community going forward. Conduct ongoing demonstrations of end-to-end Veteran use cases that require data sharing across organizational boundaries to validate improvements in Veteran healthcare and reduce burdens on healthcare providers. VA and Contractor will ensure that Federal Advisory Committee Act (FACA) guidelines are followed in leveraging any external review panels.



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# Appendix A: Interoperability Review Forum Participants

| Panelists | Title | Organization |
|---|---|---|
| Aneesh Chopra | President | CareJourney, former United States Chief Technology Officer |
| Charles E. (Chuck) Christian | Vice President, Technology and Engagement | Indiana Health Information Exchange |
| Ryan Howells | Principal | Leavitt Partners, LLC |
| Andrew Karson, MD | Director, Clinical Decision Support | Massachusetts General Hospital |
| Chris Klomp | Chief Executive Officer | Collective Medical Technologies, Inc. |
| Kenneth Mandl, MD | Professor, Biomedical Informatics<br>Director, Computational Health Informatics | Harvard Medical School<br>Boston Children's Hospital |
| Frank Opelka, MD | Medical Director, Quality and Health Policy | American College of Surgeons |
| Peter Pronovost, MD, PhD | Director, Armstrong Institute for Patient Safety and Quality<br>Senior Vice President, Patient Safety and Quality | Johns Hopkins University |
| Christopher J. (Cris) Ross | Chief Information Officer | The Mayo Clinic |
| Carla Smith | Executive Vice President | The Healthcare Information and Management Systems Society |
| Paul R. Sutton, MD, PhD | Professor, Biomedical Informatics and Medical Education<br>Associate Medical Director, Inpatient IT Systems, UW Medicine IT Services | University of Washington |

| VA Participants | Title | Organization |
|---|---|---|
| David J. Shulkin, M.D. | Secretary | Department of Veterans Affairs |
| Carolyn Clancy | Executive in Charge, Veterans Health Administration | Department of Veterans Affairs |
| Bill James | Acting Assistant Secretary, Office of Information & Technology | Department of Veterans Affairs |
| John Windom | Program Executive for EHRM and Special Advisor to the Under Secretary for Health | Department of Veterans Affairs |
| Dr. Ashwini Zenooz | Chief Medical Officer, EHRM; Deputy, Office of Deputy Under Secretary for Health Policy & Services, VHA | Department of Veterans Affairs |
| John Short | Chief Technology Officer, EHRM; Executive Director of Information Technology System Modernization | Department of Veterans Affairs |
| (b)(6) | Portfolio Lead: Project Transition and VA Integration, VA Center for Innovation | Department of Veterans Affairs |
| Camilo Sandoval | Senior White House Advisor, VHA | Department of Veterans Affairs |
| (b)(6) | Senior Advisor to the Secretary on Strategic Partnerships | Department of Veterans Affairs |
| (b)(6) | Contracts | Department of Veterans Affairs |
| Kyle Sheetz | White House Fellow | Department of Veterans Affairs |

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| Other Federal Government Participants | Title | Organization |
|---|---|---|
| (b)(6) | Senior Advisor, Office of Administration | The Centers for Medicare & Medicaid Services |
| Chris Liddell | Assistant to the President for Strategic Initiatives | The White House, Office of American Innovation |
| *Bruce Moskowitz, M.D. | Internist | External Expert Participant |
| Shannon Sartan | Director, Digital Services | The Centers for Medicare & Medicaid Services |
| Dr. Lauren Thompson | Director | DoD/VA Interagency Program Office |
| Jon White | Deputy National Coordinator for Mental Health | The United States Department of Health and Human Services/The Office of the National Coordinator for Health Information Technology |

*Upon review of this document on October 6, 2018, Fred Mingo, OEHRM FOIA Officer noticed that Dr. Bruce Moskowitz was incorrectly identified and should not be under the entry column "Other Federal Government Participants."



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# Appendix B: RFP Language for Purchasing Extensible Health IT

From https://smarthealthit.org/2017/08/draft-model-rfp-language-for-purchasing-extensible-health-it/, as of January 15, 2018.

SMART Platform (www.smarthealthit.org) is a project that lays the groundwork for a more flexible approach to sourcing health information technology tools. Like Apple and Android's app stores, SMART provides the means for developers to create and for health systems and providers to easily deploy third-party applications in tandem with their existing electronic health record, data warehouse, or health information exchange platforms.

To deploy SMART-enabled applications, health systems must ensure that their existing health information technology infrastructure supports the SMART on FHIR API. The SMART on FHIR starter set detailed below lists the minimum requirements for supporting the API and SMART-enabled applications. You may wish to augment this list of minimum requirements with suggestions from the Add-On Functionality listed depending on the types of applications your organization wishes to deploy.

This document is intended as a resource for providers and health systems as they draft Request for Proposals (RFPs) and negotiate with their HIT vendors for added functionality. It has multiple authors from across the SMART team and its advisors. Feedback is welcome.

The vendor must support the SMART on FHIR platform, a vendor agnostic API that allows third-party developers to build external apps and services that integrate with the vended product.

At a minimum, the vendor product should include the following components in order to support SMART on FHIR and SMART-enabled applications:

## Data Access

- Provide automated, standards-based, read-only access through the FHIR API and FHIR data models (resources) to:
  - a well-defined set of real-time discrete data (including support for the API parameters and resources described in the Argonaut Implementation Guide)
  - free-text clinical notes

## Data Manipulation

- Write structured data from third-party apps back to the organization's EHR and, where relevant, a data warehouse, using the FHIR REST API to communicate data including:
  - free-text clinical notes



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## Standards-Based App Authorization

- Protect data and identity endpoints with standards-based authorization mechanisms (including the OAuth2 profiles described in the Argonaut Implementation Guide).
- Provide access to data endpoints with an approach that does not require user intervention subsequent to the initial setup such as the method described in the draft SMART Backend Services Profile (http://docs.smarthealthit.org/authorization/backend-services/) Provide capability to restrict this access to a specified set of patients (roster).
- Enable Health System to connect any third-party app of their choice that is conformant with the API without pre-registering the app with HIT Vendor.
- Enable patients to connect any third-party app of their choice that is conformant with the API without pre-registering the app with HIT Vendor through the OAuth Dynamic Registration protocol.
- Provide OAuth refresh tokens with a duration of one year to patient and provider facing apps that support the SMART Client Secret profile.

## Identity Management

- Act as a standards-based Identity Provider using OpenID Connect. This ensures that users can authenticate to plug-in apps using single-sign-in via their existing EHR or patient portal credentials.
- Act as a standards-based relying party to a customer-selected Identity Provider using OpenID Connect. This ensures that users can sign into the EHR or patient portal using an external, hospital-supplied single-sign-on account.

## Workflow

- Support standards-based embedding of external application UI (HTML5). This ensures that app developers can build Web apps, and these apps can run directly inside of the EHR.
- Support the launch of external applications in the clinician's workflow (this is not limited to the EHR and should include non-EHR integrated tools such as smart phones and tablets). For example, a clinician that has opted to use a third-party-developed native iPad app to visualize a patient's BMI over time can seamlessly use the application alongside the EHR via single-sign-on.
- Support notifications to and from running applications. For example, an embedded app can notify the EHR when the user is "done" with it.

## Add-On Functionality

The provider organization may also want to consider the following additions to its RFP depending on the types of applications it wishes to develop and run in the future.



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### Bulk Data Export

- Provide automated access to bulk export of data (complete representation of all data in the MU Common Clinical data set as well as free text notes) using a method like the SMART Flat FHIR draft proposal (http://docs.smarthealthit.org/flat-fhir)

### Data Manipulation

- Write structured data from third-party apps back to the organization's EHR and, where relevant, a data warehouse, using the FHIR REST API to communicate data including:
  - medication prescriptions
  - lab and diagnostic imaging orders
- Support the dependent transactions necessary to ensure that actions completed by third-party applications using the API are valid in the EHR and data warehouse.

### Context-Specific Service Hooks

- Support the ability to call an external standards-based service in specific workflow steps, through the CDS Hooks specification, including:
  - opening a patient record
  - new prescriptions
  - new lab orders
  - new imaging studies

### Intellectual Property

The IP of any app integrated through the SMART on FHIR API belongs to the author and not the vendor.

## Custom SMART on FHIR Extension to a Proprietary API

Should a vendor neglect to provide SMART on FHIR natively, the client has the right to provide a custom extension to the vendor's API. The ownership of the IP for the custom extension is negotiable between the client and the vendor, but the ownership of the app using the custom extension belongs to its author.



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# Appendix C: Recommended RFP Interoperability Language Changes

The table below captures the recommended changes to the VA EHRM RFP.

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| **Commit to Full VA-DoD Interoperability** | | | | |
| 1 | Define specific capability performance requirement and mechanisms to hold Cerner accountable for reducing the administrative burden in clinician workflow with the objective of increasing efficiency. | The IDIQ RFP PWS Section 5.1.11 speaks to overall EHRM value and performance management monitoring, measurement and reporting. Performance metrics will be defined and enforced at the task order level, since, for example, hosting metrics will be significantly different from deployment metrics.<br><br>The RFP Section 8.6 refers to the use of Quality Assurance Surveillance Plans (QASP), which will include Functional and Non-Functional Key Performance Indicators (KPIs). The QASP will evolve as the EHRM solution and technology matures and is intended to establish Contractor accountability to what VA requires and values. | None. | Concur. |



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| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 2 | Define specifically the *span* of providers who can properly interface with VA under a proposed solution (the number of community providers who would be able to interface with VA under a solution as a function of cost to the provider). | RFP Section 5.2.1(j) states that "The EHRM solution shall support access via tablet or mobile device as adjudicated by joint governance. Platform specifics will be identified by VA at a TO level."<br><br>Section 5.10.4 states that "The Contractor is required to collaborate with VA affiliates, community partners, EHR providers, healthcare providers, and vendors to advance seamless care throughout the healthcare market." | Suggest amending the language in RFP Section 5.2.1(j) to: "Support broad access via tablet or mobile devices and pursue technology to reduce the burden to the clinicians (e.g., providing third-party provide access to information using light-weight portals and support for future generation mobile devices). Platform specifics shall be adjudicated by joint governance and incorporated by VA at a TO level." | Concur. Will negotiate with Cerner for inclusion of language. |
| 3 | Define the *degree* of interoperability the solution provides (ranging from basic file sharing to fully interchangeable, integrated and functionally identical patient records). | RFP Section 5.10.4 speaks to interoperability and provides sufficient breadth to introduce any additional information exchange requirements in the future, at the sole discretion of VA.<br><br>Requirements Traceability Matrix (RTM) VA-FR-31 discusses specifics of data management, types of data to be exchanged, and methods of communication. | Suggest adding to RFP Section 5.10.5: "m) The Contractor shall conduct an annual Interoperability Self-Assessment against standards that shall be specified by VA, such as those promulgated by HIMSS or future standards to be identified by VA." | Concur. Will negotiate with Cerner for inclusion. |



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| 4 | Pivot the RFP to be Veteran-centric and NOT system-centric. Be mindful that lessons learned are that many EHRs do not currently maximize efficient clinical workflow, so build that in (e.g., using CDS Hooks) and present information where needed with minimum "clicks to find" to reduce clinician burden. | RFP Section 5.2.1 speaks to the EHR application supporting workflows.<br><br>Section 5.5.1 Workflow development and normalization addresses configuration of workflows to meet VA requirements.<br><br>Section 5.5.7 Organizational Change Management discusses optimizing workflows for each clinical role.<br><br>Section 8.6 refers to the use of Quality Assurance Surveillance Plans (QASP) which provides active, continuous measurement against the extensive performance requirements captured in Appendices A-1 and A-2: EHRM Key Performance Indicators to ensure a Veteran-centric approach.<br><br>RTM section VA-FR-33 requires adoption, development and maintenance of metrics to assess timeliness and quality of healthcare delivery to the patient population.<br><br>The current RFP language can be clarified to specifically refer to the improvement on Veteran-centric delivery. | Suggest adding to RFP Section 5.5.1: "k) Provide an understanding of how all workflows will impact VA care coordination and management processes (e.g., incorporating community information) to improve Veteran-centric delivery."<br>Also add to Section 5.5.1: "l) Configure workflows to incorporate all community data at the discrete level in support of clinical decision support, care management, disease management. The clinical workflow within the EHR should not require users to visit additional screens to view externally sourced data."<br><br>See Item 29 for specific recommendations on CDS Hooks. | Concur. Will negotiate with Cerner for inclusion. |
| 5 | Require Cerner support end-to-end use cases with major external stakeholders involved. | RFP Section 5.2.1 speaks to the EHR application supporting workflows. The Contractor can only be held responsible for elements of the end-to-end use case that reside within their system. | Suggest adding to RFP Section 5.2.1: "Testing conducted under the Test and Evaluation Program Plan may include specific workflows to inform a demonstration of end-to-end clinical use cases involving external stakeholders." | Concur. Will negotiate with Cerner for inclusion. |



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|---|---|---|---|---|
| 6 | Develop detailed data flow requirements between Cerner and all other vendors, be specific using clinical workflow or Veteran/patient-centric use cases. | Detailed data flow requirements should not be part of the RFP as it will result in the limitation of functionality to the specific data flows specified. They will be part of the Test and Evaluation Plan (TEP), where data flows can be added or modified. However, RFP Section 5.5.1 does not indicate that the external community data and end-to-end workflows will be considered in the configuration of standard EHRM workflows. | Suggest adding to RFP Section 5.5.1: "j) The Contractor shall enable configuration of the application that supports external community data without requiring the clinician to go to special screens to see and use external data." | Concur. Will negotiate with Cerner for inclusion. |
| 7 | Specifically define the machine-data readability expectations to ensure interoperability between legacy, community care providers, and Cerner (e.g., notes fields). | RTM VA-FR-31 Requires the ability "to manage data structures that are standardized, accessible and editable." Specific requirements are to be incorporated into Task Orders, according to the structure of the contract. | See Item #34 for recommended changes to incorporate the SMART on FHIR and SMART-enabled applications.<br><br>See Item # 49 for recommended changes to incorporate sharing of the EHRM data model and to improve the amount of computable data shared with community care providers.<br><br>Suggest VA obtain a description from the Contractor that describes the current baseline of shareable data elements that are computable. | Concur. Will request information from Cerner. |
| 8 | Document the DoD-VA EHR Exchange Framework - it can serve as a starting point for the National model. | This is information that should be included as part of acquisition baseline developed by EHRM Program Management Office technical activities. | None. | Concur. |
| 9 | Require ability for bulk data export. | RFP Section 5.10.4(g) requires the Contractor to provide a software solution for multilateral standards-based ingestion, normalization, storage and exporting of Health Information Exchange acquired Veteran health information. | None. | Concur. |



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| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
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| 10 | Require "push" capability to send data back in to VA EHR / Cerner database. | RFP Section 5.10.4(g) requires the Contractor to provide a software solution for multilateral standards-based ingestion, normalization, storage and exporting of Health Information Exchange acquired Veteran health information. | None. | Concur. |



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|---|---|---|---|---|
| 11 | Require that VA drive and own the analytical algorithms and not rely on Cerner. Require that VA health organizations be involved in building the logic models with the community and the vendor. | RFP Section 5.1.5 requires the Contractor provide requirements development support but does not include who is responsible for coordinating the community input on the logic models.<br><br>RFP Section 5.1.7 requires the Contractor support data management but does not state that VA shall provide the analytical algorithms.<br><br>RFP Section 5.5.1(e) requires the Contractor support robust semantic modeling for the information associated with the workflows Further detail to achieve this recommendation is also detailed in the Functional Requirement documentation, specifically VA-FR-31. VA should lead and own the analytical algorithms as it is in the best interest of the health community. By owning the algorithms, VA will take the lead on coordinating the effort, but the Contractor will actually develop the algorithms. | Suggest adding to RFP Section 5.1.5: "While the Contractor shall provide such support, VA reserves the right to take the lead on coordinating input from the user and provider communities. VA may, at its discretion, incorporate analytics from other entities, and include them in its future Digital Veterans Platform, with which the EHR must be fully compatible and interoperable."<br><br>Suggest adding to RFP Section 5.1.7(b): "based on community and VA coordinated analytic algorithms."<br><br>Suggest adding to RFP Section 5.5.1(e): "VA and its agents shall have unlimited rights to all resulting models and algorithms."<br><br>Suggest adding to RFP Section 5.5.1(f): “which modeling shall be based on analytical algorithms and data models (1) developed by the Contractor, (2) co-developed by the Contractor in coordination with VA health organizations and the community, (3) developed by VA health organizations, or (4) provided by third-party developers. VA and its agents shall have unlimited rights to all algorithms and logic models incorporated in the EHRM solution, and intellectual property rights will be handled in accordance with § H.2 of the Contract “VA EHRM IP License Agreement” on a Task Order basis.” | Concur. Will negotiate with Cerner for inclusion. |



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| 12 | Enhance the data quality management requirements to ensure Cerner is responsible for maintaining and resolving data quality issues. | RFP Section 5.1.8 Requires the Contractor to be responsible for data migration, but RFP Section 5.1.7 does not include a requirement for the Contractor to manage data quality internal to its systems. | Suggest adding to RFP Section 5.1.7: "j) Maintain backward compatibility of the EHRM solution in such way as to maintain the quality of the data, to ensure that, once captured, the Government has access to and computational use of the data regardless of the evolution of the EHRM or age of the data k) Identify data quality issues found in data sourced from systems beyond its operational remit, applying the same validations and quality standards to incoming external data that it performs for data originated natively within the EHRM solution. Where the principle of seamless care requires that EHRM accept data that does not meet its internal data quality standards, Contractor shall implement the solution so that any incoming data that does not meet EHRM data quality standards be clearly flagged as such and provide both process and user interface to allow incorrect or missing data to be remedied if possible." | Concur. |
| 13 | Define the common identity and access management approach Cerner and others will adopt (e.g., using the Vets.gov identity as the coordinating identity). | RFP Section 5.5.2 describes the required approach to identity and access management across population types and roles. DoD/VA are aligning their efforts to address this going forward. | None. | Concur. |
| 14 | Adopt the DoD approach to data and system security. | RFP Section 5.4: Information System Authorization, Testing and Continuous Monitoring describes the security approach for the shared DoD/VA authorization boundary. Joint DoD/VA Strategy will be executed. | None. | Concur. |



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| 15 | Share the VA's security approach to medical and endpoint security with DoD for opportunity to leverage and harmonize. | RFP Section 5.4: Information System Authorization, Testing and Continuous Monitoring describes the security approach for the shared DoD/VA authorization boundary. Joint DoD/VA Strategy will be executed. | None. | Concur. |
| 16 | Require Cerner to make the VA data model, standards, and other similar interoperability changes available in all other non-VA Cerner instances of its EHR platform. | RFP Section 5.10.4.1 requires opportunity for agreed upon Contractor proprietary information/data model extension points (e.g., ingestion and record APIs) to be provided to both international and national standards designating organizations, however, this does not include providing the capability to other Cerner users, which would extend Cerner interoperability across the community. | Suggest adding to RFP Section 5.10.4.1: "The Contractor shall provide VA access and usage rights into any underlying proprietary terminology/code systems for the purpose of enhancing national standards to address any gaps identified in the EHRM solution. The Contractor shall also make the interoperability capabilities and product enhancements developed under this contract available to non-VA Cerner clients." | Concur. Will negotiate with Cerner for inclusion of language. |
| 17 | Clearly define “enabling security framework.” Does this mean a specific security framework such as NIST, HITRUST, etc. | VA Requirements Traceability Matrix Non-Functional requirements provides the security requirements to include Access Management, Identity Management, and Information Assurance/Security. RFP Sections 5.4 Information System Authorization, Testing and Continuous Monitoring and 5.5.2 Identity and Access Management provide additional clarification on the security requirements. | None. | Concur. |



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| | | **Leverage Current and Future Standards** | | |
| 18 | Specifically describe what and how you can read, write, and reconcile re: health data. | Requirement VA-FR-31 describes data management requirements: standardized data and coding terminology systems; use of government endorsed messaging and content standards for interoperability; management of data elements from various entry points etc. The current requirement does not provide understanding of which data elements are being exchanged and the degree of interoperability/ computability supported. | Suggest adding to RFP 5.10.4(m): "The annual assessment will report on the state of each data element (e.g., which are supported in what capacities and in which formats). This will help assure standards implementation consistency and assure standards compliance with evolving national standards." | Concur. Will negotiate with Cerner for inclusion of language. |
| 19 | Define who has what rights from a data sharing perspective, impacting APIs (e.g., VA owns the data + all data products vs. Community care provider owns their treatment info on patient vs. patient owns all their own data.) | Requirement VA-FR-31 and RFP Section 5.1.7 describe data management requirements (including syndication).<br><br>Section 5.5.4 requires "all, significant data stored in the software is accessible through API's" however clarification is needed to ensure access to all data originating from alternate VA-designated authoritative sources. | Suggest adding to RFP 5.5.4: "l) Provide standards-based API access (e.g., FHIR) to all patient data from the VA-designated authoritative data sources for the patient's record within the Contractor's product suite." | Concur. Will negotiate with Cerner for inclusion of language. |
| 20 | Identify the authoritative source for the various elements of a Veteran's health record. | RFP Section 5.1.4 requires the Contractor to provide support in the development and/or evaluation of new Standards, Policy Directives, Operating Procedures, Processes, etc.<br><br>Broader recommendation beyond the scope of the EHRM RFP is for VA to define the authoritative source policy for all VA data. This is not an EHRM specific policy and should be issued by VACO or VHA. | Suggest adding to RFP 5.5.4: "j) assist VA in defining and establishing the authoritative data sources associated with each data element in the EHR (e.g., where it is available and who has access to the information)." | Concur with the language for 5.5.4. |



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| 21 | Increase the VA presence and leadership role in standards-making bodies (e.g., Argonaut). | Increasing VA presence and leadership roles in standards-making bodies is an entirely separate recommendation that is not related to the IDIQ. | None. | Concur. |
| 22 | Include requirement for Cerner to support VA as an advocate to VA position on all relevant standards-making bodies. | RFP Section 5.1.4 requires Contractor support in the development and/or evaluation of new standards, policy directives, operating procedures, processes and/or assessments on their impacts when implemented. | None. | Concur. |
| 23 | Require Cerner to implement all standards as defined by VA. | Requirements Traceability Matrix VA-NJ-177 defines interoperability data standards and specifically cites support of the health data standards identified in the VA-DoD Health Information Technical Standards Profile and by the VA-DoD Interagency Clinical Informatics board. | None. | Concur. |
| 24 | Clarify the intended reference in the phrase “national Common Trust Framework.” Does this refer to the Trusted Exchange Framework and Common Agreement (TEFCA) specified in the 21st Century Cures Act? | RFP Section 5.10.4(h) refers imprecisely to the "national Common Trust Framework." | Suggest replacing the phrase in RFP Section 5.10.4 h) "national Common Trust Framework" with “Trusted Exchange Framework and Common Agreement (TEFCA).” | Concur. Will negotiate with Cerner for inclusion of language. |
| 25 | Clarify if the “provider collaboration via secure e-mail using Direct standards” is limited to the Direct protocols and just the Cerner platform. | RFP Section 5.10.4(i) requires the Contractor, by IOC, to "provide a capability for provider collaboration via secure e-mail using Direct standards within a Cerner Millennium EHR workflow context." | Suggest adding to RFP Section 5.10.4(i): "the ONC Direct protocol or future VA-designated standard." | Concur. Will negotiate with Cerner for inclusion of language. |



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| | | **Commit to Open, Standards-Based APIs** | | |
| 26 | Be specific about the VA publishing / access service requirements. | RFP Section 5.5.4 includes requirements that all significant data stored in the software is accessible through API's with no requirement for creation of custom applications to specifically access VA data. RTM VA-NF-7 requires the system to support the ability to access data elements using open standard-based interfaces including legacy data. Clarification is needed to ensure the intention to pursue standards-based APIs. | Suggest adding to RFP Section 5.5.4 – "standards-based" in front of APIs. | Concur. Will negotiate with Cerner for inclusion of language. |
| 27 | Define in the contract the VA publishing / access services specifically for (1) Veteran access services (e.g., vets.gov), (2) VA clinician access services, (3) Partner access services, and (4) HIE access service. | RFP Section 5.5.2 describes identity and access management requirements including user population types and the association of specific application permissions tied to roles/positions. RTM VA-NF-6 through 48 describe specific access services required. | None. | Concur. |
| 28 | Ensure external API developers can host their apps on an app platform that is NOT controlled by Cerner (and therefore does not require Cerner licensing and approval). | RFP Section 5.1.8(d) requires the contractor analyze and propose a way forward for the capability for external apps to use HealtheIntent as a data source.<br><br>Section 5.5.4 requires the contractor to support data exchanges via the API gateway.<br><br>Section 5.10.4.2 requires the contractor to work in good faith to integrate the EHRM with the Digital Veterans Platform API gateway. | Suggest replacing the second sentence in 5.10.4.2: "The Contractor shall integrate the EHRM to interoperate with DVP or future state VA platform." | Concur. Will negotiate with Cerner for inclusion of language. |



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| 29 | Include requirement for Cerner to provide CDS Hooks to support open clinician workflow. | RFP Section 5.8 requires the contractor provision robust data analysis toolsets that allow, among other things, analytics and Clinical Decision Support (CDS).<br><br>VA-NF-T26 requires "integration with Cerner via standards-based interfaces (including but not necessarily limited to support for FHIR APIs and/or OMG CDS API/ HL7 CDS APIs (e.g., CDS Hooks)". | None. | Concur. |
| 30 | Specify the required utility services to support intermediary or peer-to-peer services; e.g., support Veteran-directed or Veteran-mediated request, exchange, and ingestion from non-VA providers (via APIs where available). | RFP Section 5.10.4(c) requires "the Contractor shall provide a software solution enabling VA to release and consume, via on-demand access, a Veteran's complete longitudinal health record to and from DoD and connected community partners. The longitudinal record solution shall support Provider-to-Provider record sharing, as well as Provider-Veteran-Provider sharing (Veteran mediated record sharing), including appropriate consent management." | Suggest adding ", regardless of which EHR they use" after "connected community partners…to and from DoD and connected community partners, regardless of which EHR they use." | Concur. Will negotiate with Cerner for inclusion of language. |
| 31 | Require that VA has full authority to connect any VA-approved, secure third-party app with the Cerner system, without Cerner approval. | RFP Section 5.7.1 requires the contractor provide on-site integration for devices connecting to the Contractor system.<br>VA is fully responsible for the security of its systems and protection of its data. | Suggest adding to 5.7.1b: "including via the Digital Veterans Platform…support for VA-approved third-party apps connecting to the Contractor system, including via the Digital Veterans Platform."<br><br>Suggest adding to 5.7.1 – "g) Permit and approve connecting all VA approved secure apps without additional fees or licensing." | Concur. Will negotiate with Cerner for inclusion of language. |



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| 32 | Ensure the API developers retain their IP rights when their API is used to connect to the Cerner interface. | RFP Section 5.5.4 sets forth requirements with respect to APIs, including paragraph (e), which provides for the provision and maintenance of a Developer Portal.<br><br>Section 5.10 generally promotes innovation while 5.10.4.2 requires the Contractor to support the Digital Veterans Platform (DVP) API gateway which is intended to provide a neutral application platform for third party APIs.<br><br>Additional language is required to promote innovation in the creation of third party applications by removing derivative or cascading intellectual property restrictions/ constraints. | Suggest adding to RFP 5.5.4(e): " and provide policies and procedures for the use of the Developer Portal(s) and APIs that promote innovative third-party API development" and "Third party API developers shall retain their IP rights when their API is used to connect to the Cerner interface, and there will be no derivative IP ownership when third parties consume Cerner terminology through open APIs." | Concur. Will negotiate with Cerner for inclusion of language. |
| 33 | Require the ability for 3rd party apps to remain connected to the Cerner system and receive automatic notification on updates (e.g., vaccination). Allow the app to connect without being cut off in accordance with VA security requirements. | RFP Section 5.7.1 requires the contractor provide on-site integration for devices connecting to the Contractor system. | Suggest adding to RFP Section 5.7.1(b): "support for third-party apps connecting to the Contractor system."<br><br>Suggest adding the following new paragraphs (ii) and (iii) to RFP Section 5.7.1(b): "ii. Provide ability for third-party apps to remain connected to the Contractor system in accordance with VA security requirements and receive automatic notification on updates; and iii. Allow the app to remain connected without interruption lasting longer than a certain period of time to be approved by the Government." | Concur. Will negotiate with Cerner for inclusion of language. |



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|---|---|---|---|---|
| 34 | Incorporate the model RFP language necessary for Cerner to support the API and SMART on FHIR platform and SMART-enabled applications. | RFP Section 5.10.4 and the Requirements Traceability Matrix refer to SMART and FHIR based applications but do not incorporate all elements of the suggested functionality such as the support for standards-based embedding of external application UI (HTML5). | Suggest adding to RFP Section 5.10.4: "In addition, the software and services shall support the VA designated standards, such as SMART on FHIR and SMART-enabled applications, or published standard at the time." | Concur. Will negotiate with Cerner for inclusion of language. |
| **Use Community Care Contracts to Foster Interoperability** | | | | |
| 35 | Before the contract is signed, get Care Act providers and Cerner competitors to commit to support the contract as early adopters. | Pre-contractual activity and pertains to future strategic discussions to drive interoperability in the marketplace. | None. | Concur. |
| 36 | Require publication of the EHRM /Cerner clinical data model in the National Library of Medicine (following the Kaiser example). | RFP Section 5.10.4.1 states: In support of the interoperability objectives under this Section, agreed upon Contractor proprietary information/data model extension points (e.g., ingestion and record APIs) may be provided to both international and national standards designating organizations as described and set forth in an applicable Task Order. | None. | Concur. |
| 37 | Require the Veteran to be able to invoke their right of access to data as the intermediary to support data exchange (e.g., pull through their API on phone and push to their community care provider). | RFP Section 5.7.1 requires support to Veterans ensuring they can effectively navigate the HealtheLife patient portal and Wellness programs to effectively manage their health. | Suggest adding to RFP Section 5.7.1(c): “using mobile apps, thin-client and thick-client solutions" and “Veterans shall be able to enable sharing of their health data with their community care providers in accordance with all VA-designated national standards." | Concur. Will negotiate with Cerner for inclusion of language. |



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|---|---|---|---|---|
| 38 | Require Cerner and the Community Care provider applications provide bi-directional health information in exchange for using the VA-provided API gateway. | RFP Sections 5.10.1, .2, and .3 require support for innovation and other development activities.<br><br>Section 5.10.4(c) requires "a software solution enabling VA to release and consume, via on-demand access, a Veteran's complete longitudinal health record to and from DoD and connected community partners."<br><br>VA-NF-61, -63, and -65 requires bi-directional interface in support of Pharmacy. This requirement can be fulfilled by a flat file and does not require the data to be computable. | Suggest adding to RFP Section 5.10.4(c): "The bi-directional health information exchange shall maximize use of discrete data that supports context-driven clinical decisions and informatics." | Concur. Will negotiate with Cerner for inclusion of language. |
| 39 | Shift VA policy enabled by the Choice Care Act from "Opt-In" to "Opt-Out" such that the starting assumption is that data can be shared unless the Veteran "opts out." | Review and revise VA policy. | None. | Concur. |
| | | **Other** | | |
| 40 | Analyze and understand the operational cost to VA to implement and operate under the proposed solution. | Analysis of cost information is not part of a IDIQ contract. It will be done as part of the standard PMO processes. | None. | Concur. |



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| 41 | Incorporate requirement that subsequent updates and improvements to the Cerner solution is part of the baseline contract (and cost). | RFP Section 5.2.3 Software Maintenance requires: The Contractor shall provide its commercial support and maintenance services described in its End User License Agreement. Leveraging Contractor's best practices and agreed upon upgrade schedule between DoD and VA, software maintenance includes all releases of the software such as major releases, minor releases, maintenance releases. | None. | Concur. |
| 42 | Address the differences between federal and state privacy laws - policy that Federal laws take precedence over state laws. | Federal and state privacy laws can only be addressed through legislation. | None. | Concur. |
| 43 | Ensure VA has no gag order: Require Cerner to allow open, public sharing/reporting (e.g., screen shots) on issues or errors with the EHR solution (e.g., if there is a known anomaly, that anomaly and its work-around is shared with the Cerner user community). | RFP Section 5.3.3 - System Quality and Performance Measures and Monitoring is appropriate to capture this requirement.<br><br>There is no explicit contractual language requiring the contractor to disclose issues or efforts, nor is there language explicitly preserving the right of VA to share such information. | Suggest adding to RFP Section 5.3.3: "Contractor is responsible for reporting all issues or errors associated with the EHR solution and acknowledges and agrees that errors shall not be considered confidential, proprietary or trade secrets, and accordingly, shall be releasable to VA or its agents. VA retains the right to share any issue, error or resolution approach." | Concur. Will negotiate with Cerner for inclusion of language. |
| 44 | Define the way ahead for 3rd party apps (sunset, rebuild and transition) during the Cerner transition. | This should be evaluated in congruence with the legacy transition plans (pivot plans) of existing systems to Cerner. | None. | Concur. |
| 45 | Emphasize the need and resource commitment to achieve clinician consensus, change management, and culture. | RFP Section 5.5.7 Organizational Change Management includes a detailed approach to clinician consensus, change management and culture change. | None. | Concur. |



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| 46 | Develop a roadmap for all EHR vendors that specifies how Veterans and providers access and share their data and get that data from A to B. This is not limited to the Cerner solution, but includes legacy and community care systems. | These tasks are not part of the IDIQ and will be addressed via Data Migration Plan and Data Management Strategy across VA. | None. | Concur. |
| 47 | Require ability for VA to innovate using the Cerner solution, including support to a Veteran Interoperability Partnership Lab. | RFP Section 5.10: Innovation and Enhancements includes an innovation process, categories and development activities to enable VA innovation activities using the Cerner solution. The language is sufficiently broad to support issuance of a Task Order requiring the Contractor to support interoperability activities including a Veteran Interoperability Partnership Lab.<br><br>MITRE recommends this lab be independently managed and used to support 3rd party innovators, demonstrate interoperability solutions, validate the effectiveness of interoperability solutions in an end-to-end clinical use case context, and serve as a reference architecture to allow 3rd party stakeholders to exercise innovations. | None. | Concur. |



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|---|---|---|---|---|
| 48 | Understand how Cerner will manage data quality, including provenance, error bounds, data looping, security, etc. | The RFP Section 8.6 refers to the use of Quality Assurance Surveillance Plans (QASP), which is intended to establish Contractor accountability to what VA requires and values.<br><br>VA-NF-T46 requires "The system shall support provenance (chain of custody or ownership) and pedigree (processing history how the data was produced or incorporated) and enable identification, collection, and production of data according to source, custody and ownership and display of data in business, logical, legal or physical models." | None. | Concur. |



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|---|---|---|---|---|
| 49 | Understand how Cerner will provide VA with access to the data model, share data for analytics freely to 3rd parties, increase the amount of computable data exchanged with 3rd parties.<br><br>Panelists acknowledged this recommendation is a stretch goal. | RFP Section 5.8 address the support to business intelligence and data analytics. Section 5.10.4.1 supports the sharing of Contractor proprietary information/data model extension points (e.g., ingestion and record APIs) with both international and national standards designating organizations. However, current language does not require access to the EHRM data model, supporting understanding of and therefore increase the exchange of computable data with community care providers. | Suggest adding to RFP Section 5.8: "h) Provide VA EHRM data model, underpinning terminology model, tables, definitions, and examples of fully populated Veteran data files. Provide documentation or software that is used for quality checks and that illustrate what data elements are computable."<br><br>Suggest adding to Section 5.10.4.1: "n) The Contractor shall support Knowledge Interoperability by supporting the extension of clinical content assets such as terminologies, clinical decision support rules, order sets, etc. This includes the ability to curate, extend, and share that knowledge with clinical partners. This fosters rapid adoption from industry best practices, e.g., clinical professional societies."<br><br>Suggest VA obtain a price from the Contractor to provide a report explain the steps involved in accessing the data model, including producing an example data file, and demonstrating how much of the data is computable; provide cost estimates for outside parties to access the data via this mechanism. | Concur. |



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|---|---|---|---|---|
| 50 | Understand how the Cerner EHRM solution will improve Veteran and clinician experiences. | RFP Section 5.2.1 describes the EHR application, however does not specifically focus priorities on the Veteran and clinician experience as captured in end-to-end use cases.<br><br>Section 8.6 refers to the Quality Assurance Surveillance Plans, which include Functional and Non-Functional Key Performance Indicators (KPIs). These KPIs will reflect VA priorities which include improvement of both Veteran and clinician experiences. | Suggest adding to RFP Section 5.2.1.1: "k) Provide for the ability to measure the EHRM performance that contributes to any end-to-end use case, thereby capturing its impact on improving a Veteran and clinician experience." | Concur. |



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# Appendix D: Acronyms

| | |
|---|---|
| API | Application Programming Interface |
| CCHIE | ClinicalConnect Health Information Exchange |
| CDS | Clinical Decision Service |
| DoD | Department of Defense |
| EHR | Electronic Health Record |
| EHRM | Electronic Health Record Modernization |
| FHIR | Fast Healthcare Interoperability Resources |
| HIE | Health Information Exchange |
| HL7 | Health Level Seven International |
| IP | Intellectual Property |
| IT | Information Technology |
| PWS | Performance Work Statement |
| RFP | Request for Proposal |
| UPMC | University of Pittsburgh Medical Center |
| VA | Department of Veterans Affairs |
| VACO | VA Central Office |
| VHA | Veterans Health Administration |



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Document ID: 0.7.1705.733884

From: Aneesh Chopra <(b)(6) @carejourney.com>

To: Wine, Marc </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=8012b5920e724c69ad72fa487cfa6de5-wine, marc>

Cc: Tibbits, Paul A. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=8c2525e5054a458e9733c5cf6bdec39e-tibbits, pa>; Sartin, Shannon (CMS/OA) <(b)(6) @cms.hhs.gov>; Mugge, Alexandra M. (CMS/CCSQ) (b)(6) @cms.hhs.gov>; Soundararajan, Jude (b)(6) @ssa.gov>; Worthington, Charles </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=6fb5eda5c4a44f54940b391f352ab1f4-worthington>; Sandoval, Camilo J. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=91cab99711134d5898a778ab468532fc-sandoval, c>; James, Bill </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=d9952c1b903a4b068dc516d4db7466d4-james, bill>; (b)(6) @ssa.gov <(b)(6) @ssa.gov>

Bcc:

Subject: [EXTERNAL] Re: Meeting between Dr. Tibbits and Aneesh Chopra to discuss open API pledge

Date: Sun Nov 04 2018 15:17:46 EST

Attachments: VA EHRM Interoperability-Mitre- Report Jan 2018 _Redacted_FINAL.pdf

---

Marc, thanks for the summary!

Paul - it was terrific seeing you again, and thanks for hosting all of us! Here's my summary, if useful:

1) "FHIR-first" policy: I'll defer to Shannon/Alex but there is likely more information to come from CMS on how it intends to leverage open APIs to communicate with the care delivery system, and to regulate where appropriate. My suggestion was to establish a policy similar to our "cloud-first" approach back in 2010 whereby all the various sub-departments within the VA know that when starting a new interop project, or investing more in an existing one, that it pursue an "API-first" evaluation to gauge feasibility before relying on whatever legacy method is under way.

This is the direction of 21st Century Cures, and will likely be the focus of the forthcoming ONC information blocking rules. We know that existing API rules are working with respect to Apple Health's experience. They have published a list of every site where they have established a FHIR-based connection (https://support.apple.com/en-us/HT208647), which means any consumer app can follow without additional burden. As you likely know, Apple pays NOTHING to connect to these sites; the health systems pay NOTHING to connect with Apple (presuming they have "turned on" the 2015 CEHRT edition as required to meet CMS/ONC rules); and the consumer, of course, pays NOTHING to authorize the transmission.

The FHIR Argonaut Project technical specifications allow physician access, but are NOT required in regulation (as of now). The "bulk access" specifications are ready for testing (ONC has funded a project with Boston Children's - https://www.hhs.gov/about/news/2018/09/26/hhs-announces-leap-health-it-

winner.html).

2) Execute the Cerner Contract's Open Data Model Provisions: Now that the MITRE report is public, you can see all of the recommendations re: accelerating API standards development (attached). But key provisions that are in the contract have NOT been executed, including:
-publishing Cerner's data model in the NIH/national library of medicine (as Kaiser did with CMT - https://www.nlm.nih.gov/research/umls/cmt/cmt_faq.html)
-engaging the Open API Pledge partners in prioritizing use cases for standards development/acceleration.
-articulating how Cerner intends to make the work it is doing for the VA available to non-VA Cerner clients to lower the costs of future standards adoption/use.

3) Start building SMART Apps: presuming you can adopt/scale up your "Digital Veteran API Gateway" de-coupled from the timeline of the Cerner implementation, then you can do any of the following we discussed:
-Train VA employees for FHIR certification (here's the online course that started last week - http://www.hl7.org/events/fhir_fun.cfm)
-leverage the "micro-purchasing" framework to FHIR-enable popular VISTA apps like the JLV (https://doi.org/10.1007/s11606-018-4708-z), or CART-CL (https://www.hsrd.research.va.gov/for_managers/stories/cart-cl.cfm)
-Direct Leidos/Epic to open up the Scheduling API consistent with the Argonaut Specs so third party apps can build tools to help veterans access community care (https://open.epic.com/Scheduling/FHIR); and in return, API pledgees like Trinity might reciprocate in the Columbus, OH market.

I look forward to our discussion in a couple of weeks!

Regards,
Aneesh Chopra
President
(703) 672-1315 | CareJourney.com

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On Fri, Nov 2, 2018 at 12:12 PM Wine, Marc <Marc.Wine@va.gov> wrote:

Aneesh, Jude, Drew, Alexandra, Shannon, Paul and Bill;

~ A note to say thank you for yesterday's talks on Open API approach with our office.

"The API pledge encourages health-care providers to commit to work collaboratively with VA to increase the mapping pace of health data to industry standards, including the current and future versions of Fast Healthcare Interoperability Resources (FHIR)."

---

Sharing some highlight points or ideas from discussion, more ahead; plus, feel free to add, comment, further guidance or input.

*VA is Argonaut Project participant. VA Argonaut Project participant.

http://www.hl7.org/documentcenter/public_temp_51339323-1C23-BA17-0C8BC8A7320A4529/wg/argonaut/Argonaut%20Project%20Charter-12%20Dec%202014-v3.pdf

*VA can encourage standards development.

The purpose of the Argonaut Project is to rapidly develop a first-generation FHIR-based API and Core Data Services specification to enable expanded information sharing for electronic health records and other health information technology based on Internet standards and architectural patterns and styles.

*API standards, priority use case with SMART FHIR Vet Suicide Use Case.
*Open API for suicide information can be shared across healthcare in community.
*VA needs to finish the data model, start with a baseline data model.
*Place data model within Library of Medicine repository as open availability.
*VA can encourage standards development.
*API standards, priority use case with SMART FHIR Vet Suicide Use Case.
*Open API for suicide information can be shared across healthcare in community.
*VA needs to finish the data model, start with a baseline data model.
*Place data model within Library of Medicine repository as open availability.
*SSA wants to ensure ongoing sharing clinical data for SSA claims disability determination.
*FHIR Online Scheduling is online on Columbus, Ohio. FHIR questionnaire, online scheduling, Vets shared patient care, VA should adopt FHIR provider directory.
*VA DOD JVL interface cold be provided through app environment.
*Cloud available semantic interoperability tools well available healthcare arena.
*VistA functions easily convertible to FHIR Open Apps platforms. Several Apps could be built from VistA, was mentioned physicians in the private sector Like VistA; suggested train VA programmers who have MUMPS skills, to transform programming, changing EHRM environment.

Again, many thanks.

-----Original Appointment-----
From: Tibbits, Paul A.
Sent: Monday, October 22, 2018 9:41 AM

To: Tibbits, Paul A.; Aneesh Chopra; Wine, Marc; Sartin, Shannon (CMS/OA); Mugge, Alexandra M. (CMS/CCSO); Soundararajan, Jude
Cc: (b)(6) @navhealth.com; Myklegard, Drew; Worthington, Charles; Sandoval, Camilo J.; James, Bill; Luther, Suzanne
Subject: Meeting between Dr. Tibbits and Aneesh Chopra to discuss open API pledge
When: Thursday, November 01, 2018 12:00 PM-1:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: VACO Room 350, 810 Vermont Avenue, NW, Washington, DC 20420

When you get to the building and check in with security, tell them that you are here to see me, Jonathan McBride. They will call me to come and pick you up. 202-461-4419. thanks! JMcB

.....

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(b)(6)

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English (United States)

English (United States)

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Conference ID: (b)(6) (same as access code above)

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PLEASE NOTE WE HAVE NEW PHONE NUMBERS You might want to make your attendees aware of the change.

[!OC([1033])!]

.....

Jonathan McBride

EHRM for Integration

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| Document ID: 0.7.1705.733884-000001 | |
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| Owner: | Aneesh Chopra (b)(6) @carejourney.com> |
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| Last Modified: | Sun Nov 04 14:17:46 CST 2018 |

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# Department of Veterans Affairs Electronic Health Modernization

# Request for Proposal Interoperability Review Report

Authors: Jay J. Schnitzer, M.D., Ph.D.
(b)(6)

MITRE

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**Document Number: MTR180033**
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**McLean, VA**
**January 2018**

**Sponsor:**
Department of Veterans Affairs

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# VA EHRM RFP Interoperability Review Report

January 31, 2018

MITRE

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# Executive Summary

This Review Report presents responses to three requests from the Department of Veterans Affairs (VA) to MITRE related to the topic of interoperability within the VA Electronic Health Record Modernization Request for Proposal:

I. Conduct an external Interoperability Review Panel to review the interoperability language in the existing Request for Proposal (RFP),

II. Engage an independent and unbiased legal expert to identify the specific changes to the RFP language necessary to implement the recommendations from the Interoperability Review Panel, and

III. Visit the University of Pittsburgh Medical Center to understand the existing operational multi-vendor solution and interoperability solutions for applicability and scalability to the VA.

## I. Interoperability Review Panel

In support of the Secretary of Veterans Affairs, David J. Shulkin, M.D., The MITRE Corporation convened and hosted a VA Electronic Health Record Modernization (EHRM) Request for Proposal (RFP) Interoperability Review Panel on January 5, 2018, at MITRE's McLean headquarters. The invited external senior electronic health record (EHR) interoperability subject matter experts (the Panel) reviewed the interoperability language in the existing RFP and developed joint suggestions and recommendations for VA to consider for incorporation to support the successful execution of a new commercial EHR contract with industry. The Panel affirmed that the primary goal should be seamless Veteran-centric healthcare achieved through true EHR interoperability. Achieving this goal rests on three overarching principles that should be supported by interoperability language in the RFP: 1) free and open access to data, 2) an ecosystem that provides fair access to third parties by creating a level playing field, and 3) a seamless Veteran and health provider (clinician) experience. Four categories of recommendations from the Panel (the first three to the interoperability language in the RFP, and the fourth for future VA contracts) will enable VA to realize this goal on the basis of the underlying principles: 1) commit to full VA-Department of Defense (DoD) interoperability, 2) leverage current and future standards, 3) commit to open, standards-based application programming interfaces (APIs), and 4) use Care in the Community contracts to foster interoperability.

For the first category (commit to full VA-DoD interoperability), the Panel agreed that the Determination and Findings signed by Secretary Shulkin on June 1, 2017, represented the correct approach to interoperability within VA and between VA and DoD. The Panel strongly endorsed the proposed VA "API Gateway" language. The most important specific recommendations included:

- Define the degree of interoperability the solution will provide, ranging from basic file sharing to fully interchangeable, integrated and functionally identical patient records.



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Suggest that the Contractor conduct an annual Interoperability Self-Assessment against current and future standards that shall be specified by the VA; and

- The contract language should include the following elements:
  - performance measures to hold Cerner accountable for reducing the administrative burden in clinician workflow with the objective of increasing efficiency,
  - ability for bulk data export based on standards, with no proprietary formats (e.g., Flat FHIR [Fast Healthcare Interoperability Resources]), and
  - "push" capability to insert patient data back into the VA EHR / Cerner database.

For the second category (leverage current and future standards), the following specific recommendations were among the most important:

- Require that Cerner implement all standards as defined by VA, current and future,
- Engage Cerner as an advocate of the VA and DoD position in all relevant standards-making bodies, and
- Ensure that VA and Veterans have complete access to data.

For the third category (commit to open, standards-based APIs), the Panel voiced the following recommendations:

- Establish clear publishing and access service requirements,
- Provide a VA application platform that supports APIs from third party providers with no barrier to entry, and
- Require implementation of clinical decision support (CDS) Hooks to invoke decision support from within a clinician's EHR workflow.

The body of this report contains multiple additional specific recommendations.

## II. Recommendations for RFP Changes

MITRE engaged Morrison & Foerster, LLP as the independent and unbiased legal expert to identify the specific changes to the RFP language necessary to implement the recommendations from the Interoperability Review Panel. Appendix C presents all recommended changes to the RFP.

## III. Observations from University of Pittsburgh Medical Center Site Visit

A delegation from VA and MITRE traveled to Pittsburgh, Pennsylvania, on January 19, 2018, for a meeting with representatives from University of Pittsburgh Medical Center (UPMC) Enterprises to discuss aspects of EHR interoperability that UPMC has successfully implemented over the past several years. The report includes an overview of those practices.

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## IV. Closing Thoughts and Suggested Next Steps

The Panelists noted that VA cannot achieve true future EHR interoperability through the Cerner RFP alone, or through technology alone. The state of practice today shares only a small portion of available patient data. For VA to succeed in the future, multiple other components must be present and aligned: innovation, policy, standards, customer buy-in, and legislation, to name a few.

The following next steps are recommended for VA consideration:

1. Complete the RFP revisions, conduct appropriate negotiations with the Contractor expeditiously, and complete the contract process as planned. Stand firm during negotiations to maximize ease of access to data and data models for building third party APIs, applications, and services for future community innovations.
2. Continue to work with other federal government agencies and departments with similar interoperability interests and concerns, including, but not limited to, the White House, DoD, Food and Drug Administration (FDA), Centers for Medicare and Medicaid Services (CMS), Office of the National Coordinator for Health Information Technology (ONC), and other parts of the Department of Health and Human Services, to align approaches to EHR interoperability and the development and support of standards government-wide.
3. Support future innovation approaches, including concepts such as an Interoperability Laboratory and outreach to the broader innovation ecosystem (major medical centers, academia, traditional and non-traditional healthcare providers, startups, individual entrepreneurs, others). It is critical to align the innovations planned in VA's Digital Veterans Platform to the VA EHR innovation efforts to ensure consistent continuous improvements to clinician and Veteran health experiences.
4. Create an External Review Panel to provide expert continuous guidance, review, and feedback over the course of the implementation, to help capture best practices from the expert community going forward. Conduct ongoing demonstrations of end-to-end Veteran use cases requiring data sharing across organizational boundaries to validate improvements in Veteran healthcare and reduction of burden for healthcare providers. VA and Contractor will ensure that Federal Advisory Committee Act (FACA) guidelines are followed in leveraging any external review panels.



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# Table of Contents

Background....1
I. Interoperability Review Panel....2
Introduction....2
Goal....2
Methodology/Approach....2
Topic Area: VA Definition of Interoperability....3
Topic Area: Commit to Full VA-DoD Interoperability....4
Topic Area: Leverage Current and Future Standards....6
Topic Area: Commit to Open, Standards-Based APIs....7
Topic Area: Use Community Care Contracts to Foster Interoperability....9
Topic Area: Additional Contract Changes....11
II. Recommendations for RFP Changes....12
III. Observations from University of Pennsylvania Medical Center Site Visit....13
IV. Closing Thoughts and Suggested Next Steps....16
Appendix A: Interoperability Review Forum Participants....17
Appendix B: RFP Language for Purchasing Extensible Health IT....19
Appendix C: Recommended RFP Interoperability Language Changes....22
Appendix D: Acronyms....42



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## Background

The Department of Veterans Affairs (VA) plans to establish seamless care for Veterans throughout the health care provider market. Seamless care requires interoperability between the Department of Defense (DoD), VA, VA affiliates, community partners, electronic health record (EHR) providers, healthcare providers, and vendors. VA directed The MITRE Corporation to independently review the capability of Cerner's proposed EHR solution to seamlessly transmit health records between EHR systems supporting healthcare providers who both use and contribute patient data to a Veteran's health record, to include Veterans Choice Program (VCP) community-care service providers and VA affiliates. This Review Report presents responses to three requests:

I. Conduct an external Interoperability Review Panel to review the interoperability language in the existing Request for Proposal (RFP),

II. Engage an independent and unbiased legal expert to identify the specific changes to the RFP language necessary to implement the recommendations from the Interoperability Review Panel, and

III. Visit the University of Pittsburgh Medical Center to understand the existing operational multi-vendor solution and interoperability solutions for applicability and scalability to VA.



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# I. Interoperability Review Panel

## Introduction

In support of the Secretary of Veterans Affairs, David J. Shulkin, M.D., MITRE convened and hosted a VA Electronic Health Record Modernization (EHRM) Request for Proposal (RFP) Interoperability Review Panel on January 5, 2018, at MITRE's McLean, VA headquarters. MITRE invited external senior EHR interoperability subject matter experts (hereafter referred to as Panelists) to review the interoperability language in the existing RFP and to develop joint suggestions and recommendations for VA to consider incorporating into the RFP to support the successful execution of a new commercial EHR contract with industry. Eleven Panelists took part in person, and several senior government executives observed the process (see Appendix A for the full list of participants).

## Goal

The Interoperability Review Panel sought to provide Secretary Shulkin and his senior leadership team with insights into key best practices and guidance from national experts regarding EHR interoperability. The Panel evaluated the corresponding language in the draft RFP based on successful business transformations and implementations of a new commercial EHR system across a distributed hospital and provider network. This section of the report summarizes the outcome of the Panel: expert recommendations that will inform VA's interoperability contract language. The document also provides actionable and specific best practice recommendations and rationales to enable successful acquisition and implementation of EHR interoperability.

## Methodology/Approach

The first part of the session, which lasted for five hours, was conducted as a fish-bowl exercise and was guided by Chatham House Rule. The Panelists sat at a center table, with VA and other government observers sitting at surrounding tables. The second part, which lasted two hours, consisted of a summary debrief to the Secretary and senior VA leadership. The Secretary could ask questions and engage with the Panel throughout the second session. MITRE moderated the session to elicit inputs from all Panelists and to drive alignment toward consensus in the recommendations.

The agenda for the first portion of the session was structured to elicit inputs from all Panelists, with notes captured on-screen as redlines to the RFP interoperability language to ensure recommendations accurately reflected the Panelists' contributions. Subsequently, in a facilitated discussion, the Panelists grouped their recommendations into specific categories in real time. The second portion, as noted, provided opportunities for the Secretary to discuss the recommendations in additional detail.

This section of the report summarizes the discussion that took place. It highlights actionable changes to the interoperability language contained in the RFP and additional recommendations and lessons learned that can enable interoperability of the VA EHRM solution. Text boxes



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throughout the report present direct quotations from Panelists. To ensure participant confidentiality, MITRE has destroyed the transcript and event recording used to develop this report.

## Topic Area: VA Definition of Interoperability

> *The key to modernization is creating greater interoperability with Governmental partners, including DoD, in a way that focuses efforts in support of the Veteran's journey, beginning with their military service. We will partner with others to ensure Veterans can get their benefits, care, and services consistently, easily, and with excellent customer service, no matter where they are throughout their lives. VA will work with local communities, and with other Federal, State, Tribal, and Local Government entities to ensure Veterans get what they need. VA will also continue to leverage the private sector where appropriate and needed to deliver the very best outcomes for Veterans.*
>
> – draft VA 2018–2024 Strategic Plan

### Enable data sharing, interoperability, and agility through data standardization

VA needs to allow data sharing among various business applications, such as appointment scheduling and business intelligence, as well as ensure transportability of information between sites. Panelists advised VA to leverage and support the best-in-class innovation currently in use within the VA culture. VA must also enable interoperability as the Department integrates the EHR into other supporting systems, both within the VA network and with external health service providers. Agility is necessary for adoption of future innovative technologies and/or if VA wants to upgrade or change the EHR approach. The Panelists cautioned that the current EHR technology is already 20 years old and, as with all industries and information technology (IT) solutions, many possibly disruptive technologies exist on the horizon.

> "It really optimizes transportability of best practices, because if you are trying to transfer best practices from one site to another and you have the same system where the best practice is going to land, then it is much easier."

The session began with a discussion on interoperability as currently defined by VA (Figure 1). Prior to establishing a roadmap to inform a nationwide plan to advance health data interoperability, VA must first ensure system-wide interoperability across the Department. Throughout the Review Panel session, the Panelists described and referred to this concept as "Level 1 Interoperability" throughout the Review Panel session; it includes migration of Veteran data from ~130 instances of the Veterans Health Information Systems and Technology Architecture (VistA) to one VA platform.



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**Figure 1. VA Definition of EHR Interoperability**

"Level 2 Interoperability," as described in the Panel discussion, addresses the ability for VA to leverage the same Cerner platform used by DoD to ensure seamless care from active service to Veteran status. Once this capability is implemented, the clinical data transformation will allow a true longitudinal view of a Veteran's record as he or she transitions from DoD to VA for care and other critical services such as benefit adjudication.

"Level 3 Interoperability" will allow both VA and DoD to take an important step toward transforming electronic patient data exchange on a national scale. With the utilization of community healthcare providers via the VA Community of Care initiative and DoD's Tricare network providers, VA has the opportunity to drive interoperability between DoD and VA as well as with the extensive network of healthcare providers that serve our Nation's Veterans, active duty service members, and their beneficiaries.

True nationwide EHR interoperability for the entire United States is the ultimate goal, and the Panelists agreed that VA and DoD could reach this goal if the three aforementioned levels of interoperability are achieved. Here, VA has the opportunity to drive clinical transformation and instantiation of a complete EHR for all patients at the national level.

## Topic Area: Commit to Full VA-DoD Interoperability

The Panel focused primarily on reviewing the interoperability language within the RFP for the Cerner contract. However as described in Interoperability Levels 1 and 2, the commitment to the seamless integration of VA and DoD health data represents the foundation required to realize interoperability with private sector

> "You really have to get the basics done first. Let's just make absolutely sure that the interoperability between DoD and VA [is achieved]."



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healthcare providers.[1] It is important to note that the interoperability levels can be addressed simultaneously and should not be separated, as they must be integrated to efficiently achieve the larger future data sharing ecosystem.

## Specify the expectations for interoperability between DoD and VA

During discussions about the expectation that Cerner will provide a single EHR solution to be shared by both DoD and VA, the Panel raised concerns about the lack of specificity in the contract language. Current interoperability data standards address a subset of the Veteran's clinical record and VA has the opportunity to ensure Cerner provides interoperability of all discrete data, at a minimum, between VA and DoD. Adopting the same platform would increase seamless sharing, but the Panel stated that VA should take additional action to ensure that such sharing is realized. The DoD and VA systems should use proprietary database-to-database interoperability if necessary, to maximize interoperability between those two systems. These systems should be configured to meet the distinct needs of each while being connected to each other in a native database-to-database method as necessary, leveraging open interoperability standards wherever possible. As a result, clinicians should experience no differences when they move from a VA system to a DoD system. These data should also be computable, or be made computable according to a specific schedule. VA should consider adding language to the RFP that specifically defines the degree of interoperability the solution will provide, ranging from basic file sharing to fully interchangeable, integrated and functionally identical patient records.

The Panelists also stated that, for VA and DoD collectively, the contractual language should include the following requirements:

- Performance measures to hold Cerner accountable for reducing the administrative burden in clinician workflow with the objective of increasing efficiency
- Capability for bulk data export based on standards, with no proprietary formats (e.g., Flat FHIR [Fast Healthcare Interoperability Resources])
- "Push" capability to insert new patient data back into the VA EHR / Cerner database.

## Pivot the RFP to be Veteran-centric and not system-centric

The Panelists discussed the impact of EHR implementations on clinician workflow, describing the issue as one of approaching the implementation as an IT system implementation rather than the preferred Veteran- or clinician-centric implementation. The current RFP appears to be written in a system-centric way rather than leveraging use-cases to describe the Veteran or clinician experience or workflow to characterize the requirement. The Panelists recommended that VA incorporate use-cases to characterize requirements and amend the RFP language to emphasize the Veteran-centric objectives. In addition, Panelists noted that VA should recognize that EHRs do not currently maximize efficient clinical workflow, and that VA specify that the

[1] Healthcare providers is used to refer to community based physicians/specialist and hospitals.



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solution present clinicians with relevant information where needed with a minimum number of "clicks to find."

## Topic Area: Leverage Current and Future Standards

The integrated EHR platform that DoD and VA are implementing provides the opportunity to significantly influence interoperability standards across the healthcare community, addressing gaps and competition among current standards. The Panel recognized that commercial health systems and technologies would realize only limited business value from making data portable between them, but this would lower the barrier to patient movement among healthcare providers.

### Engage Cerner as an advocate of the VA and DoD position in all relevant standards-making bodies

The Panel recommended increased VA presence and leadership in national health IT standards-making activities, in coordination with the DoD. Additionally, VA should encourage Cerner to serve as an active advocate of the VA-DoD position and to participate actively in the development and/or evaluation of new standards, policy directives, operating procedures, processes, etc. As an integrated voting bloc, VA, DoD, and Cerner will have the potential to act as a strong driver of national standards. Panelists understood that VA is not currently active in the FHIR community or in the Health Level Seven International (HL7) Argonaut Project.

In addition, Panelists identified a need for standards to exchange patient-reported outcome data for integration into the clinician's workflow. The current RFP language seemingly puts the burden on Cerner for the development of standards, and the Panel recommended that VA take a more active position. This will ensure that VA will participate and drive implementation when standards mature. Where standards are immature, VA must participate in efforts to accelerate standardization.

### Require Cerner to implement all standards as defined by VA, current and future

Because it is unclear where health IT is heading in five years, the Panel strongly suggested VA include contract language to address possible future advancements in the form of standards as defined by VA. At a minimum, VA should seek maximum interoperability with community care organizations, using open interoperability standards wherever possible. This flexibility would ensure that VA does not rely on external stakeholders to determine the standards that VA would be required to accept. The Panel recommended that VA pay particular attention to specific categories of standards: real-time data read/write by care providers and Veterans; interoperability tools; seamless DoD and VA vision records; and principles for data normalization and structure. The Panel also recognized Cerner's influence in ensuring that the CommonWell network interoperates at the highest possible levels with other networks including CareQuality—an influence that VA should continue to promote.



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### VA must own its data; clear ownership and access are critical to success now and in the future

The Panel highlighted an important recommendation regarding data rights that was discussed in the prior VA EHRM Listening Forum on September 7, 2017. The Panel recommended that VA define who has what rights from the perspectives of data ownership, access, and sharing (e.g., VA owns the data and all data products vs. community care providers own the patient data vs. each Veteran owns all of his or her data). Determining the authoritative data source for the various elements of a Veteran's health record is an important Veteran-centric component of interoperability, the longitudinal record, and seamless access to data.

> "So, what you need is clear access and clear ownership of your information…you need to have absolutely, undisputed, clear ownership and ability to move the data to any place you want to use it and use it in any way you want to use it when you get there. And not have them [Cerner] be able to say no, that's our data or hinder you in any way or have an unreasonable charge to get it."

VA should define an enterprise-wide policy for all VA data. A suitable policy would include, but not be limited to, EHRM-specific data, and should be issued by the VA Central Office (VACO) or Veterans Health Administration (VHA). VA must have clear ownership of and access to all the information in the EHR and be able to move that information (into new systems or among systems) as needed, now and in the future. Owning the data ensures that it is available regardless of vendor or system. VA must include this in the Cerner contract. Technology innovations occur rapidly in the 21st century, and VA must have full ability to move its data to future systems.

Panelists also recommended that VA publish its data model, for instance to the National Library of Medicine, to further promote commercial interoperability investments. Lastly, Panelists encouraged VA to leverage its investment in the Open Source Electronic Health Record Alliance (OSEHRA) by providing seed money to develop open source connectors between Cerner and Epic, which would encourage other vendors to join in the effort.

## Topic Area: Commit to Open, Standards-Based APIs

A significant technology enabler of seamless interoperability among the community of Veteran healthcare providers is the use of Application Programming Interfaces (APIs). These software intermediaries allow disparate EHR applications to communicate with each other and exchange data using standard, defined forms. The Panel emphasized the need for VA to create an environment that would minimize additional costs to community providers in order to interoperate with VA. VA can accomplish this by requiring the new EHR system to expose APIs that support bi-directional data transactions. The Panel further recommended that VA make a commitment to open, standards-based APIs, including the SMART on FHIR/Argonaut APIs, to facilitate the ready and efficient exchange of data with partners providing care in the community and to support open clinical workflow.



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## Establish clear publishing and access service requirements

The Panel recognized that data access requirements differ depending on who provides or accesses that data. Therefore, the Panel recommended that VA be more specific in defining each level of data publishing and access service that is specific to (1) Veteran access (e.g., use of vets.gov); (2) VA clinician access; (3) partner access; and (4) Health Information Exchange (HIE) access. The RFP should include a clear description of identity and access management requirements, including user population types and the association of specific application permissions with particular roles/positions.

> "The Contractor should provide all of the data that is currently being provided in the Contractor's patient portal to the consumer via an open standards-based API gateway. The Contractor should also provide all of the reporting data required by federal law to the Veteran via an open standards based API framework, accessible via any application or third-party data store of the Veteran's choice, that's number one."

Machine-to-machine access is also critical for efficient sharing of information. The Panel recommended that VA ensure that all significant data stored in the software be accessible through APIs with no requirement for creation of custom applications to specifically access VA data. From a forward-looking perspective, VA should require that the EHR system support the ability to access data elements using open standards-based interfaces, and include the ability to interface with legacy data, patient-generated data, and third-party data that resides outside the EHR system. In addition, Cerner should provide the required utility services to support intermediary or peer-to-peer services (e.g., support Veteran-directed or Veteran-mediated requests, data exchange, and ingestion of data from non-VA providers).

## Provide a VA application platform that supports APIs from third-party providers with no barrier to entry

Currently vets.gov serves as a portal to Veteran services. The Panel recommended that VA consider using such a portal to connect any third-party application to the EHR solution without requiring fees or vendor permissions. VA should have full authority to connect any third-party application through one of the standard open APIs conformant with the vendor's API without pre-registering the application with the vendor. This is a very important authority to have in terms of the ability to innovate rapidly, without constraints.

> "The API Gateway document is awesome … world class and future looking."

The Panelists also reviewed the proposed VA "API Gateway" language provided during the API discussion to anchor the dialogue and concurred that this requirement is fundamental to supporting interoperability. The Panel strongly endorsed the "API Gateway" language. Specifically, the Panelists recommended that VA include a requirement that VA have full authority to connect any third-party application to the Cerner system without requiring prior approval by Cerner. Furthermore, VA should ensure that developers of third-party applications connecting to the VA system via the open standard and VA-defined APIs continue to own their



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intellectual property (IP). From a usability perspective, the Panel also recommended that VA be able to establish the connectivity business rules, such as the ability for applications to remain connected for a reasonable time frame (e.g., 1 year) and to receive automatic notification about patient information updates.

### Require implementation of Clinical Decision Service (CDS) Hooks to invoke decision support from within a clinician's EHR workflow

EHRs are essential to efficient delivery of high-quality care, as they provide the clinician with essential decision data at the time required. However, current EHR systems approach workflow from an IT system perspective rather than a clinician's perspective. The latter workflow should, of course, be paramount in the VA EHR implementation, and should also leverage a recent innovation called CDS Hooks. This technology provides the clinician with context-driven decision support and capability by enabling the EHR to trigger third-party services at key events that include ordering medication and opening a patient face sheet. For example, when the VA clinician begins to prescribe medication, a CDS Hook can call an external service that presents the clinician with the list of medications already prescribed to the patient by clinicians outside VA. The Panelists strongly recommended that VA require Cerner to implement and use CDS Hooks within the clinician workflow.

## Topic Area: Use Community Care Contracts to Foster Interoperability

The new EHR system must be able to communicate with other EHR systems (e.g., Epic, AllScripts, etc.) within the care community. It is critical that VA ensure the Cerner EHR system remain robust for future interoperability with new products. Cerner must commit itself to supporting other forms of interoperability, such as a presentation layer that is common to other systems (e.g., the App store model). The Panel recommended that prior to execution of the Community Care Act contract VA require third-party providers (and Cerner competitors) to commit to supporting the contract as early adopters.

> "Innovations going forward are going to come from multiple directions. And having those interfaces, and going with a general interoperability approach that doesn't fork off from what's happening in the rest of the healthcare system, will allow the Veterans to benefit from technology whether that's coming from Google, from a new company, from an innovative shop within VA -- you end up creating a market with good prices, high value."

### Veterans must be able to access and download a computable form of their health data

Panelists noted that access to data represents the biggest problem today. VA must clearly direct Cerner to expose data so it can be used by third parties. In the contract and in conversations with Cerner and third parties, VA must require specifics regarding how Veterans and providers will

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access and share their data. In addition, VA must require that any agreements leave the door open for future standards and technologies.

Panelists believed that VA could achieve this by invoking the principle that the data belongs to the Veteran, rather than by citing specific technologies and standards (given how rapidly they are evolving). Veterans must be able to invoke their right of access to data to support data exchange across all providers (e.g., pull data through an API on their smartphone and push it to their community care provider), now and in the future. Keeping pace with this requirement will drive continual innovation by Cerner and all providers.

## VA must own the API layer

Cerner ownership of the API layer (across every customer) poses a real threat to achieving interoperability, speed of innovation, and cost efficiency throughout the network of community care providers. Panelists stated that it is of utmost importance that VA include specific language stipulating that VA and Veterans be able to use third-party applications without having to register them with Cerner. VA must control the API key, not Cerner.

Additionally, VA should require that Cerner provide access to MPages, a developer toolkit, and a programming interface that will enable innovators and third parties to develop APIs.

## Require that community care contracts include VA EHR standards to support bi-directional data sharing

Panelists agreed that requiring the support and collaboration of community care providers and participating actively in health IT standards bodies would give VA the opportunity to advance the "national" standard for data sharing—closing any gaps and inconsistencies among federal, industry, and inter-industry standards. VA must require every provider in the chain of a Veteran's care to support the same standards for data interoperability in order to ensure seamless, best possible care for Veterans. This includes the requirement that all providers and third-party applications, in exchange for using the VA-provided API gateway, provide bi-directional health information back to VA that can be used for context-driven clinical decisions and informatics.

## Change the data exchange consent model from "opt in" to "opt out"

To encourage seamless interoperability across all entities providing care to Veterans, the consent model for exchanging data between healthcare providers must be modified to follow an opt-out rather than an opt-in policy, which limits participant numbers. This would allow Veterans to invoke their individual right of access under the Health Information Portability and Accountability Act (HIPAA) to move their data as needed. Many states have already adopted an opt-out consent policy as part of their HIE.[2] VA can achieve this by aligning its policy to an opt-

[2] See https://www.healthit.gov/sites/default/files/State%20HIE%20Opt-In%20vs%20Opt-Out%20Policy%20Research_09-30-16_Final.pdf



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out model, supported by the new VA proposed rule[3] to allow HIEs to collect a Veteran's consent and electronically attest to the consent to VA in order to obtain the required EHR.

## Topic Area: Additional Contract Changes

In addition to the recommendations in the prior sections, the Panelists encouraged VA to add further definitions and clarity in the following areas:

- Require Cerner to provide VA with full read and partial write access to all data elements within the EHR, at VA's sole discretion.
- Require Cerner to make the VA data model, standards, and other similar interoperability changes available in all other non-VA Cerner instances of its EHR platform.
- Clearly define "enabling security framework" so that users know if this means a specific security framework such as those provided by the National Institute of Standards and Technology (NIST), HITRUST, etc.
- Amend "national Common Trust Framework" to specifically refer to the intended source. The Panelists suggested that VA replace this wording with "Trusted Exchange Framework and Common Agreement (TEFCA)" as specified in the 21st Century Cures Act.
- Amend RFP Performance Work Statement (PWS) Section 5.10.4(i) to clarify if the "provider collaboration via secure e-mail using Direct standards" is limited to the Direct protocols and just the Cerner platform.
- Incorporate the model RFP language necessary for Cerner to support the API and SMART on FHIR platform and SMART-enabled applications, as described in Appendix B.

[3] See https://s3.amazonaws.com/public-inspection.federalregister.gov/2018-00758.pdf



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# II. Recommendations for RFP Changes

MITRE engaged Morrison & Foerster, LLP, as the independent and unbiased legal expert to identify the specific changes to the RFP language necessary to implement the recommendations made by the Interoperability Review Panel. MITRE provided Morrison & Foerster, LLP, with the summary recommendations and a copy of the RFP.[4] In addition, MITRE collected specific ideas for contract language from the Panel. Appendix C presents all recommended RFP changes.

[4] *Performance Work Statement for the VA Electronic Health Record Modernization System*, Final Version 1.7, Amendment 03, December 4, 2017, Department of Veterans Affairs. File name: 001 - VA EHRM IDIQ PWS (Amended 12.04.2017) - Copy.docx



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# III. Observations from University of Pennsylvania Medical Center Site Visit

A delegation from VA and MITRE traveled to Pittsburgh, Pennsylvania, on January 19, 2018, for a meeting with representatives of UPMC Enterprises to discuss aspects of EHR interoperability that UPMC has successfully implemented over the past several years. The VA team, led by John Windom, included Dr. Ashwini Zenooz, (b)(6), John Short, and (b)(6). The MITRE group included Richard Byrne, Jay Schnitzer, (b)(6) (b)(6), and (b)(6). The hosts at UPMC included Dr. Rasu Shrestha, C. Talbot Heppenstall, Jr., Ed McAllister, Dr. Robert Bart, Adam Berger, Diane Michalec, Phyllis Szymanski, and Dr. Amy Urban, as well as additional staff.

The meeting was broken into four parts. Following introductions, Session 1 described the structure of UPMC. Session 2 covered UPMC's last decade of interoperability, and Session 3 centered on the road ahead for UPMC and industry.

Dr. Rasu Shrestha began the meeting by making the introductions and setting the agenda. He stated that UPMC's approach had followed a best-of-breed strategy, as opposed to a best-of-suite strategy, with the intention of failing fast and succeeding often. The overall UPMC structure has four parts: provider services, insurance services, international activities, and enterprises.

During the discussion of interoperability, the UPMC team described its approach to interoperability, called Connected Healthcare, which is based on the commercial product dbMotion of AllScripts. UPMC has created an entity titled ClinicalConnect HIE (CCHIE) that uses HL7. ClinicalConnect exists as a separate 501c(3) company, of which UPMC is a member. CCHIE contains 90 live interfaces. This HIE went live in June 2012; its members consist of 10 hospitals. It competes with three other HIEs in Pennsylvania. The repository contains data on 8.3 million patients, and, in terms of patient consent, CCHIE uses an opt-out model. It currently has connections to four EHRs: Cerner (two versions), Epic, and Varian. Data available within CCHIE spans allergies, clinical documents, diagnosis, encounters, immunizations, labs, medications, problems, and procedures. Much of this data is in the form of documents (Continuity of Care Document (HITSP C32 CCD format, including problems, allergies, and medications); unstructured clinical documents (HITSP C62 format); Consolidated Clinical Document Architecture (C-CDA CCD, including problems, allergies, medications, immunizations, procedures, and insurance); and HL7 Interface (ADT: encounters, documents, imaging documents, and labs only).

At the point of care dbMotion allows multiple views for the CCHIE: 1) a clinical view, 2) a newer view titled EHR agent, and 3) a Cerner MPage integration view. The next phase of the UPMC work in this regard will consist of integration with CommonWell. Figure 2 shows the architecture of the system. Figure 3 depicts the data feeds.



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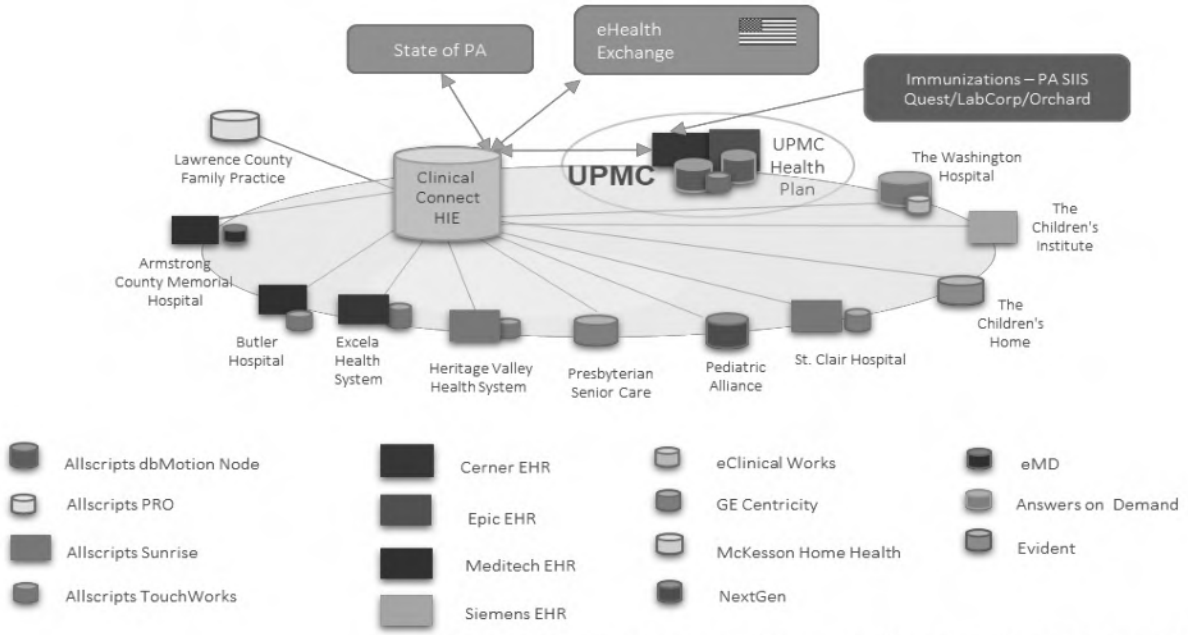


Source: From UPMC Enterprises, used with permission, for VA use only

**Figure 2. ClinicalConnect (Western Pennsylvania) Health Information Exchange**

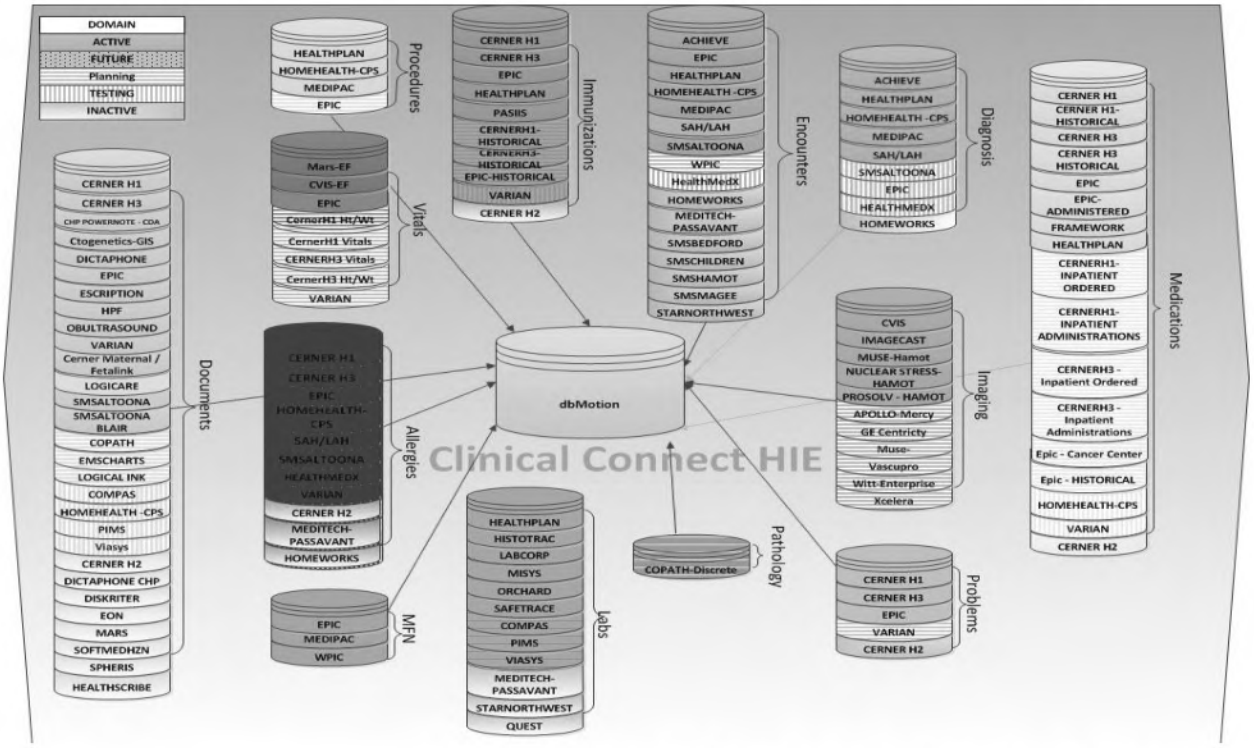


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**Figure 3. Interoperability Data Integration**

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When asked whether UPMC, or anyone else in the country, has a point-to-point Cerner-to-Epic interoperability solution that does not use an HIE, UPMC representatives responded "No." Furthermore, UPMC representatives noted that about 10 percent of the total available individual patient data is currently transferred with UPMC's interoperability system. This is complicated by an ongoing data explosion that doubles the amount of data in UPMC's system about every 18 months.

Following the presentations and lunch, MITRE Chief Technology Officer Jay Schnitzer saw a live demonstration of CCHIE by Dr. Amy Urban and Dr. Rasu Shrestha. The live demonstration confirmed that all of the documents listed above are visible with equal fidelity and a very similar format from both the UPMC end and the community provider end and perspective. The system requires clinicians to know and understand where documents can be found, and sometimes requires multiple mouse clicks, but all documents can be accessed from the same EHR entry page with one single log in. Additionally, some data elements, including vital signs and labs, can be viewed in the form of graphs as a function of time, including data elements from multiple sources.



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# IV. Closing Thoughts and Suggested Next Steps

The Panelists noted that VA cannot achieve true future EHR interoperability through the Cerner RFP alone, or through technology alone. The state of practice today shares only a small portion of available patient data. For VA to succeed in the future, multiple other components must be present and aligned: innovation, policy, standards, customer buy-in, and legislation, to name a few.

The following next steps are recommended for VA consideration:

1. Complete the RFP revisions, conduct appropriate negotiations with the Contractor expeditiously, and complete the Contract process as planned. Stand firm during negotiations to maximize ease of access to data and data models for building third-party APIs, applications, and services for future community innovations.
2. Work with other federal government agencies and departments with similar interoperability interests and concerns, including, but not limited to, the White House, DoD, Food and Drug Administration (FDA), Centers for Medicare and Medicaid Services (CMS), Office of the National Coordinator for Health Information Technology (ONC), and other parts of the Department of Health and Human Services, to align approaches to EHR interoperability and the development and support of standards government-wide.
3. Support future innovation approaches, including concepts such as an Interoperability Laboratory and outreach to the broader innovation ecosystem (major medical centers, academia, traditional and non-traditional healthcare providers, startups, individual entrepreneurs, others). It is critical to align the innovations planned in VA's Digital Veterans Platform to the VA EHR innovation efforts to ensure consistent, continuous improvements to clinician and Veteran health experiences.
4. Create an External Review Panel to provide continuous expert guidance, review, and feedback over the course of the implementation and help capture best practices from the expert community going forward. Conduct ongoing demonstrations of end-to-end Veteran use cases that require data sharing across organizational boundaries to validate improvements in Veteran healthcare and reduce burdens on healthcare providers. VA and Contractor will ensure that Federal Advisory Committee Act (FACA) guidelines are followed in leveraging any external review panels.



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# Appendix A: Interoperability Review Forum Participants

| Panelists | Title | Organization |
|---|---|---|
| Aneesh Chopra | President | CareJourney, former United States Chief Technology Officer |
| Charles E. (Chuck) Christian | Vice President, Technology and Engagement | Indiana Health Information Exchange |
| Ryan Howells | Principal | Leavitt Partners, LLC |
| Andrew Karson, MD | Director, Clinical Decision Support | Massachusetts General Hospital |
| Chris Klomp | Chief Executive Officer | Collective Medical Technologies, Inc. |
| Kenneth Mandl, MD | Professor, Biomedical Informatics<br>Director, Computational Health Informatics | Harvard Medical School<br>Boston Children's Hospital |
| Frank Opelka, MD | Medical Director, Quality and Health Policy | American College of Surgeons |
| Peter Pronovost, MD, PhD | Director, Armstrong Institute for Patient Safety and Quality<br>Senior Vice President, Patient Safety and Quality | Johns Hopkins University |
| Christopher J. (Cris) Ross | Chief Information Officer | The Mayo Clinic |
| Carla Smith | Executive Vice President | The Healthcare Information and Management Systems Society |
| Paul R. Sutton, MD, PhD | Professor, Biomedical Informatics and Medical Education<br>Associate Medical Director, Inpatient IT Systems, UW Medicine IT Services | University of Washington |

| VA Participants | Title | Organization |
|---|---|---|
| David J. Shulkin, M.D. | Secretary | Department of Veterans Affairs |
| Carolyn Clancy | Executive in Charge, Veterans Health Administration | Department of Veterans Affairs |
| Bill James | Acting Assistant Secretary, Office of Information & Technology | Department of Veterans Affairs |
| John Windom | Program Executive for EHRM and Special Advisor to the Under Secretary for Health | Department of Veterans Affairs |
| Dr. Ashwini Zenooz | Chief Medical Officer, EHRM; Deputy, Office of Deputy Under Secretary for Health Policy & Services, VHA | Department of Veterans Affairs |
| John Short | Chief Technology Officer, EHRM; Executive Director of Information Technology System Modernization | Department of Veterans Affairs |
| (b)(6) | Portfolio Lead: Project Transition and VA Integration, VA Center for Innovation | Department of Veterans Affairs |
| Camilo Sandoval | Senior White House Advisor, VHA | Department of Veterans Affairs |
| (b)(6) | Senior Advisor to the Secretary on Strategic Partnerships | Department of Veterans Affairs |
| (b)(6) | Contracts | Department of Veterans Affairs |
| Kyle Sheetz | White House Fellow | Department of Veterans Affairs |

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| Other Federal Government Participants | Title | Organization |
|---|---|---|
| (b)(6) | Senior Advisor, Office of Administration | The Centers for Medicare & Medicaid Services |
| Chris Liddell | Assistant to the President for Strategic Initiatives | The White House, Office of American Innovation |
| *Bruce Moskowitz, M.D. | Internist | External Expert Participant |
| Shannon Sartan | Director, Digital Services | The Centers for Medicare & Medicaid Services |
| Dr. Lauren Thompson | Director | DoD/VA Interagency Program Office |
| Jon White | Deputy National Coordinator for Mental Health | The United States Department of Health and Human Services/The Office of the National Coordinator for Health Information Technology |

*Upon review of this document on October 6, 2018, Fred Mingo, OEHRM FOIA Officer noticed that Dr. Bruce Moskowitz was incorrectly identified and should not be under the entry column "Other Federal Government Participants."



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# Appendix B: RFP Language for Purchasing Extensible Health IT

From https://smarthealthit.org/2017/08/draft-model-rfp-language-for-purchasing-extensible-health-it/, as of January 15, 2018.

SMART Platform (www.smarthealthit.org) is a project that lays the groundwork for a more flexible approach to sourcing health information technology tools. Like Apple and Android's app stores, SMART provides the means for developers to create and for health systems and providers to easily deploy third-party applications in tandem with their existing electronic health record, data warehouse, or health information exchange platforms.

To deploy SMART-enabled applications, health systems must ensure that their existing health information technology infrastructure supports the SMART on FHIR API. The SMART on FHIR starter set detailed below lists the minimum requirements for supporting the API and SMART-enabled applications. You may wish to augment this list of minimum requirements with suggestions from the Add-On Functionality listed depending on the types of applications your organization wishes to deploy.

This document is intended as a resource for providers and health systems as they draft Request for Proposals (RFPs) and negotiate with their HIT vendors for added functionality. It has multiple authors from across the SMART team and its advisors. Feedback is welcome.

The vendor must support the SMART on FHIR platform, a vendor agnostic API that allows third-party developers to build external apps and services that integrate with the vended product.

At a minimum, the vendor product should include the following components in order to support SMART on FHIR and SMART-enabled applications:

## Data Access

- Provide automated, standards-based, read-only access through the FHIR API and FHIR data models (resources) to:
  - a well-defined set of real-time discrete data (including support for the API parameters and resources described in the Argonaut Implementation Guide)
  - free-text clinical notes

## Data Manipulation

- Write structured data from third-party apps back to the organization's EHR and, where relevant, a data warehouse, using the FHIR REST API to communicate data including:
  - free-text clinical notes



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## Standards-Based App Authorization

- Protect data and identity endpoints with standards-based authorization mechanisms (including the OAuth2 profiles described in the Argonaut Implementation Guide).
- Provide access to data endpoints with an approach that does not require user intervention subsequent to the initial setup such as the method described in the draft SMART Backend Services Profile (http://docs.smarthealthit.org/authorization/backend-services/) Provide capability to restrict this access to a specified set of patients (roster).
- Enable Health System to connect any third-party app of their choice that is conformant with the API without pre-registering the app with HIT Vendor.
- Enable patients to connect any third-party app of their choice that is conformant with the API without pre-registering the app with HIT Vendor through the OAuth Dynamic Registration protocol.
- Provide OAuth refresh tokens with a duration of one year to patient and provider facing apps that support the SMART Client Secret profile.

## Identity Management

- Act as a standards-based Identity Provider using OpenID Connect. This ensures that users can authenticate to plug-in apps using single-sign-in via their existing EHR or patient portal credentials.
- Act as a standards-based relying party to a customer-selected Identity Provider using OpenID Connect. This ensures that users can sign into the EHR or patient portal using an external, hospital-supplied single-sign-on account.

## Workflow

- Support standards-based embedding of external application UI (HTML5). This ensures that app developers can build Web apps, and these apps can run directly inside of the EHR.
- Support the launch of external applications in the clinician's workflow (this is not limited to the EHR and should include non-EHR integrated tools such as smart phones and tablets). For example, a clinician that has opted to use a third-party-developed native iPad app to visualize a patient's BMI over time can seamlessly use the application alongside the EHR via single-sign-on.
- Support notifications to and from running applications. For example, an embedded app can notify the EHR when the user is "done" with it.

## Add-On Functionality

The provider organization may also want to consider the following additions to its RFP depending on the types of applications it wishes to develop and run in the future.



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### Bulk Data Export

- Provide automated access to bulk export of data (complete representation of all data in the MU Common Clinical data set as well as free text notes) using a method like the SMART Flat FHIR draft proposal (http://docs.smarthealthit.org/flat-fhir)

### Data Manipulation

- Write structured data from third-party apps back to the organization's EHR and, where relevant, a data warehouse, using the FHIR REST API to communicate data including:
  - medication prescriptions
  - lab and diagnostic imaging orders
- Support the dependent transactions necessary to ensure that actions completed by third-party applications using the API are valid in the EHR and data warehouse.

### Context-Specific Service Hooks

- Support the ability to call an external standards-based service in specific workflow steps, through the CDS Hooks specification, including:
  - opening a patient record
  - new prescriptions
  - new lab orders
  - new imaging studies

### Intellectual Property

The IP of any app integrated through the SMART on FHIR API belongs to the author and not the vendor.

## Custom SMART on FHIR Extension to a Proprietary API

Should a vendor neglect to provide SMART on FHIR natively, the client has the right to provide a custom extension to the vendor's API. The ownership of the IP for the custom extension is negotiable between the client and the vendor, but the ownership of the app using the custom extension belongs to its author.



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# Appendix C: Recommended RFP Interoperability Language Changes

The table below captures the recommended changes to the VA EHRM RFP.

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| **Commit to Full VA-DoD Interoperability** | | | | |
| 1 | Define specific capability performance requirement and mechanisms to hold Cerner accountable for reducing the administrative burden in clinician workflow with the objective of increasing efficiency. | The IDIQ RFP PWS Section 5.1.11 speaks to overall EHRM value and performance management monitoring, measurement and reporting. Performance metrics will be defined and enforced at the task order level, since, for example, hosting metrics will be significantly different from deployment metrics.<br><br>The RFP Section 8.6 refers to the use of Quality Assurance Surveillance Plans (QASP), which will include Functional and Non-Functional Key Performance Indicators (KPIs). The QASP will evolve as the EHRM solution and technology matures and is intended to establish Contractor accountability to what VA requires and values. | None. | Concur. |



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| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 2 | Define specifically the *span* of providers who can properly interface with VA under a proposed solution (the number of community providers who would be able to interface with VA under a solution as a function of cost to the provider). | RFP Section 5.2.1(j) states that "The EHRM solution shall support access via tablet or mobile device as adjudicated by joint governance. Platform specifics will be identified by VA at a TO level."<br><br>Section 5.10.4 states that "The Contractor is required to collaborate with VA affiliates, community partners, EHR providers, healthcare providers, and vendors to advance seamless care throughout the healthcare market." | Suggest amending the language in RFP Section 5.2.1(j) to: "Support broad access via tablet or mobile devices and pursue technology to reduce the burden to the clinicians (e.g., providing third-party provide access to information using light-weight portals and support for future generation mobile devices). Platform specifics shall be adjudicated by joint governance and incorporated by VA at a TO level." | Concur. Will negotiate with Cerner for inclusion of language. |
| 3 | Define the *degree* of interoperability the solution provides (ranging from basic file sharing to fully interchangeable, integrated and functionally identical patient records). | RFP Section 5.10.4 speaks to interoperability and provides sufficient breadth to introduce any additional information exchange requirements in the future, at the sole discretion of VA.<br><br>Requirements Traceability Matrix (RTM) VA-FR-31 discusses specifics of data management, types of data to be exchanged, and methods of communication. | Suggest adding to RFP Section 5.10.5: "m) The Contractor shall conduct an annual Interoperability Self-Assessment against standards that shall be specified by VA, such as those promulgated by HIMSS or future standards to be identified by VA." | Concur. Will negotiate with Cerner for inclusion. |



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| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 4 | Pivot the RFP to be Veteran-centric and NOT system-centric. Be mindful that lessons learned are that many EHRs do not currently maximize efficient clinical workflow, so build that in (e.g., using CDS Hooks) and present information where needed with minimum "clicks to find" to reduce clinician burden. | RFP Section 5.2.1 speaks to the EHR application supporting workflows.<br><br>Section 5.5.1 Workflow development and normalization addresses configuration of workflows to meet VA requirements.<br><br>Section 5.5.7 Organizational Change Management discusses optimizing workflows for each clinical role.<br><br>Section 8.6 refers to the use of Quality Assurance Surveillance Plans (QASP) which provides active, continuous measurement against the extensive performance requirements captured in Appendices A-1 and A-2: EHRM Key Performance Indicators to ensure a Veteran-centric approach.<br><br>RTM section VA-FR-33 requires adoption, development and maintenance of metrics to assess timeliness and quality of healthcare delivery to the patient population.<br><br>The current RFP language can be clarified to specifically refer to the improvement on Veteran-centric delivery. | Suggest adding to RFP Section 5.5.1: "k) Provide an understanding of how all workflows will impact VA care coordination and management processes (e.g., incorporating community information) to improve Veteran-centric delivery."<br>Also add to Section 5.5.1: "l) Configure workflows to incorporate all community data at the discrete level in support of clinical decision support, care management, disease management. The clinical workflow within the EHR should not require users to visit additional screens to view externally sourced data."<br><br>See Item 29 for specific recommendations on CDS Hooks. | Concur. Will negotiate with Cerner for inclusion. |
| 5 | Require Cerner support end-to-end use cases with major external stakeholders involved. | RFP Section 5.2.1 speaks to the EHR application supporting workflows. The Contractor can only be held responsible for elements of the end-to-end use case that reside within their system. | Suggest adding to RFP Section 5.2.1: "Testing conducted under the Test and Evaluation Program Plan may include specific workflows to inform a demonstration of end-to-end clinical use cases involving external stakeholders." | Concur. Will negotiate with Cerner for inclusion. |



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| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 6 | Develop detailed data flow requirements between Cerner and all other vendors, be specific using clinical workflow or Veteran/patient-centric use cases. | Detailed data flow requirements should not be part of the RFP as it will result in the limitation of functionality to the specific data flows specified. They will be part of the Test and Evaluation Plan (TEP), where data flows can be added or modified. However, RFP Section 5.5.1 does not indicate that the external community data and end-to-end workflows will be considered in the configuration of standard EHRM workflows. | Suggest adding to RFP Section 5.5.1: "j) The Contractor shall enable configuration of the application that supports external community data without requiring the clinician to go to special screens to see and use external data." | Concur. Will negotiate with Cerner for inclusion. |
| 7 | Specifically define the machine-data readability expectations to ensure interoperability between legacy, community care providers, and Cerner (e.g., notes fields). | RTM VA-FR-31 Requires the ability "to manage data structures that are standardized, accessible and editable." Specific requirements are to be incorporated into Task Orders, according to the structure of the contract. | See Item #34 for recommended changes to incorporate the SMART on FHIR and SMART-enabled applications.<br><br>See Item # 49 for recommended changes to incorporate sharing of the EHRM data model and to improve the amount of computable data shared with community care providers.<br><br>Suggest VA obtain a description from the Contractor that describes the current baseline of shareable data elements that are computable. | Concur. Will request information from Cerner. |
| 8 | Document the DoD-VA EHR Exchange Framework - it can serve as a starting point for the National model. | This is information that should be included as part of acquisition baseline developed by EHRM Program Management Office technical activities. | None. | Concur. |
| 9 | Require ability for bulk data export. | RFP Section 5.10.4(g) requires the Contractor to provide a software solution for multilateral standards-based ingestion, normalization, storage and exporting of Health Information Exchange acquired Veteran health information. | None. | Concur. |



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| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 10 | Require "push" capability to send data back in to VA EHR / Cerner database. | RFP Section 5.10.4(g) requires the Contractor to provide a software solution for multilateral standards-based ingestion, normalization, storage and exporting of Health Information Exchange acquired Veteran health information. | None. | Concur. |



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| 11 | Require that VA drive and own the analytical algorithms and not rely on Cerner. Require that VA health organizations be involved in building the logic models with the community and the vendor. | RFP Section 5.1.5 requires the Contractor provide requirements development support but does not include who is responsible for coordinating the community input on the logic models.<br><br>RFP Section 5.1.7 requires the Contractor support data management but does not state that VA shall provide the analytical algorithms.<br><br>RFP Section 5.5.1(e) requires the Contractor support robust semantic modeling for the information associated with the workflows Further detail to achieve this recommendation is also detailed in the Functional Requirement documentation, specifically VA-FR-31. VA should lead and own the analytical algorithms as it is in the best interest of the health community. By owning the algorithms, VA will take the lead on coordinating the effort, but the Contractor will actually develop the algorithms. | Suggest adding to RFP Section 5.1.5: "While the Contractor shall provide such support, VA reserves the right to take the lead on coordinating input from the user and provider communities. VA may, at its discretion, incorporate analytics from other entities, and include them in its future Digital Veterans Platform, with which the EHR must be fully compatible and interoperable."<br><br>Suggest adding to RFP Section 5.1.7(b): "based on community and VA coordinated analytic algorithms."<br><br>Suggest adding to RFP Section 5.5.1(e): "VA and its agents shall have unlimited rights to all resulting models and algorithms."<br><br>Suggest adding to RFP Section 5.5.1(f): “which modeling shall be based on analytical algorithms and data models (1) developed by the Contractor, (2) co-developed by the Contractor in coordination with VA health organizations and the community, (3) developed by VA health organizations, or (4) provided by third-party developers. VA and its agents shall have unlimited rights to all algorithms and logic models incorporated in the EHRM solution, and intellectual property rights will be handled in accordance with § H.2 of the Contract “VA EHRM IP License Agreement” on a Task Order basis.” | Concur. Will negotiate with Cerner for inclusion. |



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|---|---|---|---|---|
| 12 | Enhance the data quality management requirements to ensure Cerner is responsible for maintaining and resolving data quality issues. | RFP Section 5.1.8 Requires the Contractor to be responsible for data migration, but RFP Section 5.1.7 does not include a requirement for the Contractor to manage data quality internal to its systems. | Suggest adding to RFP Section 5.1.7: "j) Maintain backward compatibility of the EHRM solution in such way as to maintain the quality of the data, to ensure that, once captured, the Government has access to and computational use of the data regardless of the evolution of the EHRM or age of the data k) Identify data quality issues found in data sourced from systems beyond its operational remit, applying the same validations and quality standards to incoming external data that it performs for data originated natively within the EHRM solution. Where the principle of seamless care requires that EHRM accept data that does not meet its internal data quality standards, Contractor shall implement the solution so that any incoming data that does not meet EHRM data quality standards be clearly flagged as such and provide both process and user interface to allow incorrect or missing data to be remedied if possible." | Concur. |
| 13 | Define the common identity and access management approach Cerner and others will adopt (e.g., using the Vets.gov identity as the coordinating identity). | RFP Section 5.5.2 describes the required approach to identity and access management across population types and roles. DoD/VA are aligning their efforts to address this going forward. | None. | Concur. |
| 14 | Adopt the DoD approach to data and system security. | RFP Section 5.4: Information System Authorization, Testing and Continuous Monitoring describes the security approach for the shared DoD/VA authorization boundary. Joint DoD/VA Strategy will be executed. | None. | Concur. |



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| 15 | Share the VA's security approach to medical and endpoint security with DoD for opportunity to leverage and harmonize. | RFP Section 5.4: Information System Authorization, Testing and Continuous Monitoring describes the security approach for the shared DoD/VA authorization boundary. Joint DoD/VA Strategy will be executed. | None. | Concur. |
| 16 | Require Cerner to make the VA data model, standards, and other similar interoperability changes available in all other non-VA Cerner instances of its EHR platform. | RFP Section 5.10.4.1 requires opportunity for agreed upon Contractor proprietary information/data model extension points (e.g., ingestion and record APIs) to be provided to both international and national standards designating organizations, however, this does not include providing the capability to other Cerner users, which would extend Cerner interoperability across the community. | Suggest adding to RFP Section 5.10.4.1: "The Contractor shall provide VA access and usage rights into any underlying proprietary terminology/code systems for the purpose of enhancing national standards to address any gaps identified in the EHRM solution. The Contractor shall also make the interoperability capabilities and product enhancements developed under this contract available to non-VA Cerner clients." | Concur. Will negotiate with Cerner for inclusion of language. |
| 17 | Clearly define “enabling security framework.” Does this mean a specific security framework such as NIST, HITRUST, etc. | VA Requirements Traceability Matrix Non-Functional requirements provides the security requirements to include Access Management, Identity Management, and Information Assurance/Security. RFP Sections 5.4 Information System Authorization, Testing and Continuous Monitoring and 5.5.2 Identity and Access Management provide additional clarification on the security requirements. | None. | Concur. |



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| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| | | **Leverage Current and Future Standards** | | |
| 18 | Specifically describe what and how you can read, write, and reconcile re: health data. | Requirement VA-FR-31 describes data management requirements: standardized data and coding terminology systems; use of government endorsed messaging and content standards for interoperability; management of data elements from various entry points etc. The current requirement does not provide understanding of which data elements are being exchanged and the degree of interoperability/ computability supported. | Suggest adding to RFP 5.10.4(m): "The annual assessment will report on the state of each data element (e.g., which are supported in what capacities and in which formats). This will help assure standards implementation consistency and assure standards compliance with evolving national standards." | Concur. Will negotiate with Cerner for inclusion of language. |
| 19 | Define who has what rights from a data sharing perspective, impacting APIs (e.g., VA owns the data + all data products vs. Community care provider owns their treatment info on patient vs. patient owns all their own data.) | Requirement VA-FR-31 and RFP Section 5.1.7 describe data management requirements (including syndication).<br><br>Section 5.5.4 requires "all, significant data stored in the software is accessible through API's" however clarification is needed to ensure access to all data originating from alternate VA-designated authoritative sources. | Suggest adding to RFP 5.5.4: "l) Provide standards-based API access (e.g., FHIR) to all patient data from the VA-designated authoritative data sources for the patient's record within the Contractor's product suite." | Concur. Will negotiate with Cerner for inclusion of language. |
| 20 | Identify the authoritative source for the various elements of a Veteran's health record. | RFP Section 5.1.4 requires the Contractor to provide support in the development and/or evaluation of new Standards, Policy Directives, Operating Procedures, Processes, etc.<br><br>Broader recommendation beyond the scope of the EHRM RFP is for VA to define the authoritative source policy for all VA data. This is not an EHRM specific policy and should be issued by VACO or VHA. | Suggest adding to RFP 5.5.4: "j) assist VA in defining and establishing the authoritative data sources associated with each data element in the EHR (e.g., where it is available and who has access to the information)." | Concur with the language for 5.5.4. |



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|---|---|---|---|---|
| 21 | Increase the VA presence and leadership role in standards-making bodies (e.g., Argonaut). | Increasing VA presence and leadership roles in standards-making bodies is an entirely separate recommendation that is not related to the IDIQ. | None. | Concur. |
| 22 | Include requirement for Cerner to support VA as an advocate to VA position on all relevant standards-making bodies. | RFP Section 5.1.4 requires Contractor support in the development and/or evaluation of new standards, policy directives, operating procedures, processes and/or assessments on their impacts when implemented. | None. | Concur. |
| 23 | Require Cerner to implement all standards as defined by VA. | Requirements Traceability Matrix VA-NJ-177 defines interoperability data standards and specifically cites support of the health data standards identified in the VA-DoD Health Information Technical Standards Profile and by the VA-DoD Interagency Clinical Informatics board. | None. | Concur. |
| 24 | Clarify the intended reference in the phrase “national Common Trust Framework.” Does this refer to the Trusted Exchange Framework and Common Agreement (TEFCA) specified in the 21st Century Cures Act? | RFP Section 5.10.4(h) refers imprecisely to the "national Common Trust Framework." | Suggest replacing the phrase in RFP Section 5.10.4 h) "national Common Trust Framework" with “Trusted Exchange Framework and Common Agreement (TEFCA).” | Concur. Will negotiate with Cerner for inclusion of language. |
| 25 | Clarify if the “provider collaboration via secure e-mail using Direct standards” is limited to the Direct protocols and just the Cerner platform. | RFP Section 5.10.4(i) requires the Contractor, by IOC, to "provide a capability for provider collaboration via secure e-mail using Direct standards within a Cerner Millennium EHR workflow context." | Suggest adding to RFP Section 5.10.4(i): "the ONC Direct protocol or future VA-designated standard." | Concur. Will negotiate with Cerner for inclusion of language. |



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|---|---|---|---|---|
| | | **Commit to Open, Standards-Based APIs** | | |
| 26 | Be specific about the VA publishing / access service requirements. | RFP Section 5.5.4 includes requirements that all significant data stored in the software is accessible through API's with no requirement for creation of custom applications to specifically access VA data. RTM VA-NF-7 requires the system to support the ability to access data elements using open standard-based interfaces including legacy data. Clarification is needed to ensure the intention to pursue standards-based APIs. | Suggest adding to RFP Section 5.5.4 – "standards-based" in front of APIs. | Concur. Will negotiate with Cerner for inclusion of language. |
| 27 | Define in the contract the VA publishing / access services specifically for (1) Veteran access services (e.g., vets.gov), (2) VA clinician access services, (3) Partner access services, and (4) HIE access service. | RFP Section 5.5.2 describes identity and access management requirements including user population types and the association of specific application permissions tied to roles/positions. RTM VA-NF-6 through 48 describe specific access services required. | None. | Concur. |
| 28 | Ensure external API developers can host their apps on an app platform that is NOT controlled by Cerner (and therefore does not require Cerner licensing and approval). | RFP Section 5.1.8(d) requires the contractor analyze and propose a way forward for the capability for external apps to use HealtheIntent as a data source.<br><br>Section 5.5.4 requires the contractor to support data exchanges via the API gateway.<br><br>Section 5.10.4.2 requires the contractor to work in good faith to integrate the EHRM with the Digital Veterans Platform API gateway. | Suggest replacing the second sentence in 5.10.4.2: "The Contractor shall integrate the EHRM to interoperate with DVP or future state VA platform." | Concur. Will negotiate with Cerner for inclusion of language. |



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|---|---|---|---|---|
| 29 | Include requirement for Cerner to provide CDS Hooks to support open clinician workflow. | RFP Section 5.8 requires the contractor provision robust data analysis toolsets that allow, among other things, analytics and Clinical Decision Support (CDS).<br><br>VA-NF-T26 requires "integration with Cerner via standards-based interfaces (including but not necessarily limited to support for FHIR APIs and/or OMG CDS API/ HL7 CDS APIs (e.g., CDS Hooks)". | None. | Concur. |
| 30 | Specify the required utility services to support intermediary or peer-to-peer services; e.g., support Veteran-directed or Veteran-mediated request, exchange, and ingestion from non-VA providers (via APIs where available). | RFP Section 5.10.4(c) requires "the Contractor shall provide a software solution enabling VA to release and consume, via on-demand access, a Veteran's complete longitudinal health record to and from DoD and connected community partners. The longitudinal record solution shall support Provider-to-Provider record sharing, as well as Provider-Veteran-Provider sharing (Veteran mediated record sharing), including appropriate consent management." | Suggest adding ", regardless of which EHR they use" after "connected community partners…to and from DoD and connected community partners, regardless of which EHR they use." | Concur. Will negotiate with Cerner for inclusion of language. |
| 31 | Require that VA has full authority to connect any VA-approved, secure third-party app with the Cerner system, without Cerner approval. | RFP Section 5.7.1 requires the contractor provide on-site integration for devices connecting to the Contractor system.<br>VA is fully responsible for the security of its systems and protection of its data. | Suggest adding to 5.7.1b: "including via the Digital Veterans Platform…support for VA-approved third-party apps connecting to the Contractor system, including via the Digital Veterans Platform."<br><br>Suggest adding to 5.7.1 – "g) Permit and approve connecting all VA approved secure apps without additional fees or licensing." | Concur. Will negotiate with Cerner for inclusion of language. |



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| 32 | Ensure the API developers retain their IP rights when their API is used to connect to the Cerner interface. | RFP Section 5.5.4 sets forth requirements with respect to APIs, including paragraph (e), which provides for the provision and maintenance of a Developer Portal.<br><br>Section 5.10 generally promotes innovation while 5.10.4.2 requires the Contractor to support the Digital Veterans Platform (DVP) API gateway which is intended to provide a neutral application platform for third party APIs.<br><br>Additional language is required to promote innovation in the creation of third party applications by removing derivative or cascading intellectual property restrictions/ constraints. | Suggest adding to RFP 5.5.4(e): " and provide policies and procedures for the use of the Developer Portal(s) and APIs that promote innovative third-party API development" and "Third party API developers shall retain their IP rights when their API is used to connect to the Cerner interface, and there will be no derivative IP ownership when third parties consume Cerner terminology through open APIs." | Concur. Will negotiate with Cerner for inclusion of language. |
| 33 | Require the ability for 3rd party apps to remain connected to the Cerner system and receive automatic notification on updates (e.g., vaccination). Allow the app to connect without being cut off in accordance with VA security requirements. | RFP Section 5.7.1 requires the contractor provide on-site integration for devices connecting to the Contractor system. | Suggest adding to RFP Section 5.7.1(b): "support for third-party apps connecting to the Contractor system."<br><br>Suggest adding the following new paragraphs (ii) and (iii) to RFP Section 5.7.1(b): "ii. Provide ability for third-party apps to remain connected to the Contractor system in accordance with VA security requirements and receive automatic notification on updates; and iii. Allow the app to remain connected without interruption lasting longer than a certain period of time to be approved by the Government." | Concur. Will negotiate with Cerner for inclusion of language. |



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| 34 | Incorporate the model RFP language necessary for Cerner to support the API and SMART on FHIR platform and SMART-enabled applications. | RFP Section 5.10.4 and the Requirements Traceability Matrix refer to SMART and FHIR based applications but do not incorporate all elements of the suggested functionality such as the support for standards-based embedding of external application UI (HTML5). | Suggest adding to RFP Section 5.10.4: "In addition, the software and services shall support the VA designated standards, such as SMART on FHIR and SMART-enabled applications, or published standard at the time." | Concur. Will negotiate with Cerner for inclusion of language. |
| **Use Community Care Contracts to Foster Interoperability** | | | | |
| 35 | Before the contract is signed, get Care Act providers and Cerner competitors to commit to support the contract as early adopters. | Pre-contractual activity and pertains to future strategic discussions to drive interoperability in the marketplace. | None. | Concur. |
| 36 | Require publication of the EHRM /Cerner clinical data model in the National Library of Medicine (following the Kaiser example). | RFP Section 5.10.4.1 states: In support of the interoperability objectives under this Section, agreed upon Contractor proprietary information/data model extension points (e.g., ingestion and record APIs) may be provided to both international and national standards designating organizations as described and set forth in an applicable Task Order. | None. | Concur. |
| 37 | Require the Veteran to be able to invoke their right of access to data as the intermediary to support data exchange (e.g., pull through their API on phone and push to their community care provider). | RFP Section 5.7.1 requires support to Veterans ensuring they can effectively navigate the HealtheLife patient portal and Wellness programs to effectively manage their health. | Suggest adding to RFP Section 5.7.1(c): “using mobile apps, thin-client and thick-client solutions" and “Veterans shall be able to enable sharing of their health data with their community care providers in accordance with all VA-designated national standards." | Concur. Will negotiate with Cerner for inclusion of language. |



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|---|---|---|---|---|
| 38 | Require Cerner and the Community Care provider applications provide bi-directional health information in exchange for using the VA-provided API gateway. | RFP Sections 5.10.1, .2, and .3 require support for innovation and other development activities.<br><br>Section 5.10.4(c) requires "a software solution enabling VA to release and consume, via on-demand access, a Veteran's complete longitudinal health record to and from DoD and connected community partners."<br><br>VA-NF-61, -63, and -65 requires bi-directional interface in support of Pharmacy. This requirement can be fulfilled by a flat file and does not require the data to be computable. | Suggest adding to RFP Section 5.10.4(c): "The bi-directional health information exchange shall maximize use of discrete data that supports context-driven clinical decisions and informatics." | Concur. Will negotiate with Cerner for inclusion of language. |
| 39 | Shift VA policy enabled by the Choice Care Act from "Opt-In" to "Opt-Out" such that the starting assumption is that data can be shared unless the Veteran "opts out." | Review and revise VA policy. | None. | Concur. |
| | | **Other** | | |
| 40 | Analyze and understand the operational cost to VA to implement and operate under the proposed solution. | Analysis of cost information is not part of a IDIQ contract. It will be done as part of the standard PMO processes. | None. | Concur. |



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| 41 | Incorporate requirement that subsequent updates and improvements to the Cerner solution is part of the baseline contract (and cost). | RFP Section 5.2.3 Software Maintenance requires: The Contractor shall provide its commercial support and maintenance services described in its End User License Agreement. Leveraging Contractor's best practices and agreed upon upgrade schedule between DoD and VA, software maintenance includes all releases of the software such as major releases, minor releases, maintenance releases. | None. | Concur. |
| 42 | Address the differences between federal and state privacy laws - policy that Federal laws take precedence over state laws. | Federal and state privacy laws can only be addressed through legislation. | None. | Concur. |
| 43 | Ensure VA has no gag order: Require Cerner to allow open, public sharing/reporting (e.g., screen shots) on issues or errors with the EHR solution (e.g., if there is a known anomaly, that anomaly and its work-around is shared with the Cerner user community). | RFP Section 5.3.3 - System Quality and Performance Measures and Monitoring is appropriate to capture this requirement.<br><br>There is no explicit contractual language requiring the contractor to disclose issues or efforts, nor is there language explicitly preserving the right of VA to share such information. | Suggest adding to RFP Section 5.3.3: "Contractor is responsible for reporting all issues or errors associated with the EHR solution and acknowledges and agrees that errors shall not be considered confidential, proprietary or trade secrets, and accordingly, shall be releasable to VA or its agents. VA retains the right to share any issue, error or resolution approach." | Concur. Will negotiate with Cerner for inclusion of language. |
| 44 | Define the way ahead for 3rd party apps (sunset, rebuild and transition) during the Cerner transition. | This should be evaluated in congruence with the legacy transition plans (pivot plans) of existing systems to Cerner. | None. | Concur. |
| 45 | Emphasize the need and resource commitment to achieve clinician consensus, change management, and culture. | RFP Section 5.5.7 Organizational Change Management includes a detailed approach to clinician consensus, change management and culture change. | None. | Concur. |



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| 46 | Develop a roadmap for all EHR vendors that specifies how Veterans and providers access and share their data and get that data from A to B. This is not limited to the Cerner solution, but includes legacy and community care systems. | These tasks are not part of the IDIQ and will be addressed via Data Migration Plan and Data Management Strategy across VA. | None. | Concur. |
| 47 | Require ability for VA to innovate using the Cerner solution, including support to a Veteran Interoperability Partnership Lab. | RFP Section 5.10: Innovation and Enhancements includes an innovation process, categories and development activities to enable VA innovation activities using the Cerner solution. The language is sufficiently broad to support issuance of a Task Order requiring the Contractor to support interoperability activities including a Veteran Interoperability Partnership Lab.<br><br>MITRE recommends this lab be independently managed and used to support 3rd party innovators, demonstrate interoperability solutions, validate the effectiveness of interoperability solutions in an end-to-end clinical use case context, and serve as a reference architecture to allow 3rd party stakeholders to exercise innovations. | None. | Concur. |



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|---|---|---|---|---|
| 48 | Understand how Cerner will manage data quality, including provenance, error bounds, data looping, security, etc. | The RFP Section 8.6 refers to the use of Quality Assurance Surveillance Plans (QASP), which is intended to establish Contractor accountability to what VA requires and values.<br><br>VA-NF-T46 requires "The system shall support provenance (chain of custody or ownership) and pedigree (processing history how the data was produced or incorporated) and enable identification, collection, and production of data according to source, custody and ownership and display of data in business, logical, legal or physical models." | None. | Concur. |



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|---|---|---|---|---|
| 49 | Understand how Cerner will provide VA with access to the data model, share data for analytics freely to 3rd parties, increase the amount of computable data exchanged with 3rd parties.<br><br>Panelists acknowledged this recommendation is a stretch goal. | RFP Section 5.8 address the support to business intelligence and data analytics. Section 5.10.4.1 supports the sharing of Contractor proprietary information/data model extension points (e.g., ingestion and record APIs) with both international and national standards designating organizations. However, current language does not require access to the EHRM data model, supporting understanding of and therefore increase the exchange of computable data with community care providers. | Suggest adding to RFP Section 5.8: "h) Provide VA EHRM data model, underpinning terminology model, tables, definitions, and examples of fully populated Veteran data files. Provide documentation or software that is used for quality checks and that illustrate what data elements are computable."<br><br>Suggest adding to Section 5.10.4.1: "n) The Contractor shall support Knowledge Interoperability by supporting the extension of clinical content assets such as terminologies, clinical decision support rules, order sets, etc. This includes the ability to curate, extend, and share that knowledge with clinical partners. This fosters rapid adoption from industry best practices, e.g., clinical professional societies."<br><br>Suggest VA obtain a price from the Contractor to provide a report explain the steps involved in accessing the data model, including producing an example data file, and demonstrating how much of the data is computable; provide cost estimates for outside parties to access the data via this mechanism. | Concur. |



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|---|---|---|---|---|
| 50 | Understand how the Cerner EHRM solution will improve Veteran and clinician experiences. | RFP Section 5.2.1 describes the EHR application, however does not specifically focus priorities on the Veteran and clinician experience as captured in end-to-end use cases.<br><br>Section 8.6 refers to the Quality Assurance Surveillance Plans, which include Functional and Non-Functional Key Performance Indicators (KPIs). These KPIs will reflect VA priorities which include improvement of both Veteran and clinician experiences. | Suggest adding to RFP Section 5.2.1.1: "k) Provide for the ability to measure the EHRM performance that contributes to any end-to-end use case, thereby capturing its impact on improving a Veteran and clinician experience." | Concur. |



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# Appendix D: Acronyms

| | |
|---|---|
| API | Application Programming Interface |
| CCHIE | ClinicalConnect Health Information Exchange |
| CDS | Clinical Decision Service |
| DoD | Department of Defense |
| EHR | Electronic Health Record |
| EHRM | Electronic Health Record Modernization |
| FHIR | Fast Healthcare Interoperability Resources |
| HIE | Health Information Exchange |
| HL7 | Health Level Seven International |
| IP | Intellectual Property |
| IT | Information Technology |
| PWS | Performance Work Statement |
| RFP | Request for Proposal |
| UPMC | University of Pittsburgh Medical Center |
| VA | Department of Veterans Affairs |
| VACO | VA Central Office |
| VHA | Veterans Health Administration |



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# Report on the Strategic Options for the Modernization of the Department of Veterans Affairs Electronic Health Record

May 1, 2017

Grant Thornton

# Table of Contents

1.0 Executive Summary 1
*Key Decision Criteria and Trade-offs* 2
2.0 Background 5
*2.1 Objective* 7
*2.2 Guiding Principles* 8
*2.3 Analysis Framework and Approach* 9
10
3.0 Findings 10
*3.1 Strategic and Cultural Fit* 11
*3.2 Summary of Alignment with Strategic and Cultural Fit* 13
*3.3 Functionality and Technology* 13
*3.4 Benefits* 17
*3.5 Risks* 18
*3.6 Summary of Non-Cost Assessment* 20
4.0 Cost Assessment 22
*4.1 Analogous Cost Methodology* 22
*4.2 Vendor Discussions* 22
*4.3 Industry Research and Benchmarking* 23
*4.4 Option-Specific Costs* 24
*4.5 Estimated Implementation Timeline* 25
*4.6 VA Costs* 25
*4.7 Complexity Factor* 26
5.0 Summary of Findings 27
6.0 Recommendations 28
7.0 Bibliography 30
8.0 Appendix A: Macro Assumptions A-1
9.0 Appendix B: Stakeholder Interview Findings B-1
*9.1 Clinical Stakeholder Findings* B-1
*9.2 Validation of Findings with VHA Executive Leaders* B-4
*9.3 OI&T Stakeholder Findings* B-7
*9.4 Stakeholders Interviewed* B-9
10.0 Appendix C: Identification of Applicable Market Trends C-1
*10.1 Precision Medicine* C-1
*10.2 Telehealth Services* C-1

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*10.3 Advanced Computing* _____ *C-2*
*10.4 Delivering Patient Care through Innovation* _____ *C-3*
11.0 Appendix D: Calculation of Cost Estimates _____ D-1
*11.1 Option 1: COTS EHR* _____ *D-1*
*11.2 Option 2: COTS with eHMP* _____ *D-4*
*11.3 Option 3: Commercialization of VistA* _____ *D-5*
*11.4 Option 4: SaaS* _____ *D-8*
12.0 Appendix E: VistA Packages _____ E-1

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# Strategic Options for the Modernization of VA's EHR

## 1.0 Executive Summary

The Department of Veterans Affairs (VA) engaged Grant Thornton to assess four strategic options for modernizing its Electronic Health Record (EHR)[1]. VA's EHR has not kept pace with industry and does not adequately support the current and future needs of Veterans and VA clinicians. This analysis assessed the market's ability to meet VA's needs through these four strategic options.

**Figure 1. EHR Strategic Options**

| | |
|---|---|
| **Option 1: COTS** | Adopting a Commercial-of-the-shelf (COTS) product for the EHR where VA hosts the solution in a VA purchased, federally certified, secure cloud environment |
| **Option 2: COTS +eHMP/JLV** | Adopting a Commercial-of-the-shelf product for the EHR including the Electronic Health Management Platform (eHMP) and the Joint Legacy Viewer (JLV), where VA hosts the solution in a VA purchased, federally certified, secure cloud |
| **Option 3: Commercialized Vista** | Providing a gold standard VistA version to a vendor to modernize and provide back to VA as a Software as a Service (SaaS), where the vendor hosts the solution in a federally certified, secure cloud, and provides discounted licensing |
| **Option 4: COTS SaaS** | Adopting a COTS product for the EHR where the vendor hosts the solution in a federally certified, secure cloud, and VA licenses software use |

The analysis found that the market can provide for VA's EHR needs with low variability in cost among the options leaving the primary differences in the value VA will place on the benefits and risks of owning and administering the software and the degree of influence and autonomy that VA can exercise. *Option 3: Commercialized VistA* is the least expensive option but carries the greatest risk. Potential modernization partners include immature start up business that carry risk in sustaining their business and risk in scaling to the VA enterprise. Other potential partners include mature businesses who do not anticipate adequate economic return for their investment due to low potential market capture. *Option 2: COTS + eHMP/JLV* is the most expensive option and is less aligned with OI&T's strategic priority to buy first. However, both *Option 3: Commercialized VistA* and *Option 2: COTS + eHMP/JLV* provide VA the highest degree of tailorability.

Comparatively, *Option 1: COTS* and *Option 4: COTS SaaS*, cost the same and primarily vary in the control and flexibility VA retains over the EHR. If VA hosts the EHR, it has greater flexibility to integrate new solutions as they emerge in the market, but would bear the responsibility for hosting, which requires IT investment and skills. Unlike *Option 4: COTS SaaS*, where the vendor would bear the responsibility for hosting the EHR, VA would have to negotiate the addition of new solutions during contract negotiations. Because the decision among the strategic options resides on trade-offs between a few key factors, the next section will address those factors and their trade-offs.

---

[1] According to the Healthcare Information and Management Systems Society (HIMSS), "Electronic Health Record (EHR) is a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting. Included in this information are patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data and radiology reports. … The EHR has the ability to generate a complete record of a clinical patient encounter - as well as supporting other care-related activities directly or indirectly via interface - including evidence-based decision support, quality management, and outcomes reporting."

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## *Key Decision Criteria and Trade-offs*

We evaluated the strategic options against VA's clinical and IT priorities, strategic direction and future trends in healthcare and health IT to derive the decision criteria. Figure 2 highlights how each option addresses the key decision criteria.

**Figure 2. Decision Criteria applied to each Option**

| Decision Factor | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| **Time to Initial Operating Capability (IOC)** | • Out-of-the-box functionalities fulfilling >80% of VA's needs<br>• Estimate 18-24 months to IOC ~ Pilot Site post acquisition | • Out-of-the-box functionalities fulfilling >80% of VA's needs<br>• Additional time to re-design and scale eHMP to COTS solution<br>• Estimate 18-24 months to IOC ~ Pilot Site post acquisition | • Requires modernizing a single instance of VistA software prior to implementing, which will add at minimum an additional 12 months<br>• Estimate 24-36 months to IOC ~ Pilot Site post acquisition | • Out-of-the-box functionalities fulfilling >80% of VA's needs<br>• Estimate 18-24 months to IOC ~ Pilot Site post acquisition |
| **Interoperability with other health systems** | • All top tier COTS vendors meet multiple interoperability standards (e.g., FHIR) to create longitudinal record | • Same as Option 1: COTS. Also, JLV provides a static view of external records, but does not create the longitudinal record<br>• eHMP to provide longitudinal record | • Interoperability capability would have to be built into the commercialized VistA solution | • All top tier COTS vendors meet multiple interoperability standards (e.g., FHIR) to create longitudinal record |
| **Flexibility** | • VA administered cloud increases VA flexibility to access 3rd party vendors (e.g., best in class population health) | • Same as Option 1 for COTS<br>• eHMP for new capabilities over time, dependent on development time, which may exceed market timeliness | • Vendor administered cloud decreases VA flexibility to access 3rd party vendors (e.g., best in class population health) because vendors may have pre-existing agreements. | • Vendor administered cloud decreases VA flexibility to access 3rd party vendors (e.g., best in class population health) because vendors may have pre-existing agreements. |
| **Modernity** | • Industry leading software that regularly upgrades based on best practices and industry innovation<br>• Fully integrated solution with modern team based communications | • Same as Option 1 for COTS<br>• eHMP functionality would need to be de-conflicted of overlapping capability and then integrated with the COTS product. | • Vendor's commitment to continuous upgrade contingent on ability to sell the solution at other clients and make a profit<br>• VA may have to invest or enter into risk sharing arrangements if the vendor is not able to sell the solution to a critical mass to break even | • Same as Option 1: COTS |
| **Tailorability** | • COTS out-of-the-box capabilities allow software configuration to meet end-user practice preference (e.g., physician note templates) | • Same as Option 1: COTS<br>• eHMP adds capability to tailor because it is a VA developed and managed product | • Highest level of tailorability<br>• May require additional cost to purchase leading business and clinical workflows from 3rd party entities | • Same as Option 1: COTS, except code level change (customization) may not be possible because software may be shared by other clients of the COTS vendor (e.g., DoD) |

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| Decision Factor | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| | • Code level change (customization) incurs additional cost | | | |
| **IT Strategic Alignment** | • Aligns with all the strategic priorities except cloud is VA administered | • Does not align with the following strategic priorities: buy first, reduce IT footprint | • Aligns with all IT priorities | • Aligns with all IT priorities |
| **Cost** | • Total = $16.2B<br>• Includes $184M for VA cloud hosting | • Total = $18.7B<br>• Includes $525M for eHMP cost | • Total = $11.9B<br>• Assumes $830M software costs absorbed by vendor | • $16.0B<br>• VA does not incur hosting costs |
| **Relative Risk** | • Medium risk since vendors implement their solutions in this manner routinely | • Higher risk due to continued reliance on internally developed software | • High risk due to limited partner viability or appetite | • Medium risk since vendors have SaaS models in place |

Figure 3 provides a detailed breakdown of 15-year costs associated with each option. Grant Thornton surveyed industry to determine the typical cost breakdown of EHR implementations and used the software costs provided by vendor estimates to extrapolate the total cost of vendor and prime integrator costs. Additional details regarding the basis for costs are provided in the Section 4.0 of this document as well as in Appendix D.

**Figure 3. Rough Order of Magnitude 15-year Costs of Four Options**

| Cost Component | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| | | **Vendor Costs** | | |
| **Software Implementation Cost** | $4,211,574,074 | $4,736,574,074 | $1,507,526,047 | $3,327,143,519 |
| **Post-Go-Live Software Cost** | $1,332,060,606 | $1,332,060,606 | $1,170,000,000 | $2,664,121,212 |
| **Vendor Total** | **$5,543,634,680** | **$6,068,634,680** | **$2,677,526,047** | **$5,991,264,731** |
| | | **Services Cost** | | |
| **Change Management Cost** | $1,052,893,519 | $1,527,858,025 | $1,109,047,840 | $1,109,047,840 |
| **Data Migration Cost** | $505,382,301 | $505,382,301 | $505,382,301 | $505,382,301 |
| **Prime Integrator** | $2,161,941,358 | $2,161,941,358 | $1,707,933,673 | $1,707,933,673 |
| **VA PMO Cost** | $2,315,962,964 | $2,565,954,091 | $2,328,407,136 | $2,328,407,136 |
| **Cloud Hosting** | $184,673,700 | $184,673,700 | - | - |
| **Services Subtotal** | **$6,220,853,842** | **$6,945,809,474** | **$5,650,770,949** | **$5,650,770,949** |
| **Contingency** | $2,352,897,704 | $2,602,888,831 | $1,665,659,399 | $2,328,407,136 |
| **Subtotal** | **$14,117,386,226** | **$15,617,332,985** | **$9,993,956,395** | **$13,970,442,816** |
| **Complexity Factor*** | $2,117,607,934 | $3,123,466,597 | $1,998,791,279 | $2,095,566,422 |
| **Grand Total** | **$16,234,994,160** | **$18,740,799,583** | **$11,992,747,674** | **$16,066,009,238** |

* Due to the early stage of planning for the EHR modernization, lack of business and technical requirements, and the complex nature of transitioning from 130 instances of VistA, we expect additional complexity and cost to be identified during the planning phase of this effort. We therefore added a 15% complexity factor to Options 1 and 4 and a 20% complexity factor to Options 2 and 3 to account for their respective complexities.

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## *Summary*

Multiple strategic paths exist for VA's EHR Modernization, each with their own risks, costs and benefits. Understanding the relative value of the different decision criteria will help VA to make its decision. When assessing this relative value, it is helpful to think about the state of VA at two points in time: 1) One (1) year after acquisition of a new EHR, and 2) Ten (10) years after acquisition. These two points in time reflect key junctures where VA will want to understand what success looks like, after which VA can determine which options are most critical to that success. Secretary Shulkin described success for VA at one year as a time similar to where DoD is now with a decision made, a pilot in one area, and steady, deliberate progress being made. For the ten year juncture, research materials and interviewees described a modern health system with readily exchangeable information and tools that enable advanced analytics, including precision medicine and population health, and intelligence into clinical workflows and decision making. Framing a VA leadership discussion around success at these two junctures and prioritizing the decision criteria, will enable VA leaders to select an option that creates a shared vision of success and is in alignments with the full organization's strategic direction.

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## 2.0 Background

The Veterans Health Administration (VHA) is the largest integrated healthcare system in the United States, providing care at more than 1,200 sites of care, serving more than 8.9 million Veterans each year.[1,2] In many ways, VHA provides care to Veterans similarly to how their commercial counterparts provide care to the general population. However, VHA has a unique mission, patient demographic and disease burden (e.g., combat and exposure related conditions) that has an impact on how they manage the Veteran population and how they execute their quartet mission of caring for the Veterans, supporting medical research, providing medical education and serving as a back-up to DoD during national emergencies.

VHA's goal to provide whole healthcare to Veterans, no matter their geographic location or economic circumstance, drives the need for a network providing the full range of integrated physical and mental healthcare, where clinicians strive to understand health and wellbeing of their patients across all clinical domains and across the Veteran's entire life, to include during times of service and as Veterans, whether they receive care from VA, Department of Defense (DoD) or community care providers.

Because of the demographics of the Veteran population – living in locations from densely urban to sparsely populated – VA must also enable its clinicians to communicate with, treat and support their patients using the most advanced technologies available. To support this mission, VA is assessing available technologies to replace its current electronic health record (EHR) system with a more modern, adaptable technology that can leverage the innovations made in the commercial market to support the whole healthcare of Veterans across the country.

Currently, VHA's EHR runs on the Veterans Information Systems and Technology Architecture (VistA), a platform that was originally developed as a home-grown system more than 30 years ago to support clinical care delivery (with other management functions added over time) and still managed by VA today. At its inception, VistA was a revolutionary concept in healthcare management and served as an industry catalyst in the development of commercial EHR vendors such as Cerner and Epic. Over the years, VistA has proven to be a durable platform for automating both clinical and operational processes and workflows. In fact, VA currently uses VistA to handle supply chain, security, inventory management and a number of other operational activities, in addition to clinical operations such as order entry and pharmacy.

VistA has worked for VA for many decades and has leveraged new technologies such as Bar Code Medication Administration (BCMA) and management support capabilities such as supply chain, inventory management and human resources. Several factors, however, have led VA to question whether continuing with VistA is the best path forward. This is especially true now that more agile and technologically advanced EHR platforms are readily available in the commercial sector that can serve as the launching pad for delivering functionalities (e.g., clinicians reviewing and editing Veteran records and images remotely, Veterans scheduling appointments using mobile devices) that have already become common in the commercial market while adopting new innovations (e.g., provide virtual health including video communication and vitals assessment).

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These factors include:

- *Technology*: The level of complexity in VistA has increased over the years due to several factors, including the development of VistA into multiple instances as each facility changed its code. In addition, limited enhancements delivered in recent years have led to several sub-modules of VistA lagging behind its commercial off-the-shelf (COTS) counterparts in functionality (e.g., lab, radiology, scheduling). While VA has been a leader in developing and deploying telehealth capabilities, it has fallen behind commercial products in integrating these capabilities within VistA. Additionally, the financial, administrative and other support modules in VistA have lost ground relative to COTS products and do not provide the expected level of service and capability in features such as dynamic/on-demand scheduling, population health and patient engagement. In many ways, industry innovation in EHR technology has leapfrogged VA. This sentiment was echoed by VHA field leadership where three out of five respondents surveyed agreed to the clinicians' desire to have advanced capabilities where the EHR could self-populate the Veteran's information from multiple sources and provide them with salient points and lead them through the visit with minimal keying of data into the system.

> *We have been leaders in integrated electronic health records, big-data analytic capabilities, and comprehensive care, including provision of support for team-based primary care, integration of behavioral health services, attention to social determinants of health, and caregiver involvement. – Dr. David Shulkin, 2016*[54]

- *Complexity*: While clinicians expressed appreciation for the ability to customize VistA to meet their local needs, more than three out of five VHA clinicians and leadership surveyed felt that VistA and its clinical packages were not as user friendly as they could be. They said that "there are too many clicks necessary to get where you need to go, and too many screens to navigate." Local customization and work arounds have increased the level of complexity and made the integration of new capabilities across the enterprise even more challenging. The downstream impact of high variability and complexity without a universal data model and integrated data management is that data is recorded in different ways across different and often incompatible systems leading to clinician frustration and potential adverse Veteran experiences, such as continuing to send appointment reminder notifications to a Veteran's widow even after the Veteran's death. Lack of standardization can also cause clinical practice variation and may impede organizational ability to pursue emerging models of care and to perform population health analytics.

- *Interoperability*: VistA is deployed throughout VA in a decentralized manner, with 130 instances hosted at VA data centers throughout the country. Coordination and communication among the individual instances of VistA can be a challenge. In addition, with more and more Veterans relying on both VA and community care providers, seven out of ten VISN directors and VHA leadership surveyed felt that information coming from outside providers need to be a part of the record to provide high quality and integrated care. Therefore, to deliver on VHA's mission, VA needs to adopt a platform that can promote and support seamless interoperability of Veteran's health record within the enterprise, with DoD and across organizations in the community. Interoperability and data sharing across disparate systems is an area of growing focus within the health care community and VA with its sheer size and scale can potentially be the catalyst to drive change.

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- *Cost*: Recent studies suggest that VA Office of Information and Technology (OI&T) spends as much as 85 percent ($3.6B) of its annual budget on infrastructure operations and maintenance. That leaves only 15 percent to spend on enhancements and innovations for all VA systems. This level of continued cost to maintain and upgrade VA's IT infrastructure is unsustainable for VA if it plans to modernize its technology footprint and support its clinicians in delivering quality care to its Veterans.

For these reasons, VA leadership is evaluating strategic options that include commercial solutions for its EHR. In support of VA's decision making process, Grant Thornton conducted this strategic analysis to support Secretary of Veterans Affairs Dr. David Shulkin's decision, focusing on VA's future clinical and IT strategies and current and future market trends VA should consider when making a decision.

## 2.1 Objective

Secretary Shulkin announced in January 2017 that he would make a decision regarding the future of VA's EHR platform in July 2017.[3] VA directed Grant Thornton to conduct an independent assessment of four strategic options for modernizing its EHR, with a focus on technological aspects of the implementation. The four strategic options are as follows:

- *Option 1- Commercial off-the-shelf (COTS) EHR:* VA selects and implements a COTS EHR product and uses it for clinical and revenue cycle functionality. Although not all needs may be met by a single vendor, VA has the option to purchase additional COTS functionality and incorporate/integrate it with the primary COTS solution. The COTS EHR product will be hosted within a VA-purchased and operated, federally-certified, secure cloud environment (e.g., Amazon Web Services, Microsoft Azure).
- *Option 2 - COTS EHR combined with the Joint Legacy Viewer (JLV) and electronic Health Management Platform (eHMP):* This option is similar to *Option 1: COTS* plus VA retains the JLV and eHMP, both VistA packages, to develop and implement additional capabilities to fill gaps in COTS EHR capabilities. The COTS EHR product will be hosted within a VA-purchased, federally-certified, secure cloud environment.
- *Option 3 - VistA commercialization:* VA transfers VistA to a third-party vendor, and after modernization by the vendor, VA purchases licenses to use VistA as Software as a Service (SaaS). VA will receive considerations for pricing such as reduced licensing and implementation costs in exchange for VistA intellectual property rights. VA may also negotiate other terms such as directed development of new functionality to meet VA's specific requirements. In the SaaS arrangement, the vendor provides the software on a subscription basis and is responsible for hosting the software in a federally-certified, secure cloud environment.
- *Option 4 - COTS EHR provided as SaaS:* This option is similar to *Option 1: COTS*; however, in this option, the COTS EHR product is hosted and fully supported and managed by the vendor. In the SaaS arrangement, the vendor provides the software on a subscription basis and is responsible for hosting the software in a federally-certified, secure cloud environment.

This paper provides a high-level assessment of the four strategic options introduced above and the associated costs for implementing each option. The paper does not provide a recommendation on EHR vendors, but instead, shares insights captured from VA clinicians, leadership and staff regarding their needs or priorities and how they map to the capabilities offered by each strategic option. To ensure long-term success, the paper also provides key considerations around assessing and upgrading VA's technology infrastructure and hardware so that they may be able to support the strategy and solution preferred by VA.

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## 2.2 *Guiding Principles*

Selecting an EHR is not just a technology decision; it is an organizational decision. Both the EHR selection process and ensuing implementation will be profoundly transformative. The guiding principles are intended to be enduring and will drive strategic evaluations regarding IT and change management.

Technology and change management decisions must be balanced relative to business and clinical, operational, and architecture and engineering principles. Doing so will maximize the business value of IT as it relates to EHR, mitigate programmatic and technical risks, smooth change integration, enhance systems and data quality, and ensure predictability and transparency in outcomes. These principles are factored into the assessment.

### 2.2.1 Business and Clinical Principles

- Patient safety and quality care are not compromised during EHR transition.
- A modernized EHR supports Veteran-centered, quality-driven, data-driven, evidence-based and team-based care.
- Clinical priorities drive EHR functional needs. IT trends and disruptive innovations can enable/inform EHR system functions. Requirements are driven by stakeholder principles (e.g., clinician, researcher, care team).
- EHR standardization is balanced with managed configurability.
- A modern EHR is flexible and can adapt to current and future healthcare and information technology trends.
- EHR information is integrated across care settings (e.g. outpatient, inpatient, operating room, emergency department, long-term care, mental health, and telehealth) and provides a longitudinal view of the Veteran's record.
- Decisions are optimized for VA and achieve economies of scale.
- Innovation and agility are non-negotiable.

### 2.2.2 Operational Principles

- Change management and standardization of clinical processes (including business process reengineering) and data are critical to the success of EHR modernization. EHR modernization must be minimally disruptive to hospital and clinic operations.
- VistA EHR legacy represents the baseline. Consequently, clinical excellence cannot regress as a result of IT changes during EHR modernization.
- VA leverages EHR lessons learned and leading practices from other large scale healthcare organizations (e.g., Kaiser Permanente, DoD and Mayo Clinic).

### 2.2.3 Architecture and Engineering Principles

- An EHR system should be architected from a system-of-systems perspective, optimizing systems quality (e.g., reliability, scalability, maintainability, usability, etc.).
- EHR systems should promote open architecture and standards so that clinical tools remain available to public and private sector providers.
- An EHR should incorporate standardized business processes and define standardized data and information models, taxonomy and terminologies.
- Data is an essential asset, so integrity and quality must always be sustained. There is zero tolerance for data loss during the transition to a modern EHR system.

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- The EHR must be designed and implemented to provide seamless interoperability with DoD and community care providers, and encourage collaborative partnerships.

## 2.3 *Analysis Framework and Approach*

In evaluating the four strategic options, Grant Thornton leveraged our strategic evaluation framework for adoption of new enterprise technologies, which is comprised of Strategic Fit and Culture; Functionality and Technology; and Cost/Schedule and Viability (Figure 1 on next page).

- Strategic Fit and Culture contains the business drivers and needs for the technology. In this case, strategic fit and culture assesses the needs and desires of the end user clinicians, Veterans and other EHR users, to determine the right high-level expectations any solution must meet. These often include anything from specific technological options and features, to conformity to an organization's culture, mission and approach. We determined the appropriate strategic and cultural fit criteria through research and interviews with key stakeholders, as described below. Effectively, however, strategic fit and culture criteria focused on the clinical priorities of the organization.
- In Functionality and Technology, we assess the alignment of the solution with the organization's technology strategy and capabilities. Any decision regarding a significant technology investment must take the technological strategy into consideration. We determined the appropriate functionality and technology criteria through analysis of organizational strategy, interviews with stakeholders, Congressional testimony and other speaking engagements by VA leaders, and through review of published materials.
- Cost/Schedule and Viability is simply the assessment of each option's overall costs, any differentiation in schedule and the likelihood of successfully implementing each. We assessed these criteria by applying our experience and expertise supporting similar implementations across industry, and by researching similar implementations in government and commercial healthcare organizations.

Grant Thornton interviewed key stakeholders across VHA and OI&T to determine the critical factors customers are seeking in a new EHR solution. Interviewees included:

- VHA and OI&T leadership
- Product development professionals with experience supporting VistA and the eHMP
- IT operations and maintenance staff, to understand how VistA is deployed and understand their recommendations for how VA can improve its sustainment footprint
- VHA clinicians and other EHR end users, including primary care, specialty care, allied health professionals, nurses, and revenue cycle staff

The results of the interviews are captured in Appendix B, but facts and findings derived from the interviews are outlined in the Strategic Fit and Culture, Functionality and Technology, and Cost/Schedule and Viability sections below.

Grant Thornton also conducted market research focused on identifying trends in healthcare delivery and health IT that would bear on the decision regarding EHR modernization. Market research included the study of industry publications and research, including Gartner and Forrester, medical journals, leading-edge technology development and the use and management of enterprise data. Market trends identified as impacting the EHR decision are discussed in Appendix C.

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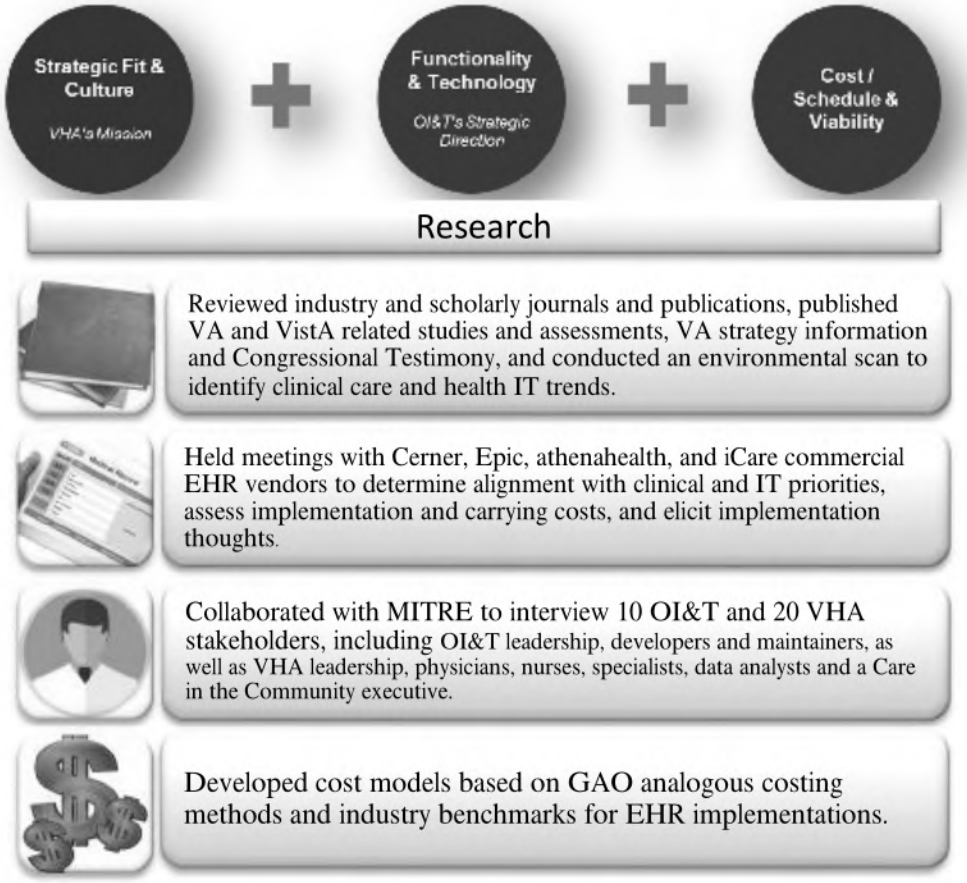
**Figure 1. Research Framework**




Finally, Grant Thornton met with leading EHR vendors to discuss their product offerings and assess fit with VA and OI&T's strategic priorities with respect to the EHR. We assessed products against these priorities, identifying those factors available in the commercial market and those factors that are not. We also discussed pricing methodologies and requested high-level cost estimates to align with our industry research on cost of adopting commercial EHR systems.

## 3.0 Findings

In order to modernize VA's EHR and enhance its ability to carry out the mission of supporting and providing healthcare for America's Veterans, VA has identified four potential options, each with its own series of benefits and risks, as well as unique cost profiles and trade-offs.

When assessing each of the options, the following should be considered:

- *Gaps in specific vendor capability:* In assessing alignment with VA's clinical priorities, we determined that although all priorities are met in the commercial market as a whole, a single vendor may not be able to meet VA's specifications completely, depending on the vendor selected. For example, a single vendor may achieve 90 percent of the solution to VA's specifications, but the other 10 percent is available through other vendors.

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- This increases the importance of the VDP should options 1 or 4 be selected. Through the VDP, VA could integrate best-in-class offerings to fill gaps of a single vendor. In essence, the best-of-breed COTS solution must support the multitude of VA care settings and stakeholders.
- Alternatively, in preparing the solicitation, VA could list out all specifications and place the burden on the bidder to fill gaps, ensuring a complete solution. An integrator would then be responsible for combining all necessary capabilities into a comprehensive EHR solution.

- *Interoperability and care in the community and interoperability:* In assessing interoperability, there is great focus on the interoperability between DoD and VA. However, in interviews and in assessing the care continuum for military members as they serve and transition to Veteran status, the interoperability with DoD is critical at the transition stage, but no more important thereafter than interoperability with community care providers. Therefore, interoperability with DoD alone should not drive the decision regarding the option, or the eventual vendor solution.

- *Buy-first rather than buy-only:* In assessing the options and alignment with IT priorities, it is important to note that the "buy-first" strategy is not a "buy-only" strategy. VA has specific needs that others in the market do not, therefore there is the potential that commercial products may not meet all of VA's needs. This is especially true when considering other management information systems, but may apply to the EHR as well. During interviews, VA staff expressed concern that commercial vendors do not have some of the capability that exists now in VistA; however, the analysis showed that these assumptions are inaccurate and that many of the requested capabilities are in fact available in commercial EHR solutions. Additionally, in many cases, a solution that achieves a vast majority of VA's desires is more cost-effective than building a system from scratch.

## 3.1 Strategic and Cultural Fit

This section provides detailed descriptions around the clinical priorities that emerged as important to VA that align with their strategy and culture. They address five areas: unique features, workflow, team based care and mental health. Upon completing our interviews with VHA staff members and leaders, we asked a group of executive leaders from around the country to rank the identified clinical priorities. The two priorities that were most highly rated were having a single view of Veteran data, and support of team-based care.

> *[VHA's vision is to] continue to be the benchmark of excellence and value in healthcare and benefits by providing exemplary services that are both patient-centered and evidence based. This care will be delivered by engaged, collaborative teams in an integrated environment that supports learning, discovery, and continuous improvement. It will emphasize prevention and population health and contribute to the Nation's well-being through education, research, and service in national emergencies.*[53]

- *Features unique to VA:* VA has several aspects of their care delivery and patient population that are different than in the non-Veteran healthcare delivery market. These include factors such as:
  - Complex eligibility standards and requirements that exist for Veterans to receive VA healthcare, which impact revenue cycle operations (e.g. inability to bill third parties for service-connected care).
  - Disproportionate disease prevalence in the Veteran population for certain conditions such as amputations, traumatic brain injury, post-traumatic stress disorder (PTSD) and specific

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environmental exposures (e.g. Agent Orange), which require the ability to establish and analyze patient cohorts not typically used in the commercial sector.
  - Broad and increasing emphasis on interaction with community care providers that underscores the need for more sophisticated interoperability and better methods of communication between VA clinicians and non-VA providers.
  - A disproportionately high rural population, with 5.2 million Veterans who constitute more than 30 percent of VA's caseload, which requires sophisticated remote capabilities.
  - A whole health focus that integrates management of psychological, social and physical health.

- *Workflow:* Workflow includes the sequencing of activities a clinician will use to treat a patient; it is adaptable to the specific conditions of the patient but standardized across the enterprise. Specific workflow considerations include:
  - *Longitudinal view of the patient record:* For the purpose of this analysis, VHA clinicians described the longitudinal view of the patient record as the ability to review medical information from community and DoD providers within the Veteran's record in one place, rather than needing to access multiple systems for information. Having a single source for all Veteran records is important so that clinicians can provide high quality care based on timely, accurate information and can also prevent medical errors and reduce waste resulting from duplicate laboratory tests or imaging.[4–6] Veterans' care is unique in that they transition from their military service to Veteran status, and their setting of care also changes from DoD to VA and community care providers. A longitudinal view for each patient in an EHR should include current and previous patient demographics, progress notes, problems and medications, as well as vital signs, past medical history, immunizations, laboratory data and radiology reports.
  - *Improved telehealth, mobile and web-based tools:* Due to the geographic dispersion of Veterans across the country, many of whom live in rural areas, VA often employs alternate methods of care delivery. VA Telehealth Services uses both synchronous (e.g. real-time videoconferencing between patients and a care team, remote medical device monitoring) and asynchronous (e.g. acquirement of and transmission of medical data for later review by providers, patient video education modules) communication to supplement face-to-face appointments and make receiving care more convenient for Veterans.[7,8] These initiatives have improved Veteran satisfaction by reducing travel and wait times.[8,9] In addition, providers endorse improved access, care coordination, and quality of care.[9]
  - *Scheduling:* Making it easier to schedule appointments, both face-to-face and via telehealth services will improve efficiency and experience for both clinicians and Veterans.

- *Team-based care/PACT*: There is increasing recognition of the value of team-based care to patients and providers, both in the primary care domain and for treatment of complex medical conditions.[10,11] The patient-centered medical home (PCMH) is one way in which team-based care is delivered, and VA has implemented this through the development of PACT. Implementation of a modern EHR can support PACT through the ability to manage relevant personal health information, allow communication among providers, patients, and care teams, analyze and report on individual and cohort outcomes and quality of care, support providers' clinical decision making, and help patients self-manage their health and medical conditions while collaborating with providers.

- *Analytics and research:* VA stakeholders all stressed the importance of analytics in delivering care. As defined through our interviews, VA clinicians are concerned with two primary types of analytics: real-time clinical decision support tools, powered by analytics, to support the clinician at the point of care; and retrospective analytics, which can support better management of the organization and its workforce, as well as improve care delivery through identification of trends that point to better

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outcomes through different care approaches. The modern EHR should support both of these capabilities, by providing point-of-care analytics in a manner convenient to the provider, as well as the ability to conduct statistical and other analytics on the vast amount of data VA generates.

- *Mental health*: Mental health is one of Secretary Shulkin's top priorities; there is a long history of programs and interventions to support Veterans, who are at higher risk for mental health conditions in general, and specifically suffer from higher incidence of PTSD and suicide. VA has long had a well-integrated mental health program that considers the care of the Veteran holistically and is provided in concert with other care that the patient receives from VA. New technologies have the potential to improve risk stratification and tracking of Veterans to support their mental health, especially through vulnerable periods like the transition from active duty to Veteran life. VA stakeholders also described the need for specific options within the EHR to support documentation of mental health appointments, findings and diagnoses that are not available in VistA.

## 3.2 Summary of Alignment with Strategic and Cultural Fit

After interviews and demonstrations by multiple commercial EHR vendors, Grant Thornton assessed each option with respect to these priorities. There are COTS products that have features addressing all the priorities endorsed by VHA, to include the single view of data and support for team-based care, thus Options 1, 2, and 4 fully align since they all include a COTS product. For *Option 3: Commercialized VistA*, an appropriate vendor contract must ensure alignment with all priorities.

**Figure 2. Option Alignment with Clinical Priorities**

| Clinical Priorities | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| Addresses features unique to VA | ● | ● | ● | ● |
| Workflow | ● | ● | ● | ● |
| Team-based care | ● | ● | ● | ● |
| Analytics and research | ● | ● | ● | ● |
| Mental health | ● | ● | ● | ● |
| Interoperability with DoD and community providers | ● | ● | ● | ● |

● Complete ◔ Partial ◑ Limited ○ Not Aligned

## 3.3 Functionality and Technology

The second part of our evaluation framework is the functionality and technology associated with the different options. For several years, OI&T has focused on maintaining a significant number of legacy IT systems, including VistA. VA also developed customized software to meet the business needs of its customers, currently spending 85 percent of the IT budget on maintaining physical and application infrastructure. The high percentage of spend reflects both inefficiency in the system and

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a level of need that outpaces VA's budget authority. Recently, OI&T began a transformation to decrease the demand for legacy systems and decrease inefficient IT management; and, is now focused on the following key objectives.

- *Single-view of the Veteran and data management:* Data management is critical for providing reliable and actionable data. Within industry, this entails the establishment and systems-based enforcement of holistic data governance models and data standards between and within systems to ensure that critical information is readily available, accurate, and actionable. Within VA, this means that a valid solution will ensure that critical health information is uniquely linked to the Veteran and centrally available at critical decision points. For VA to realize its goal of a single view of the Veteran's record, VA data must be stored within a standardized data model to facilitate the reliability and interoperability of the data between VA, DoD other Federal partners and community providers to provide a longitudinal view of the Veteran and to facilitate continuity of care.

> *The road ahead is clear, as the VA transforms itself to address future requirements. We need to strengthen our business processes so as to support clinical excellence and accelerate operational improvements to better serve veterans. By rethinking our systems, working with our current partners, and exploring new public–private partnerships, the VA is transitioning from a loose federation of regional systems to a highly integrated enterprise. – Dr. David Shulkin, 2016*[54]

- *Strategic sourcing:* Strategic sourcing is an industry and government standard practice of leveraging the combined buying power of large institutions toward a single vendor in order to gain more favorable procurement agreements. While VA has been successful in using its size and buying power to greatly reduce the cost of pharmaceuticals, for example, it has not historically leveraged this capability in the IT arena. VA's strategic sourcing effort is also focused on using VA's size in the market to incent vendors to develop capabilities and technologies that will benefit the healthcare delivery market as a whole.

- *Buy-first approach:* Application development is a resource-intensive process and requires tremendous effort to deliver a complete and viable solution. As such, it is only strategically advantageous to pursue this activity when it provides a tangible benefit to VA beyond what is readily available in the commercial space. For VA, this approach requires a transition away from in-house application development and towards sourcing and implementing commercially standardized, supported and maintained applications. Adopting a buy-first approach with respect to EHR applications will enable VA to leverage commercial experience and resources in caring for Veterans.

- *Reduced IT footprint:* OI&T currently spends 85 percent of its annual budget on maintaining its diverse IT footprint resulting in high opportunity costs for resources that could be applied elsewhere to advance VA's central mission. To effectively execute the strategy, VA is considering using commercial operational resources and Software/Platform as a Service (SaaS/PaaS) options, such as cloud computing, distributed and on-demand infrastructure, and support options. VA must consider scalability, support and hosting options and network and bandwidth requirements when evaluating EHR options and ensure that the options are able to operate effectively with and within distributed computing, platform and network environments.

- *Cloud-based:* An emerging trend within the U.S. healthcare industry is the application of cloud-based (i.e. distributed computing) environments to address the myriad infrastructure issues and shifting requirements faced by the demands of the modern healthcare environment. The application of cloud-based computing allows the supporting infrastructure of EHR systems to scale up or down to

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fit the size of the organizational need. For large distributed institutions such as VA, this provides a number of tangible benefits, cost savings and strategic options that are not available with traditional, on-premises environments, such as scalability, drastically reduced hardware costs, maintenance efficiencies and the ability to leverage the large, robust commercial networks that span the country. Currently, VA operates its EHR solution within a series of VA-owned and maintained data centers. This architecture requires a large number of resources to be dedicated solely to infrastructure support. However, by transitioning VA's EHR infrastructure to the cloud, VA could potentially realize substantial resource savings and redirect those resources toward other, more Veteran-focused initiatives. In evaluating its future EHR options, VA will want to consider solutions can fully operate within the modern, cloud-based computing environments.

**Figure 3. Alignment to Strategic Evaluation Criteria**

| Evaluation Criteria | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| **Single-view of the Veteran and data management** | ● | ● | ● | ● |
| **Strategic sourcing** | ● | ◐ | ● | ● |
| **Buy-first approach** | ● | ◐ | ● | ● |
| **Reduced IT footprint** | ◔ | ◐ | ● | ● |
| **Cloud-based** | ● | ● | ● | ● |

● Complete ◔ Partial ◐ Limited ○ Not Aligned

As illustrated in Figure 3, Options 1, 3, and 4 fully align with VA's IT strategic direction. *Option 2: COTS + eHMP* partially aligns because it relies on internal VA development to support and advance the eHMP, which does not align with the strategic sourcing and buy-first.

In addition to VA's IT strategy, we identified technical evaluation criteria to assess VA's current capabilities to support the options under consideration. The technical evaluation criteria are:

- *Network resource requirements*: Network resources are required by any solution that requires any machine, service, process or facility to connect to another. In broad terms, network resources affect the speed and responsiveness of activities within both the EHR interface and between the EHR environment and ancillary systems. Every solution will require a certain level of network resources in order to operate, however, the specific limiting resources can be drastically different between the options and this evaluation will focus on the bandwidth, connectivity, latency mitigation and topological layout of each considered solution.

- *Adaptability "future proofing":* Adaptability is the capacity of a solution to be flexible enough in terms of allowed clinical processes and workflows and underlying and integrated technologies to meet VA's immediate needs while providing a stable and robust platform to support the new care models and technologies. While all enterprise class EHRs will be configurable to address the immediate needs of VA, certain architectures will be more accessible and adaptable in terms of data and processes, which

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will allow VA greater ability and a lower barrier to mold a given solution to changes in the clinical landscape.

- *Scalability:* Simply put, scalability is the ability of a solution to efficiently scale to an organization the size of VA. Scalability takes into account not only the approach and architecture needed to scale a solution, but the level of complexity in both required systems and processes necessary to achieve this. Additionally, this takes into account the complexity of migrating workflow and processes between sites as well as the ease of expanding or contracting solution instances.

- *Redundancy:* In order for VA to continue to operate and provide critical services to Veterans, any EHR system must be adept at effectively providing needed information to doctors, nurses and other clinical staff at all times while still providing a "single view" of the Veteran. Additionally, it must provide methodology to ensure that records are not lost or corrupted, that no or minimal single points of failure exist within the network, and address concurrency issues arising from interruptions in end-to-end network coverage across the VA system.

Figure 4 illustrates each solution's degree of alignment with the above technical evaluation criteria. As templated, all solutions fulfill the intentions of these criteria to a curtain extent, however *Option 2: COTS + eHMP* has minor abrogation relative to the other solutions.

**Figure 4. Alignment to Technical Evaluation Criteria**

| Evaluation Criteria | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| Network resource requirements | ● | ◐ | ● | ● |
| Adaptability | ● | ● | ● | ◐ |
| Scalability | ● | ◐ | ● | ● |
| Redundancy | ● | ◐ | ● | ● |

● Complete ◐ Partial ◔ Limited ○ Not Aligned

Options 1 and 4 differ in adaptability due to differences in implementation model, namely SasS (*Option 4: COTS SaaS*) to non-SaaS, where VA's ability to modify their solution is attenuated be the constraints of the SaaS implementation. Under a SaaS option, VA would not have direct access to the database backend and thus would be slightly limited in the capability to directly interface with the data and thus to conduct operations on said data without going through an intermediary approved by the SaaS provider.

*Option 2: COTS + eHMP* allows for a high degree of adaptability due to its utilization of the eHMP project which allows VA to directly drive the future capability of eHMP and thus the solution itself. However, this capability is realized through the implementation of additional software on-top on the COTS EHR resulting in increased network demands and increasing the effort necessary to scale and establish redundancy analogous to an infrastructure supporting a COTS system without the addition of the eHMP's needs.

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## 3.4 Benefits

The adoption of an enterprise-wide, standardized commercial EHR product, supported by a vendor with an established track record and well-integrated modules may improve the perception of VA and underscore the organization's commitment to providing high quality care to Veterans in the 21st century.

**Figure 5. Benefits of Options**

| Benefits Category | Evaluation Criteria | Option 1: COTS | Option 2: COTS+ eHMP/JLV | Option 3: VistA Comm. | Option 4: COTS SaaS |
|---|---|---|---|---|---|
| **Defined product roadmap** | • Clear vision for software evolution<br>• Ability to keep pace with market demands, trends and innovations | HIGH | MEDIUM | LOW | HIGH |
| **Access to and ownership of data** | • VA has direct administrative and/or system authority | HIGH | HIGH | LOW<br>HIGH | LOW<br>HIGH |
| **Ability to customize EHR product** | • VA has the ability to direct product development | MEDIUM | HIGH | HIGH | LOW |

- *Defined product roadmap:* Established COTS vendors are expected to have a long term vision for their product growth strategy that can help them stay on top. Options 1, 2 and 4 offer VA such an opportunity to partner with leading COTS vendors who may be able to quickly modernize VA's care delivery process and help the agency realize its mission of Veteran-centric care. However, that *Option 2: COTS + eHMP* is rated slightly lower than Options 1 and 4 because within *Option 2: COTS + eHMP*, the eHMP package is still in its early stages of deployment as it has not yet been scaled to the enterprise level or designed to integrate with non-VistA EHR's. Similarly, *Option 3: Commercialized VistA* is also rated lower on the defined product roadmap benefit scale compared to the other options because in this scenario, the vendor is expected to design and build a custom EHR tailored for VA.

- *Access to and ownership of data: Option 1: COTS* and *Option 2: COTS + eHMP* include implementation on a VA-managed, federally-certified, secure cloud environment. While VA will not own the actual servers or data centers, they will directly manage the cloud environment and database engines supporting the EHR, and would have direct access to the live data stored within the EHR. Therefore, direct access and control to the live data and the ability to use it with any third-party solutions desired without outside vendor involvement are the primary reasons for rating Options 1 and 2 higher than Options 3 and 4. However, VA can mitigate the concern for access to the data for Options 3 and 4 by ensuring appropriate language is included in the contract for the EHR that guarantees VA's right to access the data for any reason, and to allow VA to connect any third party software VA chooses directly to the SaaS environment and solution, regardless of other agreements the COTS SaaS vendor has made. This agreement would likely have cost implications that could not be estimated, as this type of arrangement is atypical.

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- *Ability to customize EHR product*: While VA may not be able to customize a COTS product at the facility level because of its size and scale, VA has the ability to influence the vendor's product development at different degrees. However, Options 2 and 3 provide greater flexibility for VA to customize the solution. For instance, *Option 2: COTS + eHMP* leaves open the possibility for VA to develop capabilities on its own through the eHMP, while Option 3: Commercialized VistA provides VA the option to direct or otherwise have a significant voice in the future development of the solution. Comparatively, *Option 4: COTS SaaS* rates the lowest in terms of customizability because of its SaaS arrangement.

Each option provides benefits to one extent or another. In applying the benefits to a decision regarding the modernization of the EHR, VA leadership can determine which benefits are more important to VA going forward, and then assess the benefits against the other factors assessed in this paper.

## 3.5 Risks

There are always risks associated with any large enterprise-wide system implementation. The figure below highlights key risks VA leadership must be aware off when selecting the best strategic option for EHR implementation. The risks were identified and analyzed based on VHA and OI&T stakeholder interviews, COTS vendor interviews and demonstrations, industry research and Grant Thornton experience conducting EHR implementations.

**Figure 6. Risks of Options**

| Risk Category | Evaluation Criteria | Option 1: COTS | Option 2: COTS+ eHMP | Option 3: VistA Comm. | Option 4: COTS SaaS |
|---|---|---|---|---|---|
| **Transitioning to a cloud environment** | • Experience with cloud<br>• Resource skillset | HIGH | HIGH | HIGH | MEDIUM |
| **Backup and disaster recovery management (DRM)** | • Infrastructure reliability<br>• Redundancy protocols in place | HIGH | HIGH | LOW | LOW |
| **Integration of third-party COTS applications** | • COTS capabilities can address VHA's needs (e.g., population health, decision support, mental health, user-friendly, secure messaging) | LOW | LOW | MEDIUM | MEDIUM |
| **Loss of control over future EHR capabilities development*** | • VA's level of autonomy and control over its future EHR solution | HIGH<br>MEDIUM | MEDIUM | LOW | HIGH<br>MEDIUM |
| **Demand on network infrastructure** | • Relative bandwidth requirement at the VAMC and satellite facilities | MEDIUM | HIGH | MEDIUM | MEDIUM |
| **Required additional development** | • Maturity of software and its capabilities | LOW | HIGH | HIGH | LOW |

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| | | | | | |
|---|---|---|---|---|---|
| **Disruption to workflow during implementation** | • Clinical workflows and business processes will be redesigned | HIGH | HIGH | HIGH | HIGH |
| **Availability of Vendors** | • The known availability of vendors in the market that can support the option. | LOW | LOW | HIGH | LOW |

*Traditionally, this risk is high as commercial vendors control the product roadmap. VA however could reduce this risk by contractually requiring some control over the direction the vendor takes with the product.

- *Transitioning to cloud environment:* VA has 35 years of experience developing and managing their own data centers and other on-premises installations of VistA and supporting software. However, transitioning to a cloud environment requires different skill sets and competencies. The skill gap and lack of experience with cloud management poses risk, as existing experienced system administrators and managers would have to undergo retraining or new system administrators would need to be hired. Hiring new administrators would require training in VA processes and operations. This risk is common to both Options 1 and 2, as both of these options have the COTS EHR hosted within a VA-purchased, federally-certified, secure cloud environment where VA's OI&T resources are responsible for managing and administering the data and the hardware setup within the cloud environment. Option 3: Commercialized VistA is also high risk because without a defined partner, VA does not yet know whether the eventual partner will be conversant in cloud deployment. Finally, *Option 4: COTS SaaS* is less risky to VA because the vendor is already operating a SaaS environment for other clients. There is some risk due to scaling to VA's needs, but this is not as high as Options 1-3.

- *Backup and disaster recovery management (DRM):* As VA transitions to a cloud environment, backup systems and disaster recovery will need to be considered in new ways and existing back-up plans would need to be reevaluated. Migration to a commercial cloud provider – as in Options 3 and 4 – alleviates the hardware component of disaster recovery. However, VA would still bear responsibility for ensuring that failover and redundancy protocols work seamlessly to minimize disruption to clinical workflow and have zero impact to patient safety. The management and planning of these activities is a significant undertaking given the size and complexity of VA.

- *Integration of non-COTS EHR applications:* Unlike Options 3 and 4, VA would own the COTS solution in Options 1 and 2. Therefore, by leveraging the VA Digital Platform strategy in Options 1 and 2, VA can potentially connect with any non-COTS EHR application in the market to achieve its desired goals. However this advantage would be significantly reduced in Options 3 and 4 where VA has limited direct control of the software due to potential contractual restrictions and SaaS implementation.

- *Loss of control over future EHR capabilities development:* While the adoption of a COTS EHR solution allows VA to keep pace with industry leaders in health care information technology, VA may still encounter limitations with a COTS solution because a COTS vendor may be either unwilling or incapable of providing VA-requested, non-standard enhancements and functionality post go-live. Options 1 and 4 are considered high risk for this reason, but the risk could be lowered should VA ensure contract language allows them to direct the development of future capabilities. We therefore assessed the options as either high or low, dependent on VA's ability to negotiate such development control. *Option 2: COTS + eHMP* is less risky because VA would be able to adapt eHMP in the future to accommodate new technologies it can develop. Finally, *Option 3: Commercialized VistA* is low risk

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because VA would negotiate some control over future development and incorporation of new technologies.

- *Demand on network infrastructure*: *Option 2: COTS + eHMP* may have greater bandwidth requirements at VAMC and satellite facilities than Options 1, 3, and 4 as the network will have to accommodate traffic from both the EHR and the eHMP applications; this could be burdensome in areas where bandwidth is limited.

- *Required additional development*: While the ability to direct development is a benefit, an associated risk is that of taking on additional development. Options 2 and 3 by design require further development and customization. For instance, the eHMP software was designed specifically for VistA and therefore the software in its current version (2.0) will require code level redesign to seamlessly integrate with a COTS product. Likewise, the commercialized VistA in *Option 3: Commercialized VistA* also requires code level upgrades so that it can address both the unique requirements of VA along with the modernized features found in standard COTS products. Thus, Options 2 and 3 share a much higher risk compared to Options 1 and 4 that do not require code level updates.

- *Disruption to workflow during implementation*: All four options carry significant risk in disruption to existing workflow. This is inherent in a change to any new solution. VA will manage the risk through significant investment in change management, training, and hands-on support during and immediately after implementation.

- *Availability of Vendors*: Options 1, 2 and 4 are all low risk due to the availability of several vendors in the market to support the option (either through the COTS solutions or through continued development of eHMP). *Option 3: Commercialized VistA* however, is high risk. In assessing several the type of partner VA needs to make *Option 3: Commercialized VistA* successful, there may be few, if any, vendors in the market willing to support this option. Because of the criticality of finding a viable partner for this option – success is completely contingent on it – *Option 3: Commercialized VistA* should be viewed as an overall high risk.

As with benefits, the options hold differentiated risk as compared with one another. The critical factors in deciding on a modernization approach is determining the level of risk appetite the organization has, and which types of risk are more acceptable. These risks can then be balanced against alignment with strategy, benefits and costs.

## *3.6 Summary of Non-Cost Assessment*

As noted in the Executive Summary, the combination of alignment with clinical and IT priorities, benefits and risks, provide the best opportunity to assess the options against one another. VA leadership, upon determining the relative importance of these factors, can use the analysis in Figure 7 below, to support the decision:

**Figure 7. Decision Criteria applied to each Option**

| Decision Factor | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| **Time to Initial Operating Capability (IOC)** | • Out-of-the-box functionalities fulfilling >80% of VA's needs<br>• Estimate 18-24 months to IOC ~ | • Out-of-the-box functionalities fulfilling >80% of VA's needs<br>• Additional time to re-design and scale eHMP to COTS solution | • Requires modernizing a single instance of VistA software prior to implementing, which will add at minimum an additional 12 months | • Out-of-the-box functionalities fulfilling >80% of VA's needs<br>• Estimate 18-24 months to IOC ~ Pilot Site post acquisition |

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| Decision Factor | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| | Pilot Site post acquisition | • Estimate 18-24 months to IOC ~ Pilot Site post acquisition | • Estimate 24-36 months to IOC ~ Pilot Site post acquisition | |
| **Interoperability with other health systems** | • All top tier COTS vendors meet multiple interoperability standards (e.g., FHIR) to create longitudinal record | • Same as Option 1: COTS. Also, JLV provides a static view of external records, but does not create the longitudinal record<br>• eHMP to provide longitudinal record | • Interoperability capability would have to be built into the commercialized VistA solution | • All top tier COTS vendors meet multiple interoperability standards (e.g., FHIR) to create longitudinal record |
| **Flexibility** | • VA administered cloud increases VA flexibility to access 3rd party vendors (e.g., best in class population health) | • Same as Option 1 for COTS<br>• eHMP for new capabilities over time, dependent on development time, which may exceed market timeliness | • Vendor administered cloud decreases VA flexibility to access 3rd party vendors (e.g., best in class population health) because vendors may have pre-existing agreements. | • Vendor administered cloud decreases VA flexibility to access 3rd party vendors (e.g., best in class population health) because vendors may have pre-existing agreements. |
| **Modernity** | • Industry leading software that regularly upgrades based on best practices and industry innovation<br>• Fully integrated solution with modern team based communications | • Same as Option 1 for COTS<br>• eHMP functionality would need to be de-conflicted of overlapping capability and then integrated with the COTS product. | • Vendor's commitment to continuous upgrade contingent on ability to sell the solution at other clients and make a profit<br>• VA may have to invest or enter into risk sharing arrangements if the vendor is not able to sell the solution to a critical mass to break even | • Same as Option 1: COTS |
| **Tailorability** | • COTS out-of-the-box capabilities allow software configuration to meet end-user practice preference (e.g., physician note templates)<br>• Code level change (customization) incurs additional cost | • Same as Option 1: COTS<br>• eHMP adds capability to tailor because it is a VA developed and managed product | • Highest level of tailorability<br>• May require additional cost to purchase leading business and clinical workflows from 3rd party entities | • Same as Option 1: COTS, except code level change (customization) may not be possible because software may be shared by other clients of the COTS vendor (e.g., DoD) |
| **IT Strategic Alignment** | • Aligns with all the strategic priorities except cloud is VA administered | • Does <u>not</u> align with the following strategic priorities: buy first, reduce IT footprint | • Aligns with all IT priorities | • Aligns with all IT priorities |
| **Cost** | • Total = $16.2B<br>• Includes $184M for VA cloud hosting | • Total = $18.7B<br>• Includes $525M for eHMP cost | • Total = $11.9B<br>• Assumes $830M software costs absorbed by vendor | • $16.0B<br>• VA does not incur hosting costs |
| **Relative Risk** | • Medium risk since vendors implement their solutions in this manner routinely | • Higher risk due to continued reliance on internally developed software | • High risk due to limited partner viability or appetite | • Medium risk since vendors have SaaS models in place |

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# 4.0 Cost Assessment

Grant Thornton applied a three step approach to develop high-level cost estimates for each option under consideration:

- Applied the analogous costing methodology as defined by the Government Accountability Office (GAO) Cost Estimating and Assessment Guide[12]
- Met with EHR vendors, applied assumptions for software implementation in VA and requested non-attributable, rough order of magnitude (ROM) estimates from each
- Applied industry research and benchmarks for large-scale EHR and management information system implementations to identify and price various cost centers typical of these implementations

We provide a 15-year cost estimate for this analysis. The first ten years will be implementation years, as discussed in the timeline section below. The last five years provide an estimate for what VA may expect for annual software licensing and maintenance fees.

## *4.1 Analogous Cost Methodology*

Grant Thornton used the analogous methodology for the following reasons:

- There are few data points available to consider in assessing cost for an EHR implementation in an organization the size of VA. Two analogous implementations include the DoD acquisition of Cerner and the Kaiser Permanente implementation of Epic. These were determined to be analogous due to the similar care delivery model, supporting a dedicated patient population through all care delivery. In addition, the total patient population for the three are similar.
- Since VA is in the early stages of planning the EHR modernization, specific business and technical requirements are not available to provide the basis of an engineering cost build-up.
- The timeframe available for analysis to support the cost estimate is relatively short for such a large and complex organization.
- At this stage in the decision, a ROM cost estimate is sufficient for the four options as the final solution costs will be highly dependent on the vendor chosen and could change during the vendor selection process as the vendor addresses VA's specific needs.

In assessing the DoD and Kaiser implementations, Grant Thornton determined that the total number of enrolled patients provided a reasonable benchmark in performing an analogous estimate. This assessment yielded the approximately $10.6B 10-year estimate used in the VA Digital Platform (VDP) paper provided to VA in December 2016.[13]

## *4.2 Vendor Discussions*

To further refine the estimate for this paper, Grant Thornton engaged commercial EHR vendors to provide ROM estimates for the cost of software implementation and ongoing maintenance for VA. Grant Thornton provided the vendors a list of general assumptions and conditions for the EHR implementation scenario stipulating length of implementation, modules included and type of system solution offering. Upon review of the vendor-provided ROMs, it became apparent that these estimates generally agreed with the estimate delivered in the VDP report.

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## 4.3 Industry Research and Benchmarking

The analogous methodology and vendor quotes produces top-line price estimates (e.g., total cost of implementation). In order to break the top-line cost into appropriate cost centers, we applied a further cost allocation breakdown developed through a survey of industry leaders who recently went through an EHR implementation. The cost breakdown we developed is in Figure 8.

**Figure 8. Cost Allocation of Software Based on Industry Survey**

| Cost Component | Cost Allocation |
|---|---|
| **Software** | 28% |
| **Vendor Team & Support** | 41% |
| **IT Infrastructure HW & SW (Hosting)** | 6% |
| **Systems Integration** | 3% |
| **Application Support** | 11% |
| **End user devices** | 2% |
| **User training at Go-Live** | 8% |
| **Other Project Cost** | 1% |
| Total | 100% |

Next, due to the size and complexity of VA, we determined that a prime integrator would be required to support preparation for and implementation of the EHR. We identified an appropriate benchmark presented at the Health Information Management Systems Society (HIMSS) and applied it to our model. As shown in Figure 9, the effort of a prime integrator relates to the software cost with a ratio of 1.83:1.

**Figure 9. Prime Integrator Cost (HIMSS)**

| HIMSS Component | Percent Cost |
|---|---|
| **Software** | 30% |
| **Labor** | 55% |
| **Quotient** | 1.83 |

The final industry benchmark consists of a cost scalar derived from data provided by EHR in Practice[55]. Grant Thornton studied available data for both traditional and SaaS EHR implementations and based upon that data, derived a scalar which we applied to the COTS cost to determine the cost for SaaS implementation and post-go-live costs. The data showed that implementation costs for SaaS are approximately .79 those of a traditional implementation. However, ongoing licensing fees for the SaaS software and services is approximately two times the cost of the software in a traditional implementation.

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## 4.4 Option-Specific Costs

*Option 1: COTS – Option 1: COTS* utilized the above methodology to determine the overall cost and breakdown to cost centers. We first rationalized multiple vendor quotes by breaking the quotes down against various cost types and then developed an average cost among all vendors. Next, we applied the benchmark cost allocations to determine appropriate costs for each cost center, and then added the prime integrator cost. Finally, we applied our implementation timeline and allocated the implementation phase costs across the ten year implementation phase, followed by five years of annual software costs.

*Option 2: COTS + eHMP* – This option carried the costs from *Option 1: COTS* since they both include implementation of a COTS EHR solution in a VA operated cloud environment. In order to cost the eHMP component of Option 2: COTS + eHMP, Grant Thornton utilized an internal VA estimate for the cost to deliver Version 2.0 of the eHMP to all users. This estimate was provided in a briefing to the Presidential Transition Team earlier this fiscal year. The estimate provided a one-time first-year cost of $96.6M to scale the product for use by all interested users and $30.6M for each year thereafter for 14 years for a total 15-year cost of $525M.[16] Note that this cost assumes no additional development activity.

*Option 3: Commercialized VistA – Option 3: Commercialized VistA* began with a similar costing methodology to *Option 1: COTS* above. We assessed the vendor quotes to determine an appropriate price for the implementation and post-implementation phases of the project and allocated the costs according to our benchmarks listed above. We then assessed the impact of the commercialization agreement. *Option 3: Commercialized VistA* entails an agreement between VA and a commercial partner. The partner would be responsible for upgrading the technology to meet all VA-identified clinical priorities, and to bring the technology up to industry standard. Because of the significant investment necessary to accomplish this goal, we assumed a trade-off arrangement between VA and the vendor. The vendor would make the initial investment to modernize the system. Since the vendor would then be able to market the product commercially, they have an interest in the modernization effort. VA also would benefit greatly, because they transition to a familiar product and ease the concerns of many employees who are invested in the VistA application. We therefore determined that the vendor would apply 50 percent of the cost to modernize the product to their VA agreement, while self-funding the other portion. We therefore added the VA portion of this modernization cost to the implementation phase of the cost model to account for the added cost of modernization.

Grant Thornton studied the VistA 4 Roadmap to determine the total cost to modernize VistA and meet VA's clinical priorities. Our full assessment is provided in Appendix D. As per above, 50 percent of that total was applied to the cost estimate for VA.

*Option 4: COTS SaaS* – To determine the cost of *Option 4: COTS SaaS*, we applied the industry benchmarked scalar model noted in the previous section to *Option 1: COTS* above. Note that per the scalar, while the implementation phase for *Option 4: COTS SaaS* is less costly, ongoing software costs are much higher. Therefore, although the 15 year model we present shows a lower cost for COTS SaaS, this option will become more expensive over its lifetime.

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## *4.5 Estimated Implementation Timeline*

We applied a 10-year implementation time frame as the basis for the cost estimate. We selected ten years due to the size and complexity of VA, allowing adequate planning and preparation time, as well as time for appropriate alpha and beta testing prior to full roll out. Our assumed timeline includes appropriate planning for the following:

- 12-18 months for preparation, planning and Project Management Office (PMO) stand-up for the implementation
- Beta test at one facility for the next 12-18 months to deploy the future Health IT/EHR in VA:
    - Capture clinical and business requirements and standardize workflows across the facility
    - Translate clinical data and design requirements to technical specifications required for build
    - Map standard reporting capabilities to clinical and operational requirements and develop custom reports as appropriate
    - Develop a robust testing methodology to including testing data flow across vendor and VA applications and outside in the community
    - Conduct integrated clinical use case testing, including regression and community connections
    - Conduct training of clinical and operational end users
    - Determine appropriate support for activation and deployment activities
- Alpha test for 12-24 months that includes expansion to other facilities in the beta site Veteran Integrated Service Network (VISN), and additional facilities in other VISNs to control for VISN variability
    - Confirm lessons learned based from the beta site on clinical adoption and interoperability with community providers utilizing Agile methodologies
    - Conduct user review and acceptance analysis of standardized clinical and business processes developed and implemented at the beta test site
    - Determine key drivers for the time duration would be deployment of standardized clinical workflow, training and testing
- Begin national rollout of the implementation phase.

**Figure 10. Estimated Adoption Timeline**

In order to show the annual maintenance cost for the modern EHR system, we then added five years to our estimate, so the total estimate provided is for 15 years, the first 10 of which is implementation.

## *4.6 VA Costs*

VA will also incur internal costs to support the migration to a new, modern EHR. These include data migration costs, change management, and funding a PMO to act on VA's behalf (the PMO can either be staffed with internal VA resources, or through a contract).

To determine the cost of data migration, we analyzed a previous effort where VA was able to complete comprehensive data migration for 66 sites.[14] We assumed a similar level of effort per

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facility would be required to migrate the full 130 instances of VistA. We aligned the timeline for data migration with the implementation timeline from above to determine the total number of sites VA must migrate each year and the total cost of migration.

To cost the change management portion, we leveraged our technical knowledge against a body of industry experience, as well as change management costs illustrated in the eHMP 2.0 rollout program. Change management costs are approximately 25 percent of a total projects aggregate cost, therefore a factor of 25 percent was applied to the overall project cost to calculate the change management cost.

PMO costs were determined by leveraging Grant Thornton's industry experience as well as analysis of pertinent Office of Management and Budget (OMB) Form 300s and select research into other large scale ERP, EHR and information technology implementation projects to determine an appropriate benchmark. Our analysis indicates PMO costs are generally between 15-20 percent of the overall project costs. We assumed the high-end due to the inherent complexity of the scale of VA and a factor of 20 percent was applied to calculate to the PMO cost.

## *4.7 Complexity Factor*

Finally, due to the early stage of decision-making at VA, many factors that impact overall cost are not well understood. These factors include:

- Specific business and clinical requirements, which may identify additional software or integration needs, which may increase overall cost.
- A readiness assessment, which we recommend below, may identify additional internal costs such as infrastructure improvements or increased change management costs.
- Additional development needs in eHMP or VistA modernization.

We therefore added a 20 percent complexity factor for *Option 2: COTS + eHMP* and *Option 3: Commercialized VistA* and a 15% complexity factor for *Option 1: COTS* and *Option 4: COTS SaaS* to account for unknown costs that are likely to arise over the planning period.

Figure 11 provides the detailed breakdown of costs, per our analysis.[15] Appendix D provides full detail of the steps associated with developing each cost center, and the calculations performed.

**Figure 11. 15-year Costs Associated with Four Options**

| Cost Center | Option #1: COTS | Option #2: COTS + JLV/eHMP | Option #3: Commercialized VistA | Option #4: COTS SaaS |
|---|---|---|---|---|
| **Vendor Costs** | | | | |
| Software | $1,179,240,741 | $1,179,240,741 | $194,372,093 | $931,600,185 |
| Vendor Team & Support | $1,726,745,370 | $1,726,745,370 | $284,616,279 | $1,364,128,843 |
| IT Infrastructure HW & SW | $252,694,444 | $252,694,444 | $41,651,163 | $199,628,611 |
| Systems Integration | $126,347,222 | $126,347,222 | $20,825,581 | $99,814,306 |
| Application Support | $463,273,148 | $463,273,148 | $76,360,465 | $365,985,787 |
| End user devices | $84,231,481 | $84,231,481 | $13,883,721 | $66,542,870 |
| User training at Go-Live | $336,925,926 | $336,925,926 | $55,534,884 | $266,171,481 |

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| | | | | |
|---|---|---|---|---|
| Other Project Cost | $42,115,741 | $42,115,741 | $6,941,860 | $33,271,435 |
| eHMP (*Option 2: COTS + eHMP* only) | $0 | $525,000,000 | $0 | $0 |
| VistA Modernization (*Option 3: Commercialized VistA* only) | $0 | $0 | $813,340,000 | $0 |
| **Software Implementation Cost** | **$4,211,574,074** | **$4,736,574,074** | **$1,507,526,047** | **$3,327,143,519** |
| | | | | |
| Post-Go-Live Software Cost | $1,332,060,606 | $1,332,060,606 | $1,170,000,000 | $2,664,121,212 |
| | | | | |
| **Vendor Total** | **$5,543,634,680** | **$6,068,634,680** | **$2,677,526,047** | **$5,991,264,731** |
| | | | | |
| **Services Cost** | | | | |
| Change Management Cost | $1,052,893,519 | $1,527,858,025 | $1,109,047,840 | $1,109,047,840 |
| Data Migration Cost | $505,382,301 | $505,382,301 | $505,382,301 | $505,382,301 |
| Prime Integrator | $2,161,941,358 | $2,161,941,358 | $1,707,933,673 | $1,707,933,673 |
| VA PMO Cost | $2,315,962,964 | $2,565,954,091 | $2,328,407,136 | $2,328,407,136 |
| Cloud Hosting | $184,673,700 | $184,673,700 | $0 | $0 |
| **Services Subtotal** | **$6,220,853,842** | **$6,945,809,474** | **$5,650,770,949** | **$5,650,770,949** |
| Contingency | $2,352,897,704 | $2,602,888,831 | $1,665,659,399 | $2,328,407,136 |
| **Sub-Total** | **$14,117,386,226** | **$15,617,332,985** | **$9,993,956,395** | **$13,970,442,816** |
| Complexity Factor | $2,117,607,934 | $3,123,466,597 | $1,998,791,279 | $2,095,566,422 |
| **Grand Total** | **$16,234,994,160** | **$18,740,799,583** | **$11,992,747,674** | **$16,066,009,238** |

## 5.0 Summary of Findings

Grant Thornton utilized our technology adoption approach to assess various options for VA's modernized EHR. The assessment identified the clinical and IT priorities, benefits, risks and costs of each of four options for EHR modernization presented by VA. Our assessment found significant overlap in capability with respect to clinical priorities, and for the most part, alignment with VA's IT priorities. Options differentiate to a greater extent when assessed against the real and potential benefits and risks. These provide a framework against which VA leaders may weigh the options against one another, and informed the decision-criteria discussed in the Executive Summary. While Grant Thornton was not asked to provide a specific recommended option, our analysis provides objective information upon which a decision may be based.

Figure 12 provides a summary of each option's alignment with VA's clinical and technology priorities, as well as the relative benefits and risks associated.

**Figure 12.** **Alignment with Clinical Priorities & IT Strategic Direction**

| Evaluation Factors | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| Clinical priorities | | | | |
| IT strategic direction | | | | |

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| | | | | |
|---|---|---|---|---|
| Benefits | HIGH | HIGH | HIGH* | HIGH* |
| Risk | MEDIUM | HIGH | HIGH | MEDIUM |

Complete Partial Limited Not Aligned

*Rating assumes VA inserts appropriate language into the contract to guarantee access to and control of data as well as ability to connect third-party software at will.

In addition, Figure 13 provides the high-level cost breakdown of each option.

**Figure 13. Costs of Four Options**

| Cost Component | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| | | **Vendor Costs** | | |
| Software Implementation Cost | $4,211,574,074 | $4,736,574,074 | $1,507,526,047 | $3,327,143,519 |
| Maintenance & Support Cost | $1,332,060,606 | $1,332,060,606 | $1,170,000,000 | $2,664,121,212 |
| **Vendor Total** | **$5,543,634,680** | **$6,068,634,680** | **$2,677,526,047** | **$5,991,264,731** |
| | | **Services Cost** | | |
| Change Management Cost | $1,052,893,519 | $1,527,858,025 | $1,109,047,840 | $1,109,047,840 |
| Data Migration Cost | $505,382,301 | $505,382,301 | $505,382,301 | $505,382,301 |
| Prime Integrator | $2,161,941,358 | $2,161,941,358 | $1,707,933,673 | $1,707,933,673 |
| VA PMO Cost | $2,315,962,964 | $2,565,954,091 | $2,328,407,136 | $2,328,407,136 |
| Cloud Hosting | $184,673,700 | $184,673,700 | - | - |
| **Services Subtotal** | **$6,220,853,842** | **$6,945,809,474** | **$5,650,770,949** | **$5,650,770,949** |
| Contingency | $2,352,897,704 | $2,602,888,831 | $1,665,659,399 | $2,328,407,136 |
| **Subtotal** | **$14,117386,226** | **$15,617,332,985** | **$9,993,956,395** | **$13,970,442,816** |
| Complexity Factor | $2,117,607,934 | $3,123,466,597 | $1,998,791,279 | $2,095,566,422 |
| **Grand Total** | **$16,234,994,160** | **$18,740,799,583** | **$11,992,747,674** | **$16,066,009,238** |

## 6.0 Recommendations

EHR modernization is a journey. While Grant Thornton makes no recommendation on which specific option VA should pursue, no matter the choice, the following is recommended in order to inform downstream decisions such as vendor selection (should a COTS solution be involved in the modern EHR), continued development of eHMP and other factors:

- *Technical readiness assessment:* During interviews, a number of VA personnel expressed confidence that VA had the necessary network infrastructure, bandwidth and other technical capabilities to move to the cloud or adopt enterprise-wide SaaS solutions. However, there were others including VA leadership, both nationally and in the field, who expressed reservations regarding the organization having the network capacity and bandwidth to support the EHR in the cloud. We recommend that VA conduct a study to validate these statements. Readiness assessment must also include facilities, data centers and security components.

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- *Technical evaluation of eHMP:* During the interviews, some of the VA personnel shared their optimism that eHMP could help bridge the gap that currently exists around transparency and interoperability both across the different instances of VistA and also between VHA, DoD and the community providers. However, independent assessments of the technology and Grant Thornton's analysis of eHMP program documentation raise concerns as to the long-term viability of the product. A complete, independent assessment of eHMP from a technological standpoint is recommended to determine if it is scalable in its current form, and if not, the necessary additional cost to restructure the product so that it is scalable. In addition, it is also recommended that the assessment include eHMP's ability to integrate with COTS EHR solutions the way it promises to integrate with VistA.

- *Acquisition approach:* VA has specific and critical needs that impact any solution VA chooses. It is critical that VA's needs are properly documented in the clinical and technical requirements of any procurement. This needs to be supported by robust business and technical architectures (capability maps, process models), systems quality factors, service level agreements and enterprise design. In addition, contractual requirements must also address any needs VA has, such as ownership of and access to data. These contractual requirements should be assessed and included as requirements in the solicitation. Cost models are validated and Independent Government Cost Estimates (IGCE) are established. This must include garnering best practices and lessons learned from the DoD Genesis acquisition. It may also include proof of concepts, controlled pilots and phased rollouts.

- *Systems engineering and program management plan:* This should include strategy for requirements management, interface analysis, usability and human factors, architecture analysis and documentation, end-to-end testing, continuous risk management, development of performance metrics and an integrated master plan/schedule (IMP/IMS).

- *System (application) and hardware inventory:* OI&T should conduct a detailed assessment and inventory or each clinical location to ensure all software is catalogued to understand interface requirements. Additionally a detailed desktop, printer and ancillary hardware inventory needs to be conducted as all of these devices will need to be evaluated against any of the strategic options for future usability.

The studies and actions we recommend above will have an impact on the total cost to implement a solution. The readiness assessment may uncover additional necessary investment to improve the performance and bandwidth of the network infrastructure. The systems engineering and program management plan may also increase cost as additional requirements are identified the PMO or vendor must address. The results of these studies may also impact our findings from a benefits and risks standpoint, as significant change in network or organizational improvements to support the transition may introduce risks not assessed. However, these actions are critical to support the successful implementation of any solution.

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# 8.0 Appendix A: Macro Assumptions

In assessing the options, Grant Thornton made the following assumptions:

- Grant Thornton used the Health Information Management Systems Society (HIMSS) definition of an EHR, which states: "The Electronic Health Record (EHR) is a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting. Included in this information are patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data and radiology reports. The EHR automates and streamlines the clinician's workflow. The EHR has the ability to generate a complete record of a clinical patient encounter - as well as supporting other care-related activities directly or indirectly via interface - including evidence-based decision support, quality management, and outcomes reporting."
- VA will implement the EHR as a component of the overall VA Digital Platform (VDP), as described in the strategy document published in 2016 "VA Digital Platform Strategy for Next Generation of Care at the VHA." The VDP establishes a platform on which the EHR operates with other management information systems, such as human resources, financial management and customer relationship management, as well as external EHRs used in the healthcare community, to include DoD. In addition, through the VDP, VA will be able to adopt other tools available in the market to augment core EHR capabilities.
- This assessment focused on the EHR components of VistA only (core clinical, clinical ancillary and revenue cycle). This paper does not address the modernization of other components of VistA such as police and security, financial management, supply chain or others. Appendix E contains a list of current VistA modules that constitute the EHR.
- In assessing implementation costs, the continued carrying costs for maintaining the VistA EHR were deemed to be equal no matter the option selected, therefore they were not considered during this analysis.
- VA currently houses backup copies of electronic health records locally at VA Medical Centers (VAMCs) in the event of network disruptions, in addition to hardware for the provision of the new EHR product. There will be minimal, if any, net new hardware costs incurred as part of the transition to a modern EHR.
- This assessment is based upon strategic needs of the organization, from both a clinical and technological perspective. Detailed business and clinical requirements are not yet defined. The cost assessment therefore uses an analogous methodology and provides a Rough Order of Magnitude (ROM) cost estimate. Additionally, based upon our analysis, the DoD and Kaiser Permanente EHR adoptions are analogous projects.
- Industry benchmarks related to the adoption of new EHRs are relevant to this assessment. Benchmarks include the relative percentage of costs attributed to software, hardware, change management and other factors, as well as the proportional cost of SaaS models versus traditional deployment.
- Three of the four options include the adoption of a COTS EHR solution. Although all clinical and IT priorities can be satisfied by COTS software, a single COTS vendor may not address all equally. Therefore, VA may choose to adopt a vendor for a majority of the EHR components and then add, through the VDP, best-in-class capabilities available through other vendors in order to fully meet its clinical and IT priorities.

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# 9.0 Appendix B: Stakeholder Interview Findings

## *9.1 Clinical Stakeholder Findings*

In order to understand the experience of clinicians using CPRS and VistA for both clinical and research work, several qualitative interviews were conducted with VHA clinicians (both physicians and nurses), including some who had expertise and leadership roles in health informatics and health information technology implementation. The VHA interviews were led by the MITRE collaboration with Grant Thornton. While the majority of clinicians expressed that they are able to collaborate well with other clinicians in order to provide excellent care to Veterans, numerous themes were compiled after these discussions regarding ways in which an EHR solution improve Veteran and clinician experience.

Based on multiple EHR vendor interviews conducted by Grant Thornton, it was felt that all four strategic options could support the needs and requirements of VHA clinicians and leadership. This section highlights essential themes that clinicians expressed with regard to selection and implementation of a modern EHR.

### 9.1.1 Leadership

*Key Messages*: Clinicians articulated a feeling that there is a lack of central governance and that the problems are greater than just EHR choice. Many felt that:

- The *change management* aspect of an EHR transition is significant and the VA needs to be committed to understanding workflows in order to improve the experience for Veterans and clinicians
- Some providers feel significant *trust between clinicians and IT has been lost over time* with respect to partnership in VistA and CPRS development. Part of this is related to the fact that EHR improvements are hampered by budget and approval processes, and additionally, disconnect exists between VA facilities and IT with respect to business planning.
- Regardless of past issues, a number of the clinicians expressed a need for *shared partnership with IT* to deliver quality Veteran-centric care
- Clinicians also feel that the *contracting process is too long* and bureaucratic and needs attention because by the time tools are eventually developed, they are obsolete.

### 9.1.2 Clinical Workflow

*Key Messages*: Providers desire modern EHR capabilities that are intuitive, efficient and allow the clinician to spend more time delivering direct care to the patient. The following are key themes shared during the interviews:

- There is *lack of single-sign on*, which makes it frustrating to go back and forth between different applications
- There is no ability for physicians to easily see their schedules and those of trainees they are supervising. This makes it *difficult to plan their day* because for example, they cannot see if a patient has canceled and then adjust.
- Multiple clinicians mentioned that they need an *integrated way for patient information* to be presented on an EHR screen that *interfaces with clinical decision support tools* and makes *documentation streamlined* and accurate
- Despite the recognition that alerts and reminders are important parts of patient safety, there are often *too many screens and clicks that clinicians must encounter*. One nurse noted that the computer admission

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protocol takes up to two hours for an intensive care unit patient, and 45 minutes for a floor patient, significant time sinks for a nurse who has multiple patients and time-sensitive responsibilities

In addition to the above, there were more focused comments shared such as:

- Because of the decentralized nature of IT, facilities have taken to implement local solutions (both designed internally by local VA IT personnel and COTS products). One provider provided an example that while the COTS solution for their emergency department (ED) worked very well and allowed them to easily see recent Veteran ED visits and reasons, this system did not interface with CPRS. As such, if a patient was admitted to the hospital, an admitting physician could not easily see the ED record (information is saved in cumbersome PDFs).
- There Mixed feedback was shared regarding CPRS usability, with some providers expressing that they felt CPRS was very easy to use and intuitive (multiple providers noted that it worked very well for pharmacy) while others felt that COTS solutions were much more user-friendly and capable.

### 9.1.3 Team-Based Care/PACT

*Key Messages*: As discussed previously, VA has a strong commitment to providing effective team-based care for Veterans through the PACT initiative. Each PACT "teamlet" is comprised of a Veteran, a primary care provider (physician, physician assistant, or nurse practitioner), a registered nurse who functions as a care manager for the team, a licensed practical nurse or medical assistant, and a clerical assistant.[19–21]VA research has already shown that improved relationships with Veterans and speed of care received were noted positives of PACT.[19,20]Despite all of this, CPRS does not support PACT well. VA clinicians have created work-arounds to address these deficiencies, but one group of VA providers detailed several EHR features that would be beneficial in order to support team-based care (Figure B-1).

- Providers are not able to directly communicate through the EHR outside of patient records. A workaround that many use today is adding additional signers to patient notes, which creates an alert to another provider to sign that note, but does not allow for a direct specific message to that provider which is in the EHR but not in a patient note.
- There is no good way to manage panels of patients or cohorts based on clinical condition because of limitations in VistA's architecture.

**Figure B-1. Clinical Team Needs for Team-Based Panel Management**[22]

| Clinical Needs | Relevant Technical Capability |
|---|---|
| Allow user to group patients by a specific clinical condition. | The system should have multidimensional report capability, allowing the user to specify time period, patient group, and selected clinical data at a patient level. |
| Provide summary Data on key clinical variables (e.g. lab tests, prescriptions) that are used as markers of quality of care for a group of patients. | Reports need to be able to summarize numerator and denominator information for the patient group of interest. |
| Need resources to facilitate patient outreach (e.g., personalized patient letters or handouts) | The database system should be able to link pertinent information at a patient level, and provide an "on-demand" synopsis per individual patient. |
| Ability to easily track care across time. | The database system should be able to access clinical data in a longitudinal fashion at the patient level. |

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| Clinical Needs | Relevant Technical Capability |
|---|---|
| Facilitate collaboration among interdisciplinary providers. | The system must have a user interface that supports the needs of interdisciplinary clinical team members. |
| Provide timely data. | Data extraction from the electronic health record should be timely (preferably on a daily basis). |
| Need to be able to enter clinic-specific orders and requests. | Interface must have dual-way information flow between panel management tool and electronic medical record. |

### 9.1.4 Analytics and Research

*Key Messages*: The desire for improved analytics and easier methods of accessing data for both clinical improvements and research were recurring themes expressed by clinicians and informaticists.

- Though many providers emphasized that the volume of data available for Veterans is impressive, *extracting this data usefully can be difficult and slow*.
- Clinicians described *difficulty with obtaining access to databases* and data warehouses and even once they do, they are *not user friendly*. Databases that users create often do not work outside a specific facility.
- Physicians note that they are expected to monitor their productivity but cannot view real-time metrics. Relatedly, users explained that it takes significant amounts of time to run reports that are needed quickly, which greatly hinders prospective research.

### 9.1.5 Mental Health

*Key Messages*: Mental health is an area of distinct importance to VA; there is a long history of programs and interventions to support Veterans, who at higher risk for mental health conditions in general, and others specifically such as post-traumatic stress disorder (PTSD) and suicide. Talking with providers allowed better understanding of some of the technology related challenges experienced by practitioners in this division.

- Veterans receive care from many providers and *coordination of care is difficult* to manage across multiple sites. This is especially critical at times of transition such as when Veterans are leaving active duty and are particularly vulnerable. Clinicians felt that there need to be *better methods for stratifying risk levels of patients* and tracking their care within an EHR.
- Providers would also like the *ability to easily code more detailed information* (e.g. the particular type of therapy provided or assessment completed.
- Documentation is highly narrative, and providers suggested that more *standardized ways of documenting health information* would be helpful.
- From the Veteran perspective, providers recommended *incorporating Veteran input and goals*, interventions and a care plan and allowing these to be integrated with the EHR. Currently, there are numerous self-assessment tools for Veterans but they do not connect with the EHR.

### 9.1.6 Interoperability

*Key Messages*: Many providers expressed numerous difficulties with sharing patient information outside the VA.

- Providers note that the majority of the time, if a patient is seen in the community, when their records are obtained they are largely in paper format and scanned into the EHR. They are linked as images/PDFs and *not integrated with the Veteran's clinical information* in CPRS, so they cannot be linked with clinical decision support tools or reminders.

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- Providers note that if Walgreens and CVS can add immunization data into CPRS, it would be beneficial if other community providers could as well.
- Clinicians want *tools that connect with each other* better, such as kiosks or tablets into which Veterans can enter information and communicate with the EHR.

## *9.2 Validation of Findings with VHA Executive Leaders*

Grant Thornton attended a VHA leadership dinner that included discussions surrounding the EHR Strategic Assessment. Along with seeking insights and feedback, a survey was administered to VHA leadership to compile stakeholder feedback and clinical priorities that were both discovered and considered throughout the stakeholder interviews and assessment period.

In the first part of the survey, participants were asked to identify which stakeholder feedback criteria resonated with them. Stakeholder feedback was narrowed down to the following categories; culture, communications, mental health, analytics and measurement, usability/tailorability, community care interviews, and package level discussion. The captured results are in Figure B-2 below.

**Figure B-2. VHA Leadership Comments**

| | Description | Resonates (Number of times box was checked) | Percentage of results |
|---|---|---|---|
| Culture | There is a cultural legacy of partnership between clinicians and developers. Clinicians appreciate the ability to customize locally, working with developers to implement modifications to their instances of VistA. Several clinicians expressed satisfaction with this capability, and fear losing it with an enterprise COTS system. | 18 | 55% |
| | Many clinicians will accept a change and are ready for a decision to be made. They are, however, reticent about the organization's ability to make a decision and successfully implement it. | 20 | 61% |
| | Some concern of an exodus from VA for retirement eligible clinicians as they do not want to go through a difficult transition at this stage in their career. | 8 | 24% |
| Communications | *Team-Based Care:* Communication between services is difficult now, so they have work arounds where they enter notes into the record and ask for a co-signature so another provider sees it and can respond. Need secure communications tools so the care team can interact without using the patient's record to do so. | 16 | 48% |
| | *With community providers:* Care coordination and communication goes beyond just the care team. Communication with the patient, community providers, and others is important. Need a system that is easier to use for all parties. In the interview with Karen Hudgins, she noted that they are now up with encrypted email with community providers. | 21 | 64% |
| | *With the Veteran:* Current capabilities with MyHealtheVet are clunky and hard to use. The Epic solution was brought up as a very good tool, used throughout the industry. VA should look to that type of solution to communicate with Veterans. Focus on mobile, getting ready for the younger generations. | 14 | 42% |

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| | | | |
|---|---|---|---|
| | *Information Sharing:* We overprotect the data and have too many security requirements that get in the way. Providers feel that it hinders their ability to perform their work. Other organizations are able to share data much more freely, why can't VA? | 18 | 55% |
| **Mental Health** | Providers want better tools to support care coordination within and across medical centers – High risk patients often receive care at multiple locations | 22 | 67% |
| | Ability to interact with Veterans outside the care setting and receive information. This includes the use of mobile technologies to support self-help and transfer of information to the provider. | 19 | 58% |
| | Existing system is limited in the ability to provide care planning at the level VA needs. Providers however do not believe commercial products have the answer – most systems do not address mental health as completely as VA. | 9 | 27% |
| **Analytics and Measurement** | Informaticists generally agreed that they appreciated the ability to extract and analyze data for clinical and research purposes with VistA and would want this to continue. | 17 | 52% |
| | Clinicians expressed difficulty conducting analysis at the patient or cohort level with FileMan. They need to be able to dynamically analyze data at the patient, cohort, population, and eventual genomic level. | 19 | 58% |
| | From a measures standpoint, it is important to be able to measure performance. However, simply looking at care metrics isn't sufficient to truly measure performance. Canned reports are not able to provide the information needed. Clinicians want to make sure they can perform analysis beyond what is available from a canned report. | 17 | 52% |
| | While enterprise analytics is seen as a positive with VistA, at the provider level, they don't have the analytics capability they need (described by one clinician with VistA development experience that this is a challenge with MUMPS). Describe downloading data from FileMan, which takes a long time, then having to export to excel and work with it a lot to get what they need from the data. | 14 | 42% |
| | Looking for dashboards to support patient care, analytics and decision support | 3 | 9% |
| **Usability and Tailorability** | Clinicians liked the ability to develop tailored solutions in VistA and were concerned that commercial products will not allow the level of customization they are used to. | 10 | 30% |
| | Current system is not as user friendly as it could be. There are too many clicks necessary to get where you need to go, and too many screens to navigate. Solution should better align with how physicians work to smooth the process. | 21 | 64% |
| | Information coming from outside providers need to be a part of the record rather than having to go to different places. Provided example where Walgreens and CVS can now populate the record. Why not other providers? | 23 | 70% |
| | General discussion of data availability is that current system has data in too many places, requiring the provider to jump between screens/systems to view information. | 12 | 36% |
| | Reminders – Not aligned to specialty or need. All reminders hit the PCP, which puts them into a mindless clicking mentality. Reminders should go to the clinician that needs it, not just to the PCP. | 18 | 55% |

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| | | | |
|---|---|---|---|
| Innovations | Hospitals/VISNs are bringing in their own capabilities to bridge the gaps in technology (e.g., Cerner Lab). Lack of enterprise focus on new capabilities. | 11 | 33% |
| | Feeling that OI&T is unable to support innovations, so the field has to do it. Example was given related to VistA multiple instances – Region 1 has built new capabilities in VistA (screens, workflows, etc.) and other regions can't take it in because OI&T can't always migrate these capabilities across the country. | 20 | 61% |
| | Need to have a multi-disciplinary approach to IT innovation to understand how professionals work/work together. | 17 | 52% |
| | One common theme on the future is having the medical record self-populate the information a physician needs to know coming into the visit, have the record "tell" the doctor the important/salient points and lead them through the encounter using decision support tools. | 19 | 58% |
| Community Care interviews | There are currently five different legislative authorities for community care. This will make any claims management system hard to implement without customization. They are planning to merge the authorities into one authority, but not there yet. That would help with business rules around when to/not to pay. | 14 | 42% |
| | Care coordination is also important with non-VA providers. Stakeholders talked about secure communications/encrypted email. They recently deployed that capability, but would like to do more to improve collaboration and coordination between providers. | 17 | 52% |
| | Aligning what VA pays to community providers with third-party claims is important. Must be able to identify first and third-party claims received that can be charged to Veterans' insurance companies. | 14 | 42% |
| Package-Level Discussion | Pharmacy – 80% of prescriptions filled by Consolidated Mail Outpatient Pharmacy (CMOP). The solution needs to account for this. It has to be an enterprise system that allows for CMOP and local staff to see everything. Feeling is that commercial products can support this, but there should still be an eye towards VA-specific needs. | 17 | 52% |
| | Lab professionals articulated significant deficiencies with the lab package. The lab package has not been updated in a long time. VistA has difficulty importing lab data and updates cannot easily be made because they will break in other instances of VistA. They feel they need a relational database to handle their lab data. There is no lab information system and they are using middleware patches and products to try to manage this. They view VistA as archaic and a security risk with respect to lab. Other deficiencies in the current system include: microbiology, barcode reading, and order management. | 21 | 64% |

In the second part of the survey, participants were asked to rank the following clinical priorities on a scale of 1 to 5. Clinical priorities were grouped as care approaches unique to VA, workflow, team based care/PACT, analytics/research, mental health, and interoperability. Figure B-3 looks at the number of times a clinical priority was considered for ranking.

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**Figure B-3. VHA Leadership Survey**

| Category | Number of Times Ranked | Percentage of Rankings |
|---|---|---|
| **Care Approaches Unique to VA** | | |
| Configuration required to address Federal requirements while serving a unique population base e.g., pharmacy, tele-health, mental health | 1 | 20% |
| | | |
| **Workflow** | | |
| Single location for Veteran information – whether VA or community generated records. | 16 | 52% |
| Improved tele-health, mobile and web-based tools/technologies for managing Veteran care | 8 | 26% |
| Scheduling ease for Veterans and providers | 11 | 34% |
| | | |
| **Team-based care / PACT** | | |
| Improved care coordination | 17 | 45% |
| Improved communication tools | 7 | 30% |
| Management of Veteran cohorts – supporting Veteran groups with similar health concerns | 2 | 40% |
| | | |
| **Analytics / Research** | | |
| Clinical decision and cognitive analytics support - care for an individual Veteran | 12 | 35% |
| Population health - leveraging large data sets to improve care for groups | 11 | 24% |
| Performance improvement - tracking outcomes between VA facilities/regions | 4 | 24% |
| Ability to easily access data for clinical and research purposes | 6 | 24% |
| | | |
| **Mental health** | | |
| Seamless integration of mental health into EHR | 12 | 28% |
| | | |
| **Interoperability** | | |
| Seamless bi-directional exchange of data with DoD, community providers, etc. | 21 | 40% |

## *9.3 OI&T Stakeholder Findings*

In order to understand the experience of OI&T staff, both leadership and technical, qualitative interviews were conducted throughout the strategic assessment. These stakeholder interviews were led by Grant Thornton in collaboration with MITRE Corporation. The purpose of these interviews were to better understand how the four potential strategic options align with the following OI&T's

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stated priorities: single-view of Veteran and data management, strategic sourcing, buy-first approach, cloud-based, reduced IT footprint, interoperable with VistA, COTS, DoD, community care providers, etc.

### 9.3.1 Clinician Input into EHR Design

*Key Messages*: Providers had concerns about the ability of a commercial product to take into consideration VHA clinicians' wants and needs in the implementation process. Stakeholders explained that during the original development of VistA and CPRS, clinicians and end users priorities and practices were strongly taken into consideration. It is *very important to VA clinicians to have say* in their clinical practices, workflows, tools, and processes that support them.

### 9.3.2 Absence of Data Standardization

*Key Messages*: The current VistA environment is lacking data standardization across VHA sites.

- Stakeholders suggested having every VAMC running the same code base *without pulling away facilities' abilities* to do their own specific processes.
- At the data level, *standardization is important* for sharing data between VAMCs and elsewhere (DoD/community). A key concern surrounding data standardization and the VA, is that the primary problem with instituting standards is that control is currently siloed into non-interconnected regional data stores

### 9.3.3 Questioning Contractor Value

*Key Messages:* Third-party contractors are not providing true value to the VA. Stakeholders said that *contracts are limiting in nature*, which they feel prevents meaningful work from occurring. This restriction along with the contractor's unfamiliarity with VistA, and requirements not being effectively communicated, leads to inefficiency and poor results.

### 9.3.4 Development of Business Requirements

*Key Messages:* Developers expressed throughout the interviews that business processes and requirements created are not useful to developers but rather primarily designed for congressional needs and OI&T and VHA leaderships' priorities. Stakeholders felt OI&T and VHA leadership should develop of business requirements that allow for successful projects and mitigate change in project scope and direction.

### 9.3.5 Difficult System Navigation

*Key Messages:* Navigating between modules and search functions within the current system architecture is *extremely difficult* due to multiple log-ins and fire walls. Stakeholders expressed interest in incorporating single sign-on, and application interconnectivity into the new solution that VA decides to move forward with.

### 9.3.6 Network Capacity to Support New Solution

*Key Messages:* Several stakeholders expressed concern about limitations in VA's network inhibit future development

- lack of network segmentation by asset class was mentioned by one stakeholder

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- A concern expressed during one interview was that VA's network does not have the available bandwidth required by commercial systems.
- Another stakeholder expressed concern in regards to network capacity stating that VA's network is not reliable or standardized, which can result in concurrency problems. It is very important that the VA system be designed to operate natively in an asynchronous environment.

## *9.4 Stakeholders Interviewed*

**Figure B-4.VHA Stakeholders**

| Name | Title |
|---|---|
| Amy Colon | Program Manager, Pharmacy Benefits Management Services |
| Anthony P. Morreale, PharmD | Assistant Chief Consultant for Clinical Pharmacy Services & Healthcare |
| Blake J. Lesselroth MD, MBI | Hospitalist and Informaticist |
| Brook Watts, MD | Senior Advisor for Health informatics |
| Carrie Patton | Clinical Implementation Coordinator |
| Cathy Davis, RN | Chief Nurse, Primary Care |
| Charles Demosthenes, MD | Physician Lead, Analytics and Connected Care |
| Christopher Lacey, PharmD | Associate Chief, Clinical Pharmacy |
| Daniel Papell, PharmD | Pharmacist Clinical Application Coordinator |
| Bill Weppner, MD, MPH | Primary Care Chief |
| Karen Hudgins | Director, Community Care Transformation |
| Kathleen Lysell, PsyD | National Mental Health Director For Informatics |
| Michael Icardi, MD | National Director of Pathology and Laboratory Medicine Services |
| Monica Lypson MD, MHPE | Director, Medical and Dental Education |
| Steve Fihn, MD, MPH | Director, Clinical System Development and Evaluation |
| Steve Lieberman, MD | Assistant Deputy Under Secretary for Health for Access to Care |
| Tim Heimann, PharmD | Chief, Pharmacy Service |
| Eric Burgess | Associate Chief Financial Officer for Managerial Cost Accounting, VHA Office of Finance |
| Jianji Yang, PhD | Lead Data Architect and Informaticist |
| Joan Clifford, DNP | Deputy Assistant for Deputy Under Secretary for Health for Access to Care |
| Judy McConnachie, MPH | Administrative Director, Clinical Business Intelligence |
| Laura J. Kroupa, MD | Chief Medical Informatics Officer |
| Linda McConnell, MSN | Chief Nursing Officer |
| Lynn Sanders, PharmD | Associate Chief Consultant, Clinical Informatics and Pharmacy Re-Engineering, Pharmacy Benefits Management |
| Michael A. Valentino, MHSA, RPh | Chief Consultant Pharmacy, Pharmacy Benefits Management Services |
| Michael L. Davis | Executive Director, Access & Clinic Administration Program, VHA |
| Neil C. Evans, MD | Chief Officer, Connected Care |
| Rachel B. Ramoni, DMD, ScD | Chief Research & Development Officer |
| Rob Silverman, PharmD | Assistant Chief Consultant, PBM Clinical Informatics |
| Richard Barrow, BSN, MSHI | Nursing Informaticist |
| Rob Silverman, PharmD | Assistant Chief Consultant, PBM Clinical Informatics |
| Sheila Ochylski, DNP | Chief Nursing Informatics Officer |
| Shilpa Patel-Teague, MHA | Director for Clinical Programs, VHA |
| Thomas Emmendorfer, Pharm.D | Deputy Chief Consultant, Pharmacy Benefits Management Services |

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| | |
|---|---|
| Uche S. Uchendu, MD | Chief Officer, Office of Health Equity |
| Virginia S. Torrise, Pharm.D | Deputy Chief Consultant, Professional Practice and Clinical Informatics, Pharmacy Benefits Management |
| William Gunnar, MD, JD, FACHE | National Director of Surgery |
| William P. Patterson, MD, MSS | Network Director |

**Figure B-5. OI&T Stakeholders**

| Name | Title |
|---|---|
| Annette Gibbs-Skervin | Executive Director, Strategic Sourcing Transformation Management |
| Bill James | Deputy Assistant Secretary, Enterprise Program Management Office |
| Cynthia Bias | ASD VistA Evolution eHMP Product Manager |
| Daniel Carroll | IT Program Manager |
| Eugene Guglielmo | Senior Advisor, Health Data Management |
| Jack Galvin | Executive Director , End User Operations |
| Jason Hawsey | IT Specialist |
| Joel Russell | IT Specialist |
| John Short | Program Executive, VistA Evolution; Acting Deputy Director, DoD/VA Interagency Program Office |
| Keith Michael | VistA UX Product Manager |
| Kevin Meldrum | IT Specialist |
| Melanie Buechler | IT Specialist |
| Patrick Redington | IT Specialist |
| Roger Sigley | Program Manager |
| Roopangi Kadakia | Chief Cloud Strategist |
| Vanessa Davis | Health Product Support Director |
| Vitalia Devlin | Division Director, Health Product Support Clinical Product Support |

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# 10.0 Appendix C: Identification of Applicable Market Trends

Grant Thornton reviewed industry publications and research regarding the future direction of health IT and healthcare delivery. Publications and research included information from Gartner, Forrester and peer-reviewed medical journals. The following are trends identified as applicable to VA's EHR decision.

## *10.1 Precision Medicine*

VA has long been a leader in research that incorporates new technologies in order to improve the care of Veterans. Precision medicine is defined as "treatments targeted to the needs of individual patients on the basis of genetic, biomarker, phenotypic, or psychosocial characteristics that distinguish a given patient from other patients with similar clinical presentations. Inherent in this definition is the goal of improving clinical outcomes for individual patients and minimizing unnecessary side effects for those less likely to have a response to a particular treatment."[23] In 2009, VA began pilot work to plan for the Million Veterans Project, with the goal of improving understanding of health, disease, and the complex interplay between genetics, environment, and behavior. As of August 2016, more than 500,000 veterans have been enrolled.[24–26] Precision medicine aims to increase quality/speed of clinically relevant analysis and interpretation of complex biological information both for VA patients and elsewhere.[27] Recent VA studies proposed and in progress use precision medicine to target advances in diagnosis and treatment of conditions as diverse as lung cancer, kidney disease, substance abuse disorders, PTSD, cardiovascular disease, and vision loss.[25,27]

In order to support precision medicine as it is used more widely in the clinical rather than solely research setting, there are several technical requirements for an EHR. In addition to development of data standards for genetic test results, there need to be common data formats using standardized medical terminologies.[28] EHRs should be able to populate genetic and pharmacogenomics data and integrate with clinical decision support tools. Assistance with medication dosing, facilitation of orders, improved alerts and reminders, display of relevant information, and workflow support are some of the efficiencies that can be realized.[28,29] EHRs' interfacing with research data warehouses will also allow cross-population queries and improvements in individual patients' care through analysis of larger patient data sets.[30]

## *10.2 Telehealth Services*

As healthcare delivery transitions more and more to settings other than hospitals, the healthcare industry continues to innovate. Telehealth and Internet of Things and wearable technologies have the potential to transform care. Telehealth can be defined as "a broad variety of technologies and tactics to deliver virtual medical, health, and education services. Telehealth is not a specific service, but a collection of means to enhance care and education delivery."[31] Telehealth functionalities have been integrated in EHR systems and are already showing promising results in terms of patient satisfaction, cost reduction, and efficiency for providers.[32–34] Medicare has provided rural health guidelines highlighting services that can be provided via telehealth and are reimbursable.[35]

VA continues to develop ways of providing care to Veterans while improving quality, efficiency, and convenience. Approximately 25 percent of all Veterans live in predominantly rural areas, and they

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are disproportionately older, which creates opportunities for new types of care.[36,37] Approximately 30 percent of Veterans have no access to the internet, and this group is also disproportionately older.[38]

VA Telehealth Services uses both synchronous (e.g. real-time videoconferencing between patients and a care team, remote medical device monitoring) and asynchronous (e.g. acquirement of and transmission of medical data for later review by providers, patient video education modules) communication to supplement face-to-face appointments and make receiving care more convenient for Veterans. Connected Care, which resulted from merging VA's Telehealth Services and Connected Health, is part of VA's efforts to streamline VA's digital health technologies to enrich Veteran care.[7,8] Connected Care is comprised of VA Telehealth Services, MyHealtheVet, VA Mobile Health, and the VHA Innovation Program. VA Telehealth Services uses both synchronous (e.g. real-time videoconferencing between patients and a care team, remote medical device monitoring) and asynchronous (e.g. acquirement of and transmission of medical data for later review by providers, patient video education modules) communication to supplement face-to-face appointments and make receiving care more convenient for Veterans.[7,8] Research shows that these initiatives have improve Veteran satisfaction by reducing travel and wait times.[8,9] In addition, providers endorse improved access, care coordination, and quality of care.[9] MyHealtheVet is VA's personal health record (PHR) which allows Veterans to record and view medical information, order medication refills, and send messages to their care team. VA Mobile Health develops apps to create new ways for Veterans and care teams to interact and coordinate care on mobile platforms. Finally, the VHA Innovation Program leverages both VA employees and private sector professionals to develop new ideas that improve VHA care and service to Veterans.[7,8]

In order to maximize the benefit of these care delivery mechanisms, an EHR must be able to manage multiple different types of communication. In addition to synchronous (e.g. real-time video transmission, remote patient data monitoring) and asynchronous (store-and-forward) transmission, integration of mobile adjuncts and wearable devices (Internet of Things) need to be considered. VA has shown interest in incorporating medical devices and Internet of Things into patient care responsibly, and is investigating ways to ensure the security of these devices.[39,40]

## *10.3 Advanced Computing*

Advanced computing is leading to new evolutions in medical diagnosis, prognosis, and treatment. Artificial Intelligence (AI), defined broadly as "a branch of computer science dealing with the simulation of intelligent behavior in computers or the capability of a machine to imitate intelligent human behavior" is being utilized by the healthcare industry to power clinical decision support and diagnostic tools.[41,42] Technologies like machine learning (including deep learning/neural networks) and natural language processing, are being applied to parse clinical notes, text elements of lab values and other relevant data from the EHR and other clinical sources in order to enhance a physician's diagnostic and treatment capabilities and in some cases to actually act as a caregiver via mobile technologies.[42–44] AI tools (including large-scale implementations like Google's DeepMind and IBM's Watson) accomplish this by incorporating large amounts of clinical and subclinical data and then leveraging their high capacity processing capability in order to analyze this data and provide relevant information to the physician. Machine learning has the potential to assist physicians with differential diagnosis, treatment options suggestions and recommendations.[42,45,46]

Internally, VA Informatics and Computing Infrastructure (VINCI) is an initiative that provides computing resources to improve researchers' access to large amounts of Veteran data to facilitate analysis while protecting privacy and security. VINCI is also engaged in developing an ecosystem for

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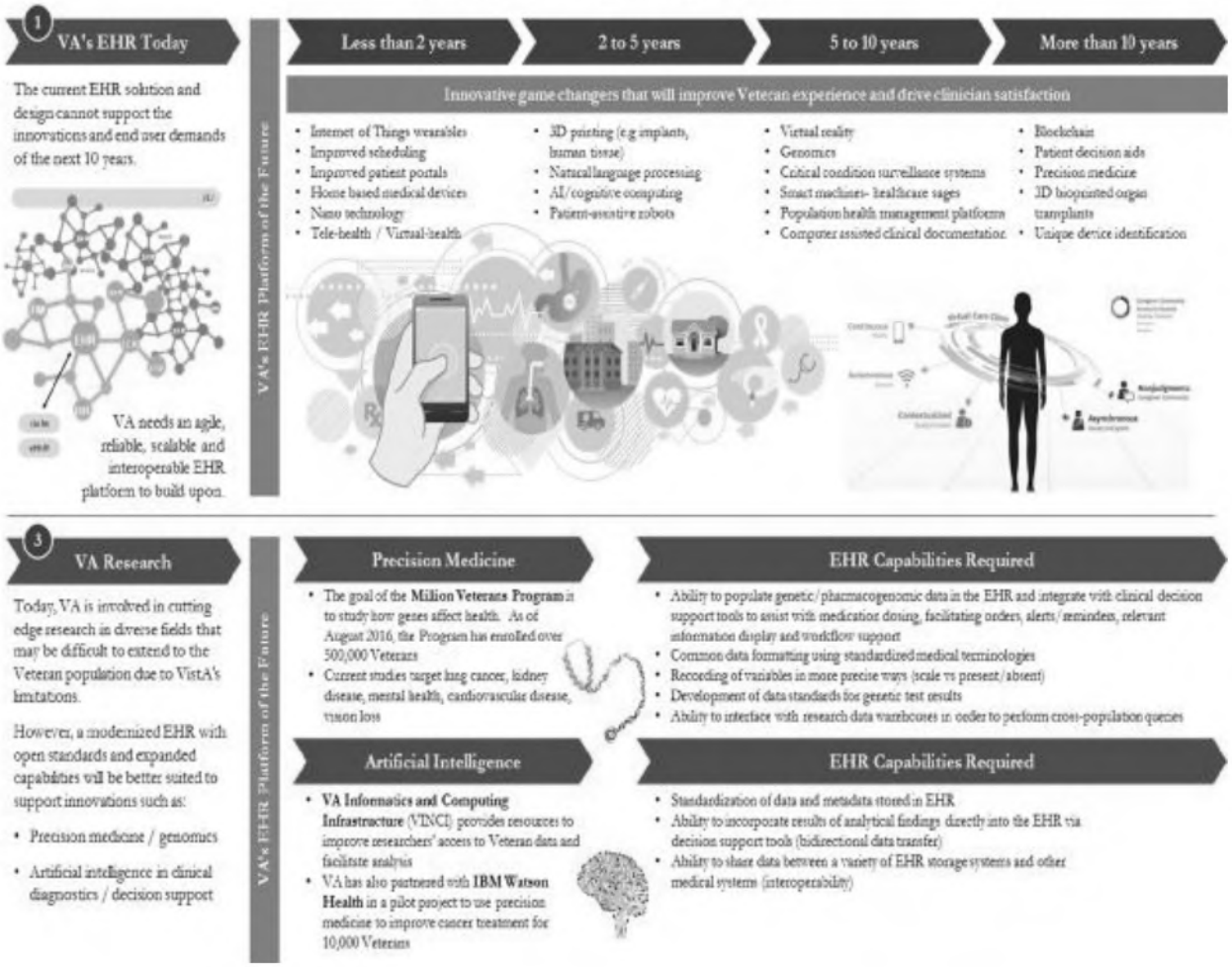
natural language processing that would ideally interface with VA's EHR[47–49] Research projects already in progress by VA researchers include: using reinforcement learning (one type of AI) with mobile health tools to manage chronic pain, employing natural language processing to assess treatment performance for patients with congestive heart failure.[43,44] Recently, VA engaged in a public-private partnership with IBM Watson in a pilot project to use precision medicine to improve cancer treatment for 10,000 Veterans.[50,51]

In order to employ these technologies clinically, there needs to be standardization of data and metadata that is stored in EHRs, the ability to incorporate results of analytical findings directly into an EHR via clinical decision support tools in a bidirectional manner, and the ability to communicate between a variety of EHR and other medical storage systems.[46]

## *10.4 Delivering Patient Care through Innovation*

The graphic below (Figure C-1) looks at the current state of VA, including its EHR package and on-going research activities in conjunction with a view of potential future innovative game changers and the required modern EHR capabilities that will improve Veteran experience and drive clinician satisfaction.

**Figure C-1. VA EHR Transformation**[52]

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# 11.0 Appendix D: Calculation of Cost Estimates

## *11.1 Option 1: COTS EHR*

| Option 1: COTS | Outcome |
|---|---|
| COTS Vendor total costs years 1-15 | 1. COTS Cost Break down for Implementation Phase of the Software costs. Based on a survey of leading industry EHR provides |

| Cost Components | Included in COTs Quote | Cost Allocation |
|---|---|---|
| Software | Yes | 28% |
| Vendor Team & Support | Yes | 41% |
| Systems Integration | Yes | 3% |
| IT Infrastructure HW & SW | No | 6% |
| Application Support | No | 11% |
| End user devices | No | 2% |
| User training at Go-Live | No | 8% |
| Other Project Cost | No | 1% |
| **Total** | - | **100%** |

2. Used an average of serval vendor ROM estimates for a COTS implementation average of $3.03B, this number was used as the basis for the estimate. This was divided by software (28%), Vendor Team & Support (41%) and Systems Integration (3%) for the total 10-year Implementation Cost of $4.21B. The $4.21B was then multiplied by the cost allocation for the given area to determine the component cost of these areas:

- Total Vendor Cost = $\frac{\$3,032,333,333}{72\%}$ = $4,211,574,074
- Software = 28% x $4,211,574,074 = $1,179,240,741
- Vendor Team & Support = 41% x $4,211,574,074 = $1,726,745,370
- IT Infrastructure HW & SW = 6% x $4,211,574,074 = $252,694,444
- Systems Integration = 3% x $4,211,574,074 = $126,347,222
- Application Support = 11% x $4,211,574,074 = $463,273,148
- End user devices = 2% x $4,211,574,074 = $84,231,481
- User training at Go-live = 8% x $4,211,574,074 = $336,925,926
- Other Project Cost = 1% x $4,211,574,074 = $42,115,741

3. The implementation timeline was assumed to be 13 instances of VistA per year for 10 years to cover all 130 instances of VistA at VA. The annual implementation cost per year were determined by the following calculation:
   - Software = 10% x $1,179,240,741= $117,924,074
   - Vendor Team & Support = 10% x $1,726,745,370= $172,674,537

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- IT Infrastructure HW & SW = 10% x $252,694,444= $25,269,444
- Systems Integration = 10% x $126,347,222= $12,634,722
- Application Support = 10% x $463,273,148= $46,327,315
- End user devices = 10% x $84,231,481= $8,423,148
- User training at Go-live = 10% x $336,925,926 = $33,692,593
- Other Project Cost = 10% x $42,115,741= $4,211,574

4. Annual Maintenance and Support costs were derived from the vendor quotes by calculating the total amount of facilities per year being supported throughout the vendor's implementation phase and dividing non-service vendor costs by it.

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Fac/yr | 0 | 1 | 7 | 10 | 25 | 25 | 25 | 25 | 25 | 25 |
| Total Fac/yr | | 1 | 8 | 18 | 43 | 68 | 93 | 118 | 143 | 168 |

| | |
|---|---|
| Total Facility Live Years | 660 |
| 10 Year Costs | $1,097,000,000 Net Total 10 Year Cost |
| Per Year Per Facility Cost | $1,662,121 = $1,097,000,000/660 |
| Annual Cost for 168 Hospitals | $279,236,363 = 1,662,121 * 168 Hospitals |
| Total Post Implementation M&S | $1,396,181,818 = 279,236,363 * year 11-15. |

However, as the number obtained is averaged with other vendor supplied numbers, post-implementation the annual cost are an average of $266,412,121 per year.

5. Data mapping costs were from previous efforts, VA was able to complete comprehensive data migration tasks at 66 sites in 6 years and 10 months. The resources for this effort were 20 FTE, plus 200hrs of overtime per instance; this corresponds to 7.47 sites per year. In order to meet VA's current mapping goals of 130 instances within 8-years, VA will need to map 16.25 sites per year; this is an increase of 218% over the previous effort. As the limiting factor effecting integration is available FTEs, VA will need to scale-up staffing to 43.52 FTEs, while maintaining 200hrs of available overtime per instance.
   1. Supporting Calculation:[14]
      - 5.1.1 Historical Data
        - 5.1.1.1 66 sites mapped / 6.833 years of effort = 7.47 site per year
        - 5.1.1.2 130 Total VistA Instances / 8 year project = 16.25 sites per year
        - 5.1.1.3 Subsequently a 218% faster project is need, the limiting constraint is assumed to be labor.
        - 5.1.1.4 20 FTE for original project tempo * 218% = 43.52 FTE needed
        - 5.1.1.5 ((FTE * Salary Level * Instances) + (Hourly Salary * OT Hours * Instances)) = $505,382,301

| ***FTE Required*** | ***Salary Level (GS13 , DC Locality)*** | ***Total VistA Instances to Migrate*** | ***Hourly Salary + OT*** | ***OT hours*** |
|---|---|---|---|---|
| 43.52 | $89,033 | 130 | $64.20 | 200 |
| **Migration Phase(Single Instance)** | **Per Site Cost** | **Notation** | | |
| Data Mapping | $3,887,556 | Calculated as ((FTE * Salary Level * Instances) + (Hourly Salary * OT Hours * Instances))/130 #This is how we did the data | | |

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| | | | |
|---|---|---|---|
| | | | mapping cost for the VDP |
| | Total Cost to Migrate a Single Instance | $3,887,556 | Sum of all component costs |
| | Total Cost to Migrate All VistA Instances | $505,382,301 | Per instance cost multiplied by number of instances |

**Total 15-year Project Costs**

6. To calculate the total 15-year project cost the following calculations were used.
   - Total 10-year Vendor Cost= sum of the Vendor total cost (software component costs plus annual maintenance and support costs) for years 1 through 10.
   - Change management cost was assumed to be 25% given the scale and complexity of VA
     Change management cost= $\frac{\text{Total 10-year Vendor Cost}}{0.75}$ x 0.25 = $1,052,893,519
   - Data migration cost were determined to be $505,382,301
   - Post-Implementation Software Cost = sum of the support totals for years 11-15 = $1,332,060,606
   - Prime Integrator = Software cost x (11/6) = $2,161,941,358
   - VA PMO= ((10-year Vendor cost + Change Management Cost + Data Migration Cost + Post-Implementation Software Cost + Prime Integrator)/0.8)x (0.2) = $2,315,962,964
   - Cloud Hosting:
     - This model assumes VA's storage, RAM and needed processing cores are equivalent to the values stated in the VDP Whitepaper, page 28.
     - AWS GovCloud estimates were utilized for values. As hosting is a commodity within industry, these costs were deemed representative of the industry

| Storage Average (TB) | RAM (GB) | Cores |
|---|---|---|
| 729.3 | 17,160 | 4290 |

Storage Cost (per TB/mo) $656,370 (729.3TB x $0.9 $0.9 Storage cost per TB)
Storage Cost Per year $7,876,440 (Storage cost per month x 12)

Each x1 server node has 72 cores.
4290 cores/72 = 59.58. Hosts are dedicated so 60 blades are needed

Node cost is $73,919 per year/per node [17,18]

Processing Cost per Year:
(Assume x1 Nodes
Dedicated Host, Up-Front Pay) $4,435,140 (Cost Per-node x Needed Nodes)

Total 1-year Cost $12,311,580 ( Cost Per-TB + Processing Cost)
Total 10-year Cost $123,115,800
Total 15-year Cost $184,673,700

   - Contingency was 20% of the total of 10-year Vendor cost + Change Management Cost + Data Migration Cost + Post- Implementation Software Cost + Prime Integrator + VA PMO + cloud hosting = $2,352,897,704
   - **Total 15-year Cost $14,117,386,226**

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## 11.2 Option 2: COTS with eHMP

<table>
<tr><th>Costing Step</th><th>Outcome</th></tr>
<tr><td>COTS Costing</td><td>For the COTS portion of Option 2: COTS + eHMP, the same costing approach was used as in Option 1: COTS</td></tr>
<tr><td>eHMP</td><td>The eHMP component was costed using data provided by VA leadership<br>The Year 1 Startup cost are as followed:
<table>
<tr><th>Start Up Cost</th><th>Year 1</th></tr>
<tr><td>Hosting at a Commercial Cloud- Services (OM)</td><td>$ 18,000,000</td></tr>
<tr><td>Operational Support- Services (OM)</td><td>$ 7,000,000</td></tr>
<tr><td>Software license Renewal (OM)</td><td>$ 4,000,000</td></tr>
<tr><td>New SW Licenses (DME)</td><td>$ 22,000,000</td></tr>
<tr><td>Cloud Migration- Services (DME)</td><td>$ 8,000,000</td></tr>
<tr><td>WAN Connection- Equipment (DME)</td><td>$ 11,000,000</td></tr>
<tr><td>Wan-Telecommunication Services (OM)</td><td>$ 1,600,000</td></tr>
<tr><td>VHA-Org. Change Management (OCM)</td><td>$ 25,000,000</td></tr>
<tr><td>Total</td><td>$ 96,600,000</td></tr>
</table>
The Recurring eHMP Costs for Year 2 to Year 15
<table>
<tr><th>Recurring Cost</th><th>Year 1</th></tr>
<tr><td>Hosting at a Commercial Cloud- Services (OM)</td><td>$ 18,000,000</td></tr>
<tr><td>Operational Support- Services (OM)</td><td>$ 7,000,000</td></tr>
<tr><td>Software license Renewal (OM)</td><td>$ 4,000,000</td></tr>
<tr><td>Wan-Telecommunication Services (OM)</td><td>$ 1,600,000</td></tr>
<tr><td>Total</td><td>$ 30,600,000</td></tr>
</table>
The total 15 year costs were determined to be $525,000,000</td></tr>
<tr><td>Adding COTs and eHMP</td><td>The eHMP costs were added to the COTS cost for the 15-year total.
<table>
<tr><th>Years</th><th>eHMP</th><th>COTs</th></tr>
<tr><td>1</td><td>$96,600,000</td><td>$421,157,407</td></tr>
<tr><td>2</td><td>$30,600,000</td><td>$421,157,407</td></tr>
<tr><td>3</td><td>$30,600,000</td><td>$421,157,407</td></tr>
</table></td></tr>
</table>

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| | | |
|---|---|---|
| 4 | $30,600,000 | $421,157,407 |
| 5 | $30,600,000 | $421,157,407 |
| 6 | $30,600,000 | $421,157,407 |
| 7 | $30,600,000 | $421,157,407 |
| 8 | $30,600,000 | $421,157,407 |
| 9 | $30,600,000 | $421,157,407 |
| 10 | $30,600,000 | $421,157,407 |
| 11 | $30,600,000 | $266,945,425 |
| 12 | $30,600,000 | $266,945,425 |
| 13 | $30,600,000 | $266,945,425 |
| 14 | $30,600,000 | $266,945,425 |
| 15 | $30,600,000 | $266,945,425 |
| **Total 15-year Costs** | | **$6,068,634,680** |

*assuming average COTs Vendor Costs

**Total Project Costs Calculation**

The total project costs were calculated as in the same method as in Option 1: COTS.

| Total 15-year Project Cost | Total Cost | % of Total Cost |
|---|---|---|
| Total 10-year Vendor Cost | $ 4,583,574,074 | 29% |
| Change Management Cost | $ 1,527,858,025 | 10% |
| Data Migration Cost | $ 505,382,301 | 3% |
| Post-Implementation Software Cost | $ 1,485,060,606 | 10% |
| Prime Integrator | $ 2,161,941,358 | 14% |
| VA PMO | $ 2,565,954,091 | 16% |
| Cloud Hosting | $ 184,673,700 | 1% |
| **Subtotal** | **$ 13,014,444,155** | 83% |
| Contingency (20%) | $ 2,602,888,831 | 17% |
| **Total 15-year Cost** | **$15,617,332,985** | |

## *11.3 Option 3: Commercialization of VistA*

| Costing Step | Outcome |
|---|---|
| VistA Calculations | As in the other analysis, a vendor ROM estimate for EHR implementation of $554M was used as the basis; this number was divided by the percentage cost centers for: software (28%), Vendor Team & Support (41%), Systems Integration (3%) and Go-Live training (8%) for a total Vendor Cost of $694,186,047.<br><br>An identical distribution of EHR cost centers where utilized as in the commercial SaaS (Option 4: COTS SaaS) model. |

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Total Vendor Cost=

- Total Vendor Cost = $\frac{\$554,000,000}{80\%}$ = $694,186,047

The $694,186,047 was then multiplied by the cost allocation for the given area to determine the component cost of these areas:

| Costs Components | Cost Allocation | Component | |
|---|---|---|---|
| Software | 28% | $ | 194,372,093 |
| Vendor Team & Support | 41% | $ | 284,616,279 |
| IT Infrastructure HW & SW | 6% | $ | 41,651,163 |
| Systems Integration | 3% | $ | 20,825,581 |
| Application Support | 11% | $ | 76,360,465 |
| End user devices | 2% | $ | 13,883,721 |
| User training at Go-Live | 8% | $ | 55,534,884 |
| Other Project Cost | 1% | $ | 6,941,860 |
| **Total** | | **$** | **694,186,047** |

The annual maintenance and support costs was calculated for each year by the formula:

- Annual Maintenance & Support Cost= $\frac{1}{\text{\# of Instances Implemented}}$ x $1,800,000 (average cost M&S per VistA instance)

The annual maintenance cost for the implementation phase (years 1-10) were included in the cost estimate.

VistA Modernization

VistA 4 Evolution Cost Centers were pulled from the VistA 4 Life Cycle Cost Estimate document.

The relevant cost centers were determined to be:

| | | |
|---|---|---|
| Government Program Management | $ | 54,630,000 |
| Program Management-Contractor | | |
| System Engineering | $ | 84,200,000 |
| API Exposure | $ | 36,960,000 |
| API Exposure 2.0 | $ | 8,780,000 |
| API Exposure 2.0-Phase II | $ | 6,390,000 |
| Clinical Capabilities- EHR Certification 2014 | $ | 859,890,000 |
| Clinical Decision Support | $ | 23,450,000 |
| Clinician Services (Misc. clinical modules) | $ | 30,520,000 |
| Clinician Services Lab/Pharmacy | $ | 97,910,000 |
| Clinician Services Phase II | $ | 71,600,000 |
| Clinician User Interfaces | $ | 85,530,000 |
| eHMP Enterprise Wide Deployment | | |

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| | | | |
|---|---|---|---|
| | Enhancements to Scheduling Module | $ | 4,090,000 |
| | FileMan Modernization | $ | 1,370,000 |
| | Immunization Module | $ | 15,920,000 |
| | Interoperability/Data Standard (FileMan) | $ | 29,010,000 |
| | Interoperability/Data Standard (Pharmacy) | $ | 64,620,000 |
| | Laboratory Module Enhancements | $ | 28,170,000 |
| | Laboratory Module Modernization | $ | 30,500,000 |
| | Pharmacy Module | $ | 25,100,000 |
| | Radiology | $ | 29,580,000 |
| | Scheduling Module | $ | 8,520,000 |
| | Specialty Clinical Modules (Women's Health) | $ | 21,050,000 |
| | Veteran Authorization and Preferences | $ | 7,090,000 |
| | VistA Immunization Enhancement | $ | 1,800,000 |
| | VistA Service Assembler- Phase II | | |
| | VistA Services Assembler | | |
| | **Total** | **$** | **1,626,680,000** |
| | It was assumed a risk sharing of 50:50 would occur between VA and the commercial vendor, which lowered this amount to $813,340,000.<br>This was then distributed over a 10-year implementation period on an equal basis of 10% per year, or $81,334,000 annually throughout implementation. | | |
| 15-Year Project Costs | To calculate the total 15-year project cost the following calculations were used.<br>• Total 10-year Vendor Cost= sum of the Vendor total cost (software component costs plus annual maintenance and support costs) for years 1 through 10 = $1,507,526,047<br>• Change management cost was assumed to be 25% given the scale and complexity of VA Change management cost= Total 10-year Vendor Cost / 0.75 x 0.25 = $1,109,047,840<br>• Data migration cost were determined to be $505,382,301 with the same methodology as in the rest of the Options as VistA does not have a common model and enforced data standards.<br>• Post-Implementation Software Cost = sum of support costs total for years 11-15 = $1,170,000,000<br>• Prime Integrator = Software cost x (11/6) = $1,707,933,673<br>• VA PMO costs = ((10-year Vendor cost + Change Management Cost + Data Migration Cost + Post- Implementation Software Cost + Prime Integrator)/0.8)x (0.2) = $2,328,407,136<br>• Contingency was calculated at 20% of the total of 10-year Vendor cost + Change Management Cost + Data Migration Cost + Post- Implementation Software Cost + Prime Integrator + VA PMO = $1,665,659,399<br>• Total 15-year costs are calculated at = $9,993,956,395 | | |

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## 11.4 Option 4: SaaS

| Costing Step | Outcome |
|---|---|
| Vendor ROM Cost | Used an average of serval vendor ROM estimates for a COTS implementation average of $3.03B, this number was used as the basis for the estimate. This number was then multiplied by a scalar factor of .79 in order to adjust the cost COTS average to a SaaS implementation number. |

Scalars are derived as follows:

| | *Implementation Costs* | *Yearly Cost (After Year 1)* | *5-yr TCO* |
|---|---|---|---|
| **Non-SaaS:** | 33000 | 4000 | 48000 |
| **SaaS:** | 26000 | 8000 | 58000 |
| **Factor:** | 0.787878788 | 2 | 1.208333333 |
| **Narrative:** | Implementation costs (including 1st year licensing cost) for a SaaS option is 79% of what is would be for a COTS option | Annual recurring costs for a SaaS option are 200% of what it would be for a COTS option | This is built out to a 5-year model. At this resolution, SaaS is more expensive than COTS by about %21 |

Total SaaS Implementation Costs = Vendor Average * .79 = $2,395,543,333.33

This was divided by software (28%), Vendor Team & Support (41%) and Systems Integration (3%) for the total 10-year Implementation Cost of $3.3B. The $3.3B was then multiplied by the cost allocation for the given area to determine the component cost of these areas:

Total SaaS Vendor Cost=

- Total Vendor Cost = $\frac{\$2,395,543,333}{72\%}$ = $3,327,143,519

The software cost components were determined by the following calculations. These were then scaled over the course of the 10-year implementation and 5-year post-go-live phase.

- Software = 28% x $3,327,143,519 = $931,600,185
- Vendor Team & Support = 41% x $3,327,143,519 = $1,364,128,843
- IT Infrastructure HW & SW = 6% x $3,327,143,519 = $199,628,611
- Systems Integration = 3% x $3,327,143,519 = $99,814,306
- Application Support = 11% x $3,327,143,519 = $365,985,787
- End user devices = 2% x $3,327,143,519 = $66,542,870
- User training at Go-live = 8% x $3,327,143,519 = $266,171,481
- Other Project Cost = 1% x $3,327,143,519 = $33,271,435

| Year | Number of Hospitals |
|---|---|
| 1 | 0 |
| 2 | 1 |
| 3 | 7 |

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| | |
|---|---|
| 4 | 10 |
| 5 | 25 |
| 6 | 25 |
| 7 | 25 |
| 8 | 25 |
| 9 | 25 |
| 10 | 25 |
| 11 | - |
| 12 | - |
| 13 | - |
| 14 | - |
| 15 | - |

The annual maintenance and support costs was calculated for each year by the formula:

- Annual Maintenance & Support Cost= $\frac{1}{\text{\# of Hospitals Implemented}}$ x $532,824,242 (average cost)

- The vendor provided a range of annual maintenance post-go-live of $220,000,000-$300,000,000. These costs were averaged $266,412,121, as per the method utilized for implementation, this number was then multiplied by a scalar factor of 2 to yield: $532,824,242

**15-year project Cost**

To calculate the total 15-year project cost the following calculations were used.

- Total 10-year Vendor Cost= sum of the Vendor total cost (software component costs plus annual maintenance and support costs) for years 1 through 10 = $3,327,143,519
- Change management cost was assumed to be 25% given the scale and complexity of VA
  Change management cost= $\frac{\text{Total 10-year Vendor Cost}}{0.75}$ x 0.25 = $1,109,047,840
- Data migration cost were determined to be $505,382,301 with the same methodology as in Option 1: COTS.
- Post-Implementation Software Cost = sum of the support totals for years 11-15 = $2,664,121,212
- Prime Integrator = Software cost x (11/6) = $1,707,933,673
- VA PMO= ((10-year Vendor cost + Change Management Cost + Data Migration Cost + Post-Implementation Software Cost + Prime Integrator)/0.8)x (0.2) = $2,328,407,136
- Contingency was 20% of the total of 10-year Vendor cost + Change Management Cost + Data Migration Cost + Post- Implementation Software Cost + Prime Integrator + VA PMO = $2,328,407,136
- Total 15-Year Cost = $13,970,442,816

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## 12.0 Appendix E: VistA Packages

The table below provides a complete list of VistA packages. Modules specific to EHR are bolded and italicized.

| Package Type | Package Name | Package Name |
|---|---|---|
| Clinical | Admission Discharge Transfer (ADT) | Methicillin Resistant Staph Aurerus (MRSA) |
| Clinical | Ambulatory Care Reporting | Mobile Electronic Documentation (MED) |
| Clinical | Anticoagulation Management Tool (AMT) | Mobile Scheduling Applications Suite (MBAA) |
| Clinical | Automated Service Connected Designation (ASCD) | Multiple Sclerosis Surveillance Registry (MSSR) |
| Clinical | Bar Code Expansion (BCE) | Nationwide Health Information Network Adapter (NHIN) |
| Clinical | Beneficiary Travel | ***Nursing*** |
| Clinical | Blind Rehabilitation | Nutrition and Food Service (NFS) |
| Clinical | ***Care Management*** | ONCOLOGY |
| Clinical | Clinical Case Registries | Patient Appointment Info. Transmission (PAIT) |
| Clinical | ***Clinical Procedures*** | ***Patient Assessment Documentation Package (PADP)*** |
| Clinical | Clinical/Health Data Repository (CHDR) | ***Patient Care Encounter (PCE)*** |
| Clinical | ***Computerized Patient Record System (CPRS)*** | Patient Centered Management Module (PCMM Web) |
| Clinical | ***CPRS: Adverse Reaction Tracking (ART)*** | ***Patient Record Flags*** |
| Clinical | ***CPRS: Authorization Subscription Utility (ASU)*** | Pharm: Automatic Replenish / Ward Stock (AR/WS) |
| Clinical | ***CPRS: Clinical Reminders*** | Pharm: Bar Code Medication Administration (BCMA) |
| Clinical | ***CPRS: Consult/Request Tracking*** | Pharm: Benefits Management (PBM) |
| Clinical | ***CPRS: Health Summary*** | Pharm: Consolidated Mail Outpatient Pharmacy |
| Clinical | ***CPRS: Problem List*** | Pharm: Controlled Substances |
| Clinical | ***CPRS: Text Integration Utility (TIU)*** | Pharm: Data Management (PDM) |
| Clinical | Dentistry | Pharm: Drug Accountability |
| Clinical | Electronic Wait List | Pharm: Inpatient Medications |
| Clinical | Emergency Department Integration Software (EDIS) | Pharm: National Drug File (NDF) |
| Clinical | Functional Independence Measurement (FIM) | Pharm: Outpatient Pharmacy |
| Clinical | Group Notes | Pharm: Prescription Practices (PPP) |
| Clinical | HDR - Historical (HDR-Hx) | Primary Care Management Module (PCMM) |
| Clinical | Health Management Platform | Prosthetics |
| Clinical | Home Based Primary Care (HBPC) | ***Quality Audiology and Speech Analysis and Reporting (QUASAR)*** |
| Clinical | Home Telehealth | Radiology / Nuclear Medicine |
| Clinical | Immunology Case Registry (ICR) | RAI/MDS |
| Clinical | ***Incomplete Records Tracking (IRT)*** | Registries Airborne Hazard Open Burn Pit (AHOBPR) |
| Clinical | ***Intake and Output*** | Registries Military Eye Vision Injury (MEVIR) |
| Clinical | Laboratory | Remote Order Entry System (ROES) |
| Clinical | Laboratory: Anatomic Pathology | Scheduling |

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| | | |
|---|---|---|
| Clinical | Laboratory: Blood Bank | Shift Handoff Tool |
| Clinical | Laboratory: Blood Bank Workarounds | Social Work |
| Clinical | Laboratory: Electronic Data Interchange (LEDI) | Spinal Cord Dysfunction |
| Clinical | Laboratory: Emerging Pathogens Initiative (EPI) | Standards & Terminology Services (STS) |
| Clinical | Laboratory: Howdy Computerized Phlebotomy Login Process | Surgery |
| Clinical | Laboratory: National Laboratory Tests (NLT) Documents and LOINC Request Form | Traumatic Brain Injury (TBI) |
| Clinical | Laboratory: Point of Care (POC) | ***Virtual Patient Record*** |
| Clinical | Laboratory: Universal Interface | VistA Imaging System |
| Clinical | Laboratory: VistA Blood Establishment Computer Software (VBECS) | VistAWeb |
| Clinical | Lexicon Utility | Visual Impairment Service Team (VIST) |
| Clinical | ***Medicine*** | ***Vitals / Measurements*** |
| Clinical | Mental Health | Women's Health |
| Financial-Administrative | ***Accounts Receivable (AR)*** | Hospital Inquiry (HINQ) |
| Financial-Administrative | Auto Safety Incident Surv Track System (ASISTS) | ICD-9-CM |
| Financial-Administrative | Automated Information Collection System (AICS) | IFCAP |
| Financial-Administrative | Automated Medical Information Exchange (AMIE) | ***Incident Reporting*** |
| Financial-Administrative | ***Bed Management Solution (BMS)*** | ***Income Verification Match (IVM)*** |
| Financial-Administrative | ***Clinical Monitoring System*** | ***Integrated Billing (IB)*** |
| Financial-Administrative | ***Compensation and Pension Record Interchange (CAPRI)*** | ***Integrated Patient Funds*** |
| Financial-Administrative | Current Procedural Terminology (CPT) | Library |
| Financial-Administrative | Decision Support System (DSS) Extracts | Occurrence Screen |
| Financial-Administrative | ***Diagnostic Related Group (DRG) Grouper*** | Patient Representative |
| Financial-Administrative | Electronic Claims Management Engine (ECME) | Personnel and Accounting Integrated Data (PAID) |
| Financial-Administrative | Engineering (AEMS / MERS) | Police and Security |
| Financial-Administrative | ***Enrollment Application System*** | Quality Management Integration Module |
| Financial-Administrative | Equipment / Turn-In Request | Record Tracking |
| Financial-Administrative | Event Capture System (ECS) | Release of Information (ROI) Manager |
| Financial-Administrative | ***Fee Basis*** | Veterans Identification Card (VIC/PICS) |
| Financial-Administrative | Fugitive Felon Program (FFP) | Voluntary Service System (VSS) |
| Financial-Administrative | Generic Code Sheet (GCS) | WebHR |
| Financial-Administrative | Health Eligibility Center (HEC) | Wounded Injured and Ill Warrior |

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| | | |
|---|---|---|
| HealtheVet | Breast Care Registry | Pharm: Medication Order Check Healthcare Application (MOCHA) |
| HealtheVet | Clinical Information Support System (CISS) | Pharm: Pharmacy Data Update (DATUP) |
| HealtheVet | Electronic Signature (ESig) | Pharm: Pharmacy Enterprise Customization System (PECS) |
| HealtheVet | HealtheVet Web Services Client (HWSC) | Pharm: Pharmacy Product System - National (PPS-N) |
| HealtheVet | MyHealtheVet | Registries |
| HealtheVet | National Utilization Management Integration (NUMI) | ***Spinal Cord Injury and Disorders Outcomes (SCIDO)*** |
| HealtheVet | ***Occupational Health Record-keeping System (OHRS)*** | VA Enrollment System (VES) |
| HealtheVet | Patient Advocate Tracking System (PATS) | Veterans Personal Finance System (VPFS) |
| HealtheVet | Person Services | VHA Point Service (Kiosks) |
| Infrastructure | ***Capacity Management Tools*** | M-to-M Broker |
| Infrastructure | Duplicate Record Merge: Patient Merge | Name Standardization |
| Infrastructure | Electronic Error and Enhancement Reporting (E3R) | National Online Information Sharing (NOIS) |
| Infrastructure | Enterprise Exception Log Service (EELS) | National Patch Module (NPM) |
| Infrastructure | FatKAAT | Network Health Exchange (NHE) |
| Infrastructure | FileMan | Patient Data Exchange (PDX) |
| Infrastructure | FileMan Delphi Components (FMDC) | Remote Procedure Call (RPC) Broker |
| Infrastructure | Health Data Informatics | Resource Usage Monitor (RUM) |
| Infrastructure | HL7 (VistA Messaging) | Single Sign on/User Context (SSO/UC) |
| Infrastructure | Institution File Redesign (IFR) | SlotMaster (Kernel ZSLOT) |
| Infrastructure | KAAJEE | SQL Interface (SQLI) |
| Infrastructure | Kernel | Standard Files and Tables |
| Infrastructure | Kernel Delphi Components (KDC) | Statistical Analysis of Global Growth (SAGG) |
| Infrastructure | Kernel Toolkit | Survey Generator |
| Infrastructure | Kernel Unwinder | System Toolkit (STK) |
| Infrastructure | List Manager | VistA Data Extraction Framework (VDEF) |
| Infrastructure | MailMan | VistA System Monitor (VSM) |
| Infrastructure | Master Patient Index (MPI) | VistALink |
| Infrastructure | Medical Domain Web Services (MDWS) | XML Parser (VistA) |

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# Report on the Strategic Options for the Modernization of the Department of Veterans Affairs Electronic Health Record

May 1, 2017

Grant Thornton

# Table of Contents

1.0 Executive Summary 1
*Key Decision Criteria and Trade-offs* 2
2.0 Background 5
*2.1 Objective* 7
*2.2 Guiding Principles* 8
*2.3 Analysis Framework and Approach* 9
10
3.0 Findings 10
*3.1 Strategic and Cultural Fit* 11
*3.2 Summary of Alignment with Strategic and Cultural Fit* 13
*3.3 Functionality and Technology* 13
*3.4 Benefits* 17
*3.5 Risks* 18
*3.6 Summary of Non-Cost Assessment* 20
4.0 Cost Assessment 22
*4.1 Analogous Cost Methodology* 22
*4.2 Vendor Discussions* 22
*4.3 Industry Research and Benchmarking* 23
*4.4 Option-Specific Costs* 24
*4.5 Estimated Implementation Timeline* 25
*4.6 VA Costs* 25
*4.7 Complexity Factor* 26
5.0 Summary of Findings 27
6.0 Recommendations 28
7.0 Bibliography 30
8.0 Appendix A: Macro Assumptions A-1
9.0 Appendix B: Stakeholder Interview Findings B-1
*9.1 Clinical Stakeholder Findings* B-1
*9.2 Validation of Findings with VHA Executive Leaders* B-4
*9.3 OI&T Stakeholder Findings* B-7
*9.4 Stakeholders Interviewed* B-9
10.0 Appendix C: Identification of Applicable Market Trends C-1
*10.1 Precision Medicine* C-1
*10.2 Telehealth Services* C-1

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*10.3 Advanced Computing* _____ *C-2*
*10.4 Delivering Patient Care through Innovation* _____ *C-3*
11.0 Appendix D: Calculation of Cost Estimates _____ D-1
*11.1 Option 1: COTS EHR* _____ *D-1*
*11.2 Option 2: COTS with eHMP* _____ *D-4*
*11.3 Option 3: Commercialization of VistA* _____ *D-5*
*11.4 Option 4: SaaS* _____ *D-8*
12.0 Appendix E: VistA Packages _____ E-1

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# Strategic Options for the Modernization of VA's EHR

## 1.0 Executive Summary

The Department of Veterans Affairs (VA) engaged Grant Thornton to assess four strategic options for modernizing its Electronic Health Record (EHR)[1]. VA's EHR has not kept pace with industry and does not adequately support the current and future needs of Veterans and VA clinicians. This analysis assessed the market's ability to meet VA's needs through these four strategic options.

**Figure 1. EHR Strategic Options**

| | |
|---|---|
| **Option 1: COTS** | Adopting a Commercial-of-the-shelf (COTS) product for the EHR where VA hosts the solution in a VA purchased, federally certified, secure cloud environment |
| **Option 2: COTS +eHMP/JLV** | Adopting a Commercial-of-the-shelf product for the EHR including the Electronic Health Management Platform (eHMP) and the Joint Legacy Viewer (JLV), where VA hosts the solution in a VA purchased, federally certified, secure cloud |
| **Option 3: Commercialized Vista** | Providing a gold standard VistA version to a vendor to modernize and provide back to VA as a Software as a Service (SaaS), where the vendor hosts the solution in a federally certified, secure cloud, and provides discounted licensing |
| **Option 4: COTS SaaS** | Adopting a COTS product for the EHR where the vendor hosts the solution in a federally certified, secure cloud, and VA licenses software use |

The analysis found that the market can provide for VA's EHR needs with low variability in cost among the options leaving the primary differences in the value VA will place on the benefits and risks of owning and administering the software and the degree of influence and autonomy that VA can exercise. *Option 3: Commercialized VistA* is the least expensive option but carries the greatest risk. Potential modernization partners include immature start up business that carry risk in sustaining their business and risk in scaling to the VA enterprise. Other potential partners include mature businesses who do not anticipate adequate economic return for their investment due to low potential market capture. *Option 2: COTS + eHMP/JLV* is the most expensive option and is less aligned with OI&T's strategic priority to buy first. However, both *Option 3: Commercialized VistA* and *Option 2: COTS + eHMP/JLV* provide VA the highest degree of tailorability.

Comparatively, *Option 1: COTS* and *Option 4: COTS SaaS*, cost the same and primarily vary in the control and flexibility VA retains over the EHR. If VA hosts the EHR, it has greater flexibility to integrate new solutions as they emerge in the market, but would bear the responsibility for hosting, which requires IT investment and skills. Unlike *Option 4: COTS SaaS*, where the vendor would bear the responsibility for hosting the EHR, VA would have to negotiate the addition of new solutions during contract negotiations. Because the decision among the strategic options resides on trade-offs between a few key factors, the next section will address those factors and their trade-offs.

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[1] According to the Healthcare Information and Management Systems Society (HIMSS), "Electronic Health Record (EHR) is a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting. Included in this information are patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data and radiology reports. … The EHR has the ability to generate a complete record of a clinical patient encounter - as well as supporting other care-related activities directly or indirectly via interface - including evidence-based decision support, quality management, and outcomes reporting."

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## *Key Decision Criteria and Trade-offs*

We evaluated the strategic options against VA's clinical and IT priorities, strategic direction and future trends in healthcare and health IT to derive the decision criteria. Figure 2 highlights how each option addresses the key decision criteria.

**Figure 2. Decision Criteria applied to each Option**

| Decision Factor | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| **Time to Initial Operating Capability (IOC)** | • Out-of-the-box functionalities fulfilling >80% of VA's needs<br>• Estimate 18-24 months to IOC ~ Pilot Site post acquisition | • Out-of-the-box functionalities fulfilling >80% of VA's needs<br>• Additional time to re-design and scale eHMP to COTS solution<br>• Estimate 18-24 months to IOC ~ Pilot Site post acquisition | • Requires modernizing a single instance of VistA software prior to implementing, which will add at minimum an additional 12 months<br>• Estimate 24-36 months to IOC ~ Pilot Site post acquisition | • Out-of-the-box functionalities fulfilling >80% of VA's needs<br>• Estimate 18-24 months to IOC ~ Pilot Site post acquisition |
| **Interoperability with other health systems** | • All top tier COTS vendors meet multiple interoperability standards (e.g., FHIR) to create longitudinal record | • Same as Option 1: COTS. Also, JLV provides a static view of external records, but does not create the longitudinal record<br>• eHMP to provide longitudinal record | • Interoperability capability would have to be built into the commercialized VistA solution | • All top tier COTS vendors meet multiple interoperability standards (e.g., FHIR) to create longitudinal record |
| **Flexibility** | • VA administered cloud increases VA flexibility to access 3rd party vendors (e.g., best in class population health) | • Same as Option 1 for COTS<br>• eHMP for new capabilities over time, dependent on development time, which may exceed market timeliness | • Vendor administered cloud decreases VA flexibility to access 3rd party vendors (e.g., best in class population health) because vendors may have pre-existing agreements. | • Vendor administered cloud decreases VA flexibility to access 3rd party vendors (e.g., best in class population health) because vendors may have pre-existing agreements. |
| **Modernity** | • Industry leading software that regularly upgrades based on best practices and industry innovation<br>• Fully integrated solution with modern team based communications | • Same as Option 1 for COTS<br>• eHMP functionality would need to be de-conflicted of overlapping capability and then integrated with the COTS product. | • Vendor's commitment to continuous upgrade contingent on ability to sell the solution at other clients and make a profit<br>• VA may have to invest or enter into risk sharing arrangements if the vendor is not able to sell the solution to a critical mass to break even | • Same as Option 1: COTS |
| **Tailorability** | • COTS out-of-the-box capabilities allow software configuration to meet end-user practice preference (e.g., physician note templates) | • Same as Option 1: COTS<br>• eHMP adds capability to tailor because it is a VA developed and managed product | • Highest level of tailorability<br>• May require additional cost to purchase leading business and clinical workflows from 3rd party entities | • Same as Option 1: COTS, except code level change (customization) may not be possible because software may be shared by other clients of the COTS vendor (e.g., DoD) |

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| Decision Factor | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| | • Code level change (customization) incurs additional cost | | | |
| **IT Strategic Alignment** | • Aligns with all the strategic priorities except cloud is VA administered | • Does not align with the following strategic priorities: buy first, reduce IT footprint | • Aligns with all IT priorities | • Aligns with all IT priorities |
| **Cost** | • Total = $16.2B<br>• Includes $184M for VA cloud hosting | • Total = $18.7B<br>• Includes $525M for eHMP cost | • Total = $11.9B<br>• Assumes $830M software costs absorbed by vendor | • $16.0B<br>• VA does not incur hosting costs |
| **Relative Risk** | • Medium risk since vendors implement their solutions in this manner routinely | • Higher risk due to continued reliance on internally developed software | • High risk due to limited partner viability or appetite | • Medium risk since vendors have SaaS models in place |

Figure 3 provides a detailed breakdown of 15-year costs associated with each option. Grant Thornton surveyed industry to determine the typical cost breakdown of EHR implementations and used the software costs provided by vendor estimates to extrapolate the total cost of vendor and prime integrator costs. Additional details regarding the basis for costs are provided in the Section 4.0 of this document as well as in Appendix D.

**Figure 3. Rough Order of Magnitude 15-year Costs of Four Options**

| Cost Component | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| | | **Vendor Costs** | | |
| **Software Implementation Cost** | $4,211,574,074 | $4,736,574,074 | $1,507,526,047 | $3,327,143,519 |
| **Post-Go-Live Software Cost** | $1,332,060,606 | $1,332,060,606 | $1,170,000,000 | $2,664,121,212 |
| **Vendor Total** | **$5,543,634,680** | **$6,068,634,680** | **$2,677,526,047** | **$5,991,264,731** |
| | | **Services Cost** | | |
| **Change Management Cost** | $1,052,893,519 | $1,527,858,025 | $1,109,047,840 | $1,109,047,840 |
| **Data Migration Cost** | $505,382,301 | $505,382,301 | $505,382,301 | $505,382,301 |
| **Prime Integrator** | $2,161,941,358 | $2,161,941,358 | $1,707,933,673 | $1,707,933,673 |
| **VA PMO Cost** | $2,315,962,964 | $2,565,954,091 | $2,328,407,136 | $2,328,407,136 |
| **Cloud Hosting** | $184,673,700 | $184,673,700 | - | - |
| **Services Subtotal** | **$6,220,853,842** | **$6,945,809,474** | **$5,650,770,949** | **$5,650,770,949** |
| **Contingency** | $2,352,897,704 | $2,602,888,831 | $1,665,659,399 | $2,328,407,136 |
| **Subtotal** | **$14,117,386,226** | **$15,617,332,985** | **$9,993,956,395** | **$13,970,442,816** |
| **Complexity Factor*** | $2,117,607,934 | $3,123,466,597 | $1,998,791,279 | $2,095,566,422 |
| **Grand Total** | **$16,234,994,160** | **$18,740,799,583** | **$11,992,747,674** | **$16,066,009,238** |

* Due to the early stage of planning for the EHR modernization, lack of business and technical requirements, and the complex nature of transitioning from 130 instances of VistA, we expect additional complexity and cost to be identified during the planning phase of this effort. We therefore added a 15% complexity factor to Options 1 and 4 and a 20% complexity factor to Options 2 and 3 to account for their respective complexities.

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## *Summary*

Multiple strategic paths exist for VA's EHR Modernization, each with their own risks, costs and benefits. Understanding the relative value of the different decision criteria will help VA to make its decision. When assessing this relative value, it is helpful to think about the state of VA at two points in time: 1) One (1) year after acquisition of a new EHR, and 2) Ten (10) years after acquisition. These two points in time reflect key junctures where VA will want to understand what success looks like, after which VA can determine which options are most critical to that success. Secretary Shulkin described success for VA at one year as a time similar to where DoD is now with a decision made, a pilot in one area, and steady, deliberate progress being made. For the ten year juncture, research materials and interviewees described a modern health system with readily exchangeable information and tools that enable advanced analytics, including precision medicine and population health, and intelligence into clinical workflows and decision making. Framing a VA leadership discussion around success at these two junctures and prioritizing the decision criteria, will enable VA leaders to select an option that creates a shared vision of success and is in alignments with the full organization's strategic direction.

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## 2.0 Background

The Veterans Health Administration (VHA) is the largest integrated healthcare system in the United States, providing care at more than 1,200 sites of care, serving more than 8.9 million Veterans each year.[1,2] In many ways, VHA provides care to Veterans similarly to how their commercial counterparts provide care to the general population. However, VHA has a unique mission, patient demographic and disease burden (e.g., combat and exposure related conditions) that has an impact on how they manage the Veteran population and how they execute their quartet mission of caring for the Veterans, supporting medical research, providing medical education and serving as a back-up to DoD during national emergencies.

VHA's goal to provide whole healthcare to Veterans, no matter their geographic location or economic circumstance, drives the need for a network providing the full range of integrated physical and mental healthcare, where clinicians strive to understand health and wellbeing of their patients across all clinical domains and across the Veteran's entire life, to include during times of service and as Veterans, whether they receive care from VA, Department of Defense (DoD) or community care providers.

Because of the demographics of the Veteran population – living in locations from densely urban to sparsely populated – VA must also enable its clinicians to communicate with, treat and support their patients using the most advanced technologies available. To support this mission, VA is assessing available technologies to replace its current electronic health record (EHR) system with a more modern, adaptable technology that can leverage the innovations made in the commercial market to support the whole healthcare of Veterans across the country.

Currently, VHA's EHR runs on the Veterans Information Systems and Technology Architecture (VistA), a platform that was originally developed as a home-grown system more than 30 years ago to support clinical care delivery (with other management functions added over time) and still managed by VA today. At its inception, VistA was a revolutionary concept in healthcare management and served as an industry catalyst in the development of commercial EHR vendors such as Cerner and Epic. Over the years, VistA has proven to be a durable platform for automating both clinical and operational processes and workflows. In fact, VA currently uses VistA to handle supply chain, security, inventory management and a number of other operational activities, in addition to clinical operations such as order entry and pharmacy.

VistA has worked for VA for many decades and has leveraged new technologies such as Bar Code Medication Administration (BCMA) and management support capabilities such as supply chain, inventory management and human resources. Several factors, however, have led VA to question whether continuing with VistA is the best path forward. This is especially true now that more agile and technologically advanced EHR platforms are readily available in the commercial sector that can serve as the launching pad for delivering functionalities (e.g., clinicians reviewing and editing Veteran records and images remotely, Veterans scheduling appointments using mobile devices) that have already become common in the commercial market while adopting new innovations (e.g., provide virtual health including video communication and vitals assessment).

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These factors include:

- *Technology*: The level of complexity in VistA has increased over the years due to several factors, including the development of VistA into multiple instances as each facility changed its code. In addition, limited enhancements delivered in recent years have led to several sub-modules of VistA lagging behind its commercial off-the-shelf (COTS) counterparts in functionality (e.g., lab, radiology, scheduling). While VA has been a leader in developing and deploying telehealth capabilities, it has fallen behind commercial products in integrating these capabilities within VistA. Additionally, the financial, administrative and other support modules in VistA have lost ground relative to COTS products and do not provide the expected level of service and capability in features such as dynamic/on-demand scheduling, population health and patient engagement. In many ways, industry innovation in EHR technology has leapfrogged VA. This sentiment was echoed by VHA field leadership where three out of five respondents surveyed agreed to the clinicians' desire to have advanced capabilities where the EHR could self-populate the Veteran's information from multiple sources and provide them with salient points and lead them through the visit with minimal keying of data into the system.

> *We have been leaders in integrated electronic health records, big-data analytic capabilities, and comprehensive care, including provision of support for team-based primary care, integration of behavioral health services, attention to social determinants of health, and caregiver involvement. – Dr. David Shulkin, 2016*[54]

- *Complexity*: While clinicians expressed appreciation for the ability to customize VistA to meet their local needs, more than three out of five VHA clinicians and leadership surveyed felt that VistA and its clinical packages were not as user friendly as they could be. They said that "there are too many clicks necessary to get where you need to go, and too many screens to navigate." Local customization and work arounds have increased the level of complexity and made the integration of new capabilities across the enterprise even more challenging. The downstream impact of high variability and complexity without a universal data model and integrated data management is that data is recorded in different ways across different and often incompatible systems leading to clinician frustration and potential adverse Veteran experiences, such as continuing to send appointment reminder notifications to a Veteran's widow even after the Veteran's death. Lack of standardization can also cause clinical practice variation and may impede organizational ability to pursue emerging models of care and to perform population health analytics.

- *Interoperability*: VistA is deployed throughout VA in a decentralized manner, with 130 instances hosted at VA data centers throughout the country. Coordination and communication among the individual instances of VistA can be a challenge. In addition, with more and more Veterans relying on both VA and community care providers, seven out of ten VISN directors and VHA leadership surveyed felt that information coming from outside providers need to be a part of the record to provide high quality and integrated care. Therefore, to deliver on VHA's mission, VA needs to adopt a platform that can promote and support seamless interoperability of Veteran's health record within the enterprise, with DoD and across organizations in the community. Interoperability and data sharing across disparate systems is an area of growing focus within the health care community and VA with its sheer size and scale can potentially be the catalyst to drive change.

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- *Cost*: Recent studies suggest that VA Office of Information and Technology (OI&T) spends as much as 85 percent ($3.6B) of its annual budget on infrastructure operations and maintenance. That leaves only 15 percent to spend on enhancements and innovations for all VA systems. This level of continued cost to maintain and upgrade VA's IT infrastructure is unsustainable for VA if it plans to modernize its technology footprint and support its clinicians in delivering quality care to its Veterans.

For these reasons, VA leadership is evaluating strategic options that include commercial solutions for its EHR. In support of VA's decision making process, Grant Thornton conducted this strategic analysis to support Secretary of Veterans Affairs Dr. David Shulkin's decision, focusing on VA's future clinical and IT strategies and current and future market trends VA should consider when making a decision.

## 2.1 Objective

Secretary Shulkin announced in January 2017 that he would make a decision regarding the future of VA's EHR platform in July 2017.[3] VA directed Grant Thornton to conduct an independent assessment of four strategic options for modernizing its EHR, with a focus on technological aspects of the implementation. The four strategic options are as follows:

- *Option 1- Commercial off-the-shelf (COTS) EHR:* VA selects and implements a COTS EHR product and uses it for clinical and revenue cycle functionality. Although not all needs may be met by a single vendor, VA has the option to purchase additional COTS functionality and incorporate/integrate it with the primary COTS solution. The COTS EHR product will be hosted within a VA-purchased and operated, federally-certified, secure cloud environment (e.g., Amazon Web Services, Microsoft Azure).
- *Option 2 - COTS EHR combined with the Joint Legacy Viewer (JLV) and electronic Health Management Platform (eHMP):* This option is similar to *Option 1: COTS* plus VA retains the JLV and eHMP, both VistA packages, to develop and implement additional capabilities to fill gaps in COTS EHR capabilities. The COTS EHR product will be hosted within a VA-purchased, federally-certified, secure cloud environment.
- *Option 3 - VistA commercialization:* VA transfers VistA to a third-party vendor, and after modernization by the vendor, VA purchases licenses to use VistA as Software as a Service (SaaS). VA will receive considerations for pricing such as reduced licensing and implementation costs in exchange for VistA intellectual property rights. VA may also negotiate other terms such as directed development of new functionality to meet VA's specific requirements. In the SaaS arrangement, the vendor provides the software on a subscription basis and is responsible for hosting the software in a federally-certified, secure cloud environment.
- *Option 4 - COTS EHR provided as SaaS:* This option is similar to *Option 1: COTS*; however, in this option, the COTS EHR product is hosted and fully supported and managed by the vendor. In the SaaS arrangement, the vendor provides the software on a subscription basis and is responsible for hosting the software in a federally-certified, secure cloud environment.

This paper provides a high-level assessment of the four strategic options introduced above and the associated costs for implementing each option. The paper does not provide a recommendation on EHR vendors, but instead, shares insights captured from VA clinicians, leadership and staff regarding their needs or priorities and how they map to the capabilities offered by each strategic option. To ensure long-term success, the paper also provides key considerations around assessing and upgrading VA's technology infrastructure and hardware so that they may be able to support the strategy and solution preferred by VA.

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## 2.2 *Guiding Principles*

Selecting an EHR is not just a technology decision; it is an organizational decision. Both the EHR selection process and ensuing implementation will be profoundly transformative. The guiding principles are intended to be enduring and will drive strategic evaluations regarding IT and change management.

Technology and change management decisions must be balanced relative to business and clinical, operational, and architecture and engineering principles. Doing so will maximize the business value of IT as it relates to EHR, mitigate programmatic and technical risks, smooth change integration, enhance systems and data quality, and ensure predictability and transparency in outcomes. These principles are factored into the assessment.

### 2.2.1 Business and Clinical Principles

- Patient safety and quality care are not compromised during EHR transition.
- A modernized EHR supports Veteran-centered, quality-driven, data-driven, evidence-based and team-based care.
- Clinical priorities drive EHR functional needs. IT trends and disruptive innovations can enable/inform EHR system functions. Requirements are driven by stakeholder principles (e.g., clinician, researcher, care team).
- EHR standardization is balanced with managed configurability.
- A modern EHR is flexible and can adapt to current and future healthcare and information technology trends.
- EHR information is integrated across care settings (e.g. outpatient, inpatient, operating room, emergency department, long-term care, mental health, and telehealth) and provides a longitudinal view of the Veteran's record.
- Decisions are optimized for VA and achieve economies of scale.
- Innovation and agility are non-negotiable.

### 2.2.2 Operational Principles

- Change management and standardization of clinical processes (including business process reengineering) and data are critical to the success of EHR modernization. EHR modernization must be minimally disruptive to hospital and clinic operations.
- VistA EHR legacy represents the baseline. Consequently, clinical excellence cannot regress as a result of IT changes during EHR modernization.
- VA leverages EHR lessons learned and leading practices from other large scale healthcare organizations (e.g., Kaiser Permanente, DoD and Mayo Clinic).

### 2.2.3 Architecture and Engineering Principles

- An EHR system should be architected from a system-of-systems perspective, optimizing systems quality (e.g., reliability, scalability, maintainability, usability, etc.).
- EHR systems should promote open architecture and standards so that clinical tools remain available to public and private sector providers.
- An EHR should incorporate standardized business processes and define standardized data and information models, taxonomy and terminologies.
- Data is an essential asset, so integrity and quality must always be sustained. There is zero tolerance for data loss during the transition to a modern EHR system.

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- The EHR must be designed and implemented to provide seamless interoperability with DoD and community care providers, and encourage collaborative partnerships.

## 2.3 *Analysis Framework and Approach*

In evaluating the four strategic options, Grant Thornton leveraged our strategic evaluation framework for adoption of new enterprise technologies, which is comprised of Strategic Fit and Culture; Functionality and Technology; and Cost/Schedule and Viability (Figure 1 on next page).

- Strategic Fit and Culture contains the business drivers and needs for the technology. In this case, strategic fit and culture assesses the needs and desires of the end user clinicians, Veterans and other EHR users, to determine the right high-level expectations any solution must meet. These often include anything from specific technological options and features, to conformity to an organization's culture, mission and approach. We determined the appropriate strategic and cultural fit criteria through research and interviews with key stakeholders, as described below. Effectively, however, strategic fit and culture criteria focused on the clinical priorities of the organization.
- In Functionality and Technology, we assess the alignment of the solution with the organization's technology strategy and capabilities. Any decision regarding a significant technology investment must take the technological strategy into consideration. We determined the appropriate functionality and technology criteria through analysis of organizational strategy, interviews with stakeholders, Congressional testimony and other speaking engagements by VA leaders, and through review of published materials.
- Cost/Schedule and Viability is simply the assessment of each option's overall costs, any differentiation in schedule and the likelihood of successfully implementing each. We assessed these criteria by applying our experience and expertise supporting similar implementations across industry, and by researching similar implementations in government and commercial healthcare organizations.

Grant Thornton interviewed key stakeholders across VHA and OI&T to determine the critical factors customers are seeking in a new EHR solution. Interviewees included:

- VHA and OI&T leadership
- Product development professionals with experience supporting VistA and the eHMP
- IT operations and maintenance staff, to understand how VistA is deployed and understand their recommendations for how VA can improve its sustainment footprint
- VHA clinicians and other EHR end users, including primary care, specialty care, allied health professionals, nurses, and revenue cycle staff

The results of the interviews are captured in Appendix B, but facts and findings derived from the interviews are outlined in the Strategic Fit and Culture, Functionality and Technology, and Cost/Schedule and Viability sections below.

Grant Thornton also conducted market research focused on identifying trends in healthcare delivery and health IT that would bear on the decision regarding EHR modernization. Market research included the study of industry publications and research, including Gartner and Forrester, medical journals, leading-edge technology development and the use and management of enterprise data. Market trends identified as impacting the EHR decision are discussed in Appendix C.

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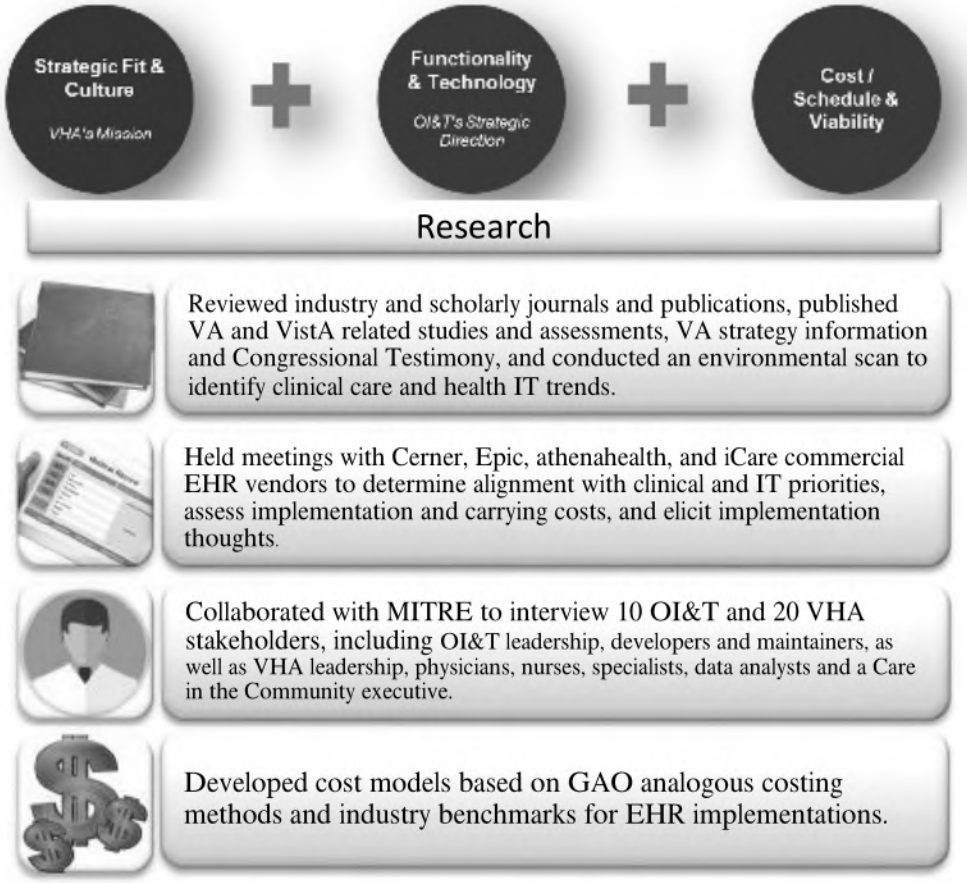
**Figure 1. Research Framework**




Finally, Grant Thornton met with leading EHR vendors to discuss their product offerings and assess fit with VA and OI&T's strategic priorities with respect to the EHR. We assessed products against these priorities, identifying those factors available in the commercial market and those factors that are not. We also discussed pricing methodologies and requested high-level cost estimates to align with our industry research on cost of adopting commercial EHR systems.

## 3.0 Findings

In order to modernize VA's EHR and enhance its ability to carry out the mission of supporting and providing healthcare for America's Veterans, VA has identified four potential options, each with its own series of benefits and risks, as well as unique cost profiles and trade-offs.

When assessing each of the options, the following should be considered:

- *Gaps in specific vendor capability:* In assessing alignment with VA's clinical priorities, we determined that although all priorities are met in the commercial market as a whole, a single vendor may not be able to meet VA's specifications completely, depending on the vendor selected. For example, a single vendor may achieve 90 percent of the solution to VA's specifications, but the other 10 percent is available through other vendors.

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- This increases the importance of the VDP should options 1 or 4 be selected. Through the VDP, VA could integrate best-in-class offerings to fill gaps of a single vendor. In essence, the best-of-breed COTS solution must support the multitude of VA care settings and stakeholders.
- Alternatively, in preparing the solicitation, VA could list out all specifications and place the burden on the bidder to fill gaps, ensuring a complete solution. An integrator would then be responsible for combining all necessary capabilities into a comprehensive EHR solution.

- *Interoperability and care in the community and interoperability:* In assessing interoperability, there is great focus on the interoperability between DoD and VA. However, in interviews and in assessing the care continuum for military members as they serve and transition to Veteran status, the interoperability with DoD is critical at the transition stage, but no more important thereafter than interoperability with community care providers. Therefore, interoperability with DoD alone should not drive the decision regarding the option, or the eventual vendor solution.

- *Buy-first rather than buy-only:* In assessing the options and alignment with IT priorities, it is important to note that the "buy-first" strategy is not a "buy-only" strategy. VA has specific needs that others in the market do not, therefore there is the potential that commercial products may not meet all of VA's needs. This is especially true when considering other management information systems, but may apply to the EHR as well. During interviews, VA staff expressed concern that commercial vendors do not have some of the capability that exists now in VistA; however, the analysis showed that these assumptions are inaccurate and that many of the requested capabilities are in fact available in commercial EHR solutions. Additionally, in many cases, a solution that achieves a vast majority of VA's desires is more cost-effective than building a system from scratch.

## 3.1 Strategic and Cultural Fit

This section provides detailed descriptions around the clinical priorities that emerged as important to VA that align with their strategy and culture. They address five areas: unique features, workflow, team based care and mental health. Upon completing our interviews with VHA staff members and leaders, we asked a group of executive leaders from around the country to rank the identified clinical priorities. The two priorities that were most highly rated were having a single view of Veteran data, and support of team-based care.

> *[VHA's vision is to] continue to be the benchmark of excellence and value in healthcare and benefits by providing exemplary services that are both patient-centered and evidence based. This care will be delivered by engaged, collaborative teams in an integrated environment that supports learning, discovery, and continuous improvement. It will emphasize prevention and population health and contribute to the Nation's well-being through education, research, and service in national emergencies.*[53]

- *Features unique to VA:* VA has several aspects of their care delivery and patient population that are different than in the non-Veteran healthcare delivery market. These include factors such as:
  - Complex eligibility standards and requirements that exist for Veterans to receive VA healthcare, which impact revenue cycle operations (e.g. inability to bill third parties for service-connected care).
  - Disproportionate disease prevalence in the Veteran population for certain conditions such as amputations, traumatic brain injury, post-traumatic stress disorder (PTSD) and specific

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environmental exposures (e.g. Agent Orange), which require the ability to establish and analyze patient cohorts not typically used in the commercial sector.
  - Broad and increasing emphasis on interaction with community care providers that underscores the need for more sophisticated interoperability and better methods of communication between VA clinicians and non-VA providers.
  - A disproportionately high rural population, with 5.2 million Veterans who constitute more than 30 percent of VA's caseload, which requires sophisticated remote capabilities.
  - A whole health focus that integrates management of psychological, social and physical health.

- *Workflow:* Workflow includes the sequencing of activities a clinician will use to treat a patient; it is adaptable to the specific conditions of the patient but standardized across the enterprise. Specific workflow considerations include:
  - *Longitudinal view of the patient record:* For the purpose of this analysis, VHA clinicians described the longitudinal view of the patient record as the ability to review medical information from community and DoD providers within the Veteran's record in one place, rather than needing to access multiple systems for information. Having a single source for all Veteran records is important so that clinicians can provide high quality care based on timely, accurate information and can also prevent medical errors and reduce waste resulting from duplicate laboratory tests or imaging.[4–6] Veterans' care is unique in that they transition from their military service to Veteran status, and their setting of care also changes from DoD to VA and community care providers. A longitudinal view for each patient in an EHR should include current and previous patient demographics, progress notes, problems and medications, as well as vital signs, past medical history, immunizations, laboratory data and radiology reports.
  - *Improved telehealth, mobile and web-based tools:* Due to the geographic dispersion of Veterans across the country, many of whom live in rural areas, VA often employs alternate methods of care delivery. VA Telehealth Services uses both synchronous (e.g. real-time videoconferencing between patients and a care team, remote medical device monitoring) and asynchronous (e.g. acquirement of and transmission of medical data for later review by providers, patient video education modules) communication to supplement face-to-face appointments and make receiving care more convenient for Veterans.[7,8] These initiatives have improved Veteran satisfaction by reducing travel and wait times.[8,9] In addition, providers endorse improved access, care coordination, and quality of care.[9]
  - *Scheduling:* Making it easier to schedule appointments, both face-to-face and via telehealth services will improve efficiency and experience for both clinicians and Veterans.

- *Team-based care/PACT*: There is increasing recognition of the value of team-based care to patients and providers, both in the primary care domain and for treatment of complex medical conditions.[10,11] The patient-centered medical home (PCMH) is one way in which team-based care is delivered, and VA has implemented this through the development of PACT. Implementation of a modern EHR can support PACT through the ability to manage relevant personal health information, allow communication among providers, patients, and care teams, analyze and report on individual and cohort outcomes and quality of care, support providers' clinical decision making, and help patients self-manage their health and medical conditions while collaborating with providers.

- *Analytics and research:* VA stakeholders all stressed the importance of analytics in delivering care. As defined through our interviews, VA clinicians are concerned with two primary types of analytics: real-time clinical decision support tools, powered by analytics, to support the clinician at the point of care; and retrospective analytics, which can support better management of the organization and its workforce, as well as improve care delivery through identification of trends that point to better

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outcomes through different care approaches. The modern EHR should support both of these capabilities, by providing point-of-care analytics in a manner convenient to the provider, as well as the ability to conduct statistical and other analytics on the vast amount of data VA generates.

- *Mental health*: Mental health is one of Secretary Shulkin's top priorities; there is a long history of programs and interventions to support Veterans, who are at higher risk for mental health conditions in general, and specifically suffer from higher incidence of PTSD and suicide. VA has long had a well-integrated mental health program that considers the care of the Veteran holistically and is provided in concert with other care that the patient receives from VA. New technologies have the potential to improve risk stratification and tracking of Veterans to support their mental health, especially through vulnerable periods like the transition from active duty to Veteran life. VA stakeholders also described the need for specific options within the EHR to support documentation of mental health appointments, findings and diagnoses that are not available in VistA.

## 3.2 Summary of Alignment with Strategic and Cultural Fit

After interviews and demonstrations by multiple commercial EHR vendors, Grant Thornton assessed each option with respect to these priorities. There are COTS products that have features addressing all the priorities endorsed by VHA, to include the single view of data and support for team-based care, thus Options 1, 2, and 4 fully align since they all include a COTS product. For *Option 3: Commercialized VistA*, an appropriate vendor contract must ensure alignment with all priorities.

**Figure 2. Option Alignment with Clinical Priorities**

| Clinical Priorities | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| Addresses features unique to VA | ● | ● | ● | ● |
| Workflow | ● | ● | ● | ● |
| Team-based care | ● | ● | ● | ● |
| Analytics and research | ● | ● | ● | ● |
| Mental health | ● | ● | ● | ● |
| Interoperability with DoD and community providers | ● | ● | ● | ● |

● Complete ◔ Partial ◑ Limited ○ Not Aligned

## 3.3 Functionality and Technology

The second part of our evaluation framework is the functionality and technology associated with the different options. For several years, OI&T has focused on maintaining a significant number of legacy IT systems, including VistA. VA also developed customized software to meet the business needs of its customers, currently spending 85 percent of the IT budget on maintaining physical and application infrastructure. The high percentage of spend reflects both inefficiency in the system and

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a level of need that outpaces VA's budget authority. Recently, OI&T began a transformation to decrease the demand for legacy systems and decrease inefficient IT management; and, is now focused on the following key objectives.

- *Single-view of the Veteran and data management:* Data management is critical for providing reliable and actionable data. Within industry, this entails the establishment and systems-based enforcement of holistic data governance models and data standards between and within systems to ensure that critical information is readily available, accurate, and actionable. Within VA, this means that a valid solution will ensure that critical health information is uniquely linked to the Veteran and centrally available at critical decision points. For VA to realize its goal of a single view of the Veteran's record, VA data must be stored within a standardized data model to facilitate the reliability and interoperability of the data between VA, DoD other Federal partners and community providers to provide a longitudinal view of the Veteran and to facilitate continuity of care.

> *The road ahead is clear, as the VA transforms itself to address future requirements. We need to strengthen our business processes so as to support clinical excellence and accelerate operational improvements to better serve veterans. By rethinking our systems, working with our current partners, and exploring new public–private partnerships, the VA is transitioning from a loose federation of regional systems to a highly integrated enterprise. – Dr. David Shulkin, 2016*[54]

- *Strategic sourcing:* Strategic sourcing is an industry and government standard practice of leveraging the combined buying power of large institutions toward a single vendor in order to gain more favorable procurement agreements. While VA has been successful in using its size and buying power to greatly reduce the cost of pharmaceuticals, for example, it has not historically leveraged this capability in the IT arena. VA's strategic sourcing effort is also focused on using VA's size in the market to incent vendors to develop capabilities and technologies that will benefit the healthcare delivery market as a whole.

- *Buy-first approach:* Application development is a resource-intensive process and requires tremendous effort to deliver a complete and viable solution. As such, it is only strategically advantageous to pursue this activity when it provides a tangible benefit to VA beyond what is readily available in the commercial space. For VA, this approach requires a transition away from in-house application development and towards sourcing and implementing commercially standardized, supported and maintained applications. Adopting a buy-first approach with respect to EHR applications will enable VA to leverage commercial experience and resources in caring for Veterans.

- *Reduced IT footprint:* OI&T currently spends 85 percent of its annual budget on maintaining its diverse IT footprint resulting in high opportunity costs for resources that could be applied elsewhere to advance VA's central mission. To effectively execute the strategy, VA is considering using commercial operational resources and Software/Platform as a Service (SaaS/PaaS) options, such as cloud computing, distributed and on-demand infrastructure, and support options. VA must consider scalability, support and hosting options and network and bandwidth requirements when evaluating EHR options and ensure that the options are able to operate effectively with and within distributed computing, platform and network environments.

- *Cloud-based:* An emerging trend within the U.S. healthcare industry is the application of cloud-based (i.e. distributed computing) environments to address the myriad infrastructure issues and shifting requirements faced by the demands of the modern healthcare environment. The application of cloud-based computing allows the supporting infrastructure of EHR systems to scale up or down to

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fit the size of the organizational need. For large distributed institutions such as VA, this provides a number of tangible benefits, cost savings and strategic options that are not available with traditional, on-premises environments, such as scalability, drastically reduced hardware costs, maintenance efficiencies and the ability to leverage the large, robust commercial networks that span the country. Currently, VA operates its EHR solution within a series of VA-owned and maintained data centers. This architecture requires a large number of resources to be dedicated solely to infrastructure support. However, by transitioning VA's EHR infrastructure to the cloud, VA could potentially realize substantial resource savings and redirect those resources toward other, more Veteran-focused initiatives. In evaluating its future EHR options, VA will want to consider solutions can fully operate within the modern, cloud-based computing environments.

**Figure 3. Alignment to Strategic Evaluation Criteria**

| Evaluation Criteria | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| **Single-view of the Veteran and data management** | ● | ● | ● | ● |
| **Strategic sourcing** | ● | ◐ | ● | ● |
| **Buy-first approach** | ● | ◐ | ● | ● |
| **Reduced IT footprint** | ◔ | ◐ | ● | ● |
| **Cloud-based** | ● | ● | ● | ● |

● Complete ◔ Partial
◐ Limited ○ Not Aligned

As illustrated in Figure 3, Options 1, 3, and 4 fully align with VA's IT strategic direction. *Option 2: COTS + eHMP* partially aligns because it relies on internal VA development to support and advance the eHMP, which does not align with the strategic sourcing and buy-first.

In addition to VA's IT strategy, we identified technical evaluation criteria to assess VA's current capabilities to support the options under consideration. The technical evaluation criteria are:

- *Network resource requirements*: Network resources are required by any solution that requires any machine, service, process or facility to connect to another. In broad terms, network resources affect the speed and responsiveness of activities within both the EHR interface and between the EHR environment and ancillary systems. Every solution will require a certain level of network resources in order to operate, however, the specific limiting resources can be drastically different between the options and this evaluation will focus on the bandwidth, connectivity, latency mitigation and topological layout of each considered solution.

- *Adaptability "future proofing":* Adaptability is the capacity of a solution to be flexible enough in terms of allowed clinical processes and workflows and underlying and integrated technologies to meet VA's immediate needs while providing a stable and robust platform to support the new care models and technologies. While all enterprise class EHRs will be configurable to address the immediate needs of VA, certain architectures will be more accessible and adaptable in terms of data and processes, which

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will allow VA greater ability and a lower barrier to mold a given solution to changes in the clinical landscape.

- *Scalability:* Simply put, scalability is the ability of a solution to efficiently scale to an organization the size of VA. Scalability takes into account not only the approach and architecture needed to scale a solution, but the level of complexity in both required systems and processes necessary to achieve this. Additionally, this takes into account the complexity of migrating workflow and processes between sites as well as the ease of expanding or contracting solution instances.

- *Redundancy:* In order for VA to continue to operate and provide critical services to Veterans, any EHR system must be adept at effectively providing needed information to doctors, nurses and other clinical staff at all times while still providing a "single view" of the Veteran. Additionally, it must provide methodology to ensure that records are not lost or corrupted, that no or minimal single points of failure exist within the network, and address concurrency issues arising from interruptions in end-to-end network coverage across the VA system.

Figure 4 illustrates each solution's degree of alignment with the above technical evaluation criteria. As templated, all solutions fulfill the intentions of these criteria to a curtain extent, however *Option 2: COTS + eHMP* has minor abrogation relative to the other solutions.

**Figure 4. Alignment to Technical Evaluation Criteria**

| Evaluation Criteria | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| Network resource requirements | ● | ◐ | ● | ● |
| Adaptability | ● | ● | ● | ◐ |
| Scalability | ● | ◐ | ● | ● |
| Redundancy | ● | ◐ | ● | ● |

● Complete ◐ Partial
◐ Limited ○ Not Aligned

Options 1 and 4 differ in adaptability due to differences in implementation model, namely SasS (*Option 4: COTS SaaS*) to non-SaaS, where VA's ability to modify their solution is attenuated be the constraints of the SaaS implementation. Under a SaaS option, VA would not have direct access to the database backend and thus would be slightly limited in the capability to directly interface with the data and thus to conduct operations on said data without going through an intermediary approved by the SaaS provider.

*Option 2: COTS + eHMP* allows for a high degree of adaptability due to its utilization of the eHMP project which allows VA to directly drive the future capability of eHMP and thus the solution itself. However, this capability is realized through the implementation of additional software on-top on the COTS EHR resulting in increased network demands and increasing the effort necessary to scale and establish redundancy analogous to an infrastructure supporting a COTS system without the addition of the eHMP's needs.

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## 3.4 Benefits

The adoption of an enterprise-wide, standardized commercial EHR product, supported by a vendor with an established track record and well-integrated modules may improve the perception of VA and underscore the organization's commitment to providing high quality care to Veterans in the 21st century.

**Figure 5. Benefits of Options**

| Benefits Category | Evaluation Criteria | Option 1: COTS | Option 2: COTS+ eHMP/JLV | Option 3: VistA Comm. | Option 4: COTS SaaS |
|---|---|---|---|---|---|
| **Defined product roadmap** | • Clear vision for software evolution<br>• Ability to keep pace with market demands, trends and innovations | HIGH | MEDIUM | LOW | HIGH |
| **Access to and ownership of data** | • VA has direct administrative and/or system authority | HIGH | HIGH | LOW<br>HIGH | LOW<br>HIGH |
| **Ability to customize EHR product** | • VA has the ability to direct product development | MEDIUM | HIGH | HIGH | LOW |

- *Defined product roadmap:* Established COTS vendors are expected to have a long term vision for their product growth strategy that can help them stay on top. Options 1, 2 and 4 offer VA such an opportunity to partner with leading COTS vendors who may be able to quickly modernize VA's care delivery process and help the agency realize its mission of Veteran-centric care. However, that *Option 2: COTS + eHMP* is rated slightly lower than Options 1 and 4 because within *Option 2: COTS + eHMP*, the eHMP package is still in its early stages of deployment as it has not yet been scaled to the enterprise level or designed to integrate with non-VistA EHR's. Similarly, *Option 3: Commercialized VistA* is also rated lower on the defined product roadmap benefit scale compared to the other options because in this scenario, the vendor is expected to design and build a custom EHR tailored for VA.

- *Access to and ownership of data: Option 1: COTS* and *Option 2: COTS + eHMP* include implementation on a VA-managed, federally-certified, secure cloud environment. While VA will not own the actual servers or data centers, they will directly manage the cloud environment and database engines supporting the EHR, and would have direct access to the live data stored within the EHR. Therefore, direct access and control to the live data and the ability to use it with any third-party solutions desired without outside vendor involvement are the primary reasons for rating Options 1 and 2 higher than Options 3 and 4. However, VA can mitigate the concern for access to the data for Options 3 and 4 by ensuring appropriate language is included in the contract for the EHR that guarantees VA's right to access the data for any reason, and to allow VA to connect any third party software VA chooses directly to the SaaS environment and solution, regardless of other agreements the COTS SaaS vendor has made. This agreement would likely have cost implications that could not be estimated, as this type of arrangement is atypical.

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- *Ability to customize EHR product*: While VA may not be able to customize a COTS product at the facility level because of its size and scale, VA has the ability to influence the vendor's product development at different degrees. However, Options 2 and 3 provide greater flexibility for VA to customize the solution. For instance, *Option 2: COTS + eHMP* leaves open the possibility for VA to develop capabilities on its own through the eHMP, while Option 3: Commercialized VistA provides VA the option to direct or otherwise have a significant voice in the future development of the solution. Comparatively, *Option 4: COTS SaaS* rates the lowest in terms of customizability because of its SaaS arrangement.

Each option provides benefits to one extent or another. In applying the benefits to a decision regarding the modernization of the EHR, VA leadership can determine which benefits are more important to VA going forward, and then assess the benefits against the other factors assessed in this paper.

## 3.5 Risks

There are always risks associated with any large enterprise-wide system implementation. The figure below highlights key risks VA leadership must be aware off when selecting the best strategic option for EHR implementation. The risks were identified and analyzed based on VHA and OI&T stakeholder interviews, COTS vendor interviews and demonstrations, industry research and Grant Thornton experience conducting EHR implementations.

**Figure 6. Risks of Options**

| Risk Category | Evaluation Criteria | Option 1: COTS | Option 2: COTS+ eHMP | Option 3: VistA Comm. | Option 4: COTS SaaS |
|---|---|---|---|---|---|
| **Transitioning to a cloud environment** | • Experience with cloud<br>• Resource skillset | HIGH | HIGH | HIGH | MEDIUM |
| **Backup and disaster recovery management (DRM)** | • Infrastructure reliability<br>• Redundancy protocols in place | HIGH | HIGH | LOW | LOW |
| **Integration of third-party COTS applications** | • COTS capabilities can address VHA's needs (e.g., population health, decision support, mental health, user-friendly, secure messaging) | LOW | LOW | MEDIUM | MEDIUM |
| **Loss of control over future EHR capabilities development*** | • VA's level of autonomy and control over its future EHR solution | HIGH<br>MEDIUM | MEDIUM | LOW | HIGH<br>MEDIUM |
| **Demand on network infrastructure** | • Relative bandwidth requirement at the VAMC and satellite facilities | MEDIUM | HIGH | MEDIUM | MEDIUM |
| **Required additional development** | • Maturity of software and its capabilities | LOW | HIGH | HIGH | LOW |

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| | | | | | |
|---|---|---|---|---|---|
| **Disruption to workflow during implementation** | • Clinical workflows and business processes will be redesigned | HIGH | HIGH | HIGH | HIGH |
| **Availability of Vendors** | • The known availability of vendors in the market that can support the option. | LOW | LOW | HIGH | LOW |

*Traditionally, this risk is high as commercial vendors control the product roadmap. VA however could reduce this risk by contractually requiring some control over the direction the vendor takes with the product.

- *Transitioning to cloud environment:* VA has 35 years of experience developing and managing their own data centers and other on-premises installations of VistA and supporting software. However, transitioning to a cloud environment requires different skill sets and competencies. The skill gap and lack of experience with cloud management poses risk, as existing experienced system administrators and managers would have to undergo retraining or new system administrators would need to be hired. Hiring new administrators would require training in VA processes and operations. This risk is common to both Options 1 and 2, as both of these options have the COTS EHR hosted within a VA-purchased, federally-certified, secure cloud environment where VA's OI&T resources are responsible for managing and administering the data and the hardware setup within the cloud environment. Option 3: Commercialized VistA is also high risk because without a defined partner, VA does not yet know whether the eventual partner will be conversant in cloud deployment. Finally, *Option 4: COTS SaaS* is less risky to VA because the vendor is already operating a SaaS environment for other clients. There is some risk due to scaling to VA's needs, but this is not as high as Options 1-3.

- *Backup and disaster recovery management (DRM):* As VA transitions to a cloud environment, backup systems and disaster recovery will need to be considered in new ways and existing back-up plans would need to be reevaluated. Migration to a commercial cloud provider – as in Options 3 and 4 – alleviates the hardware component of disaster recovery. However, VA would still bear responsibility for ensuring that failover and redundancy protocols work seamlessly to minimize disruption to clinical workflow and have zero impact to patient safety. The management and planning of these activities is a significant undertaking given the size and complexity of VA.

- *Integration of non-COTS EHR applications:* Unlike Options 3 and 4, VA would own the COTS solution in Options 1 and 2. Therefore, by leveraging the VA Digital Platform strategy in Options 1 and 2, VA can potentially connect with any non-COTS EHR application in the market to achieve its desired goals. However this advantage would be significantly reduced in Options 3 and 4 where VA has limited direct control of the software due to potential contractual restrictions and SaaS implementation.

- *Loss of control over future EHR capabilities development:* While the adoption of a COTS EHR solution allows VA to keep pace with industry leaders in health care information technology, VA may still encounter limitations with a COTS solution because a COTS vendor may be either unwilling or incapable of providing VA-requested, non-standard enhancements and functionality post go-live. Options 1 and 4 are considered high risk for this reason, but the risk could be lowered should VA ensure contract language allows them to direct the development of future capabilities. We therefore assessed the options as either high or low, dependent on VA's ability to negotiate such development control. *Option 2: COTS + eHMP* is less risky because VA would be able to adapt eHMP in the future to accommodate new technologies it can develop. Finally, *Option 3: Commercialized VistA* is low risk

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because VA would negotiate some control over future development and incorporation of new technologies.

- *Demand on network infrastructure*: *Option 2: COTS + eHMP* may have greater bandwidth requirements at VAMC and satellite facilities than Options 1, 3, and 4 as the network will have to accommodate traffic from both the EHR and the eHMP applications; this could be burdensome in areas where bandwidth is limited.

- *Required additional development*: While the ability to direct development is a benefit, an associated risk is that of taking on additional development. Options 2 and 3 by design require further development and customization. For instance, the eHMP software was designed specifically for VistA and therefore the software in its current version (2.0) will require code level redesign to seamlessly integrate with a COTS product. Likewise, the commercialized VistA in *Option 3: Commercialized VistA* also requires code level upgrades so that it can address both the unique requirements of VA along with the modernized features found in standard COTS products. Thus, Options 2 and 3 share a much higher risk compared to Options 1 and 4 that do not require code level updates.

- *Disruption to workflow during implementation*: All four options carry significant risk in disruption to existing workflow. This is inherent in a change to any new solution. VA will manage the risk through significant investment in change management, training, and hands-on support during and immediately after implementation.

- *Availability of Vendors*: Options 1, 2 and 4 are all low risk due to the availability of several vendors in the market to support the option (either through the COTS solutions or through continued development of eHMP). *Option 3: Commercialized VistA* however, is high risk. In assessing several the type of partner VA needs to make *Option 3: Commercialized VistA* successful, there may be few, if any, vendors in the market willing to support this option. Because of the criticality of finding a viable partner for this option – success is completely contingent on it – *Option 3: Commercialized VistA* should be viewed as an overall high risk.

As with benefits, the options hold differentiated risk as compared with one another. The critical factors in deciding on a modernization approach is determining the level of risk appetite the organization has, and which types of risk are more acceptable. These risks can then be balanced against alignment with strategy, benefits and costs.

## *3.6 Summary of Non-Cost Assessment*

As noted in the Executive Summary, the combination of alignment with clinical and IT priorities, benefits and risks, provide the best opportunity to assess the options against one another. VA leadership, upon determining the relative importance of these factors, can use the analysis in Figure 7 below, to support the decision:

**Figure 7. Decision Criteria applied to each Option**

| Decision Factor | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| **Time to Initial Operating Capability (IOC)** | • Out-of-the-box functionalities fulfilling >80% of VA's needs<br>• Estimate 18-24 months to IOC ~ | • Out-of-the-box functionalities fulfilling >80% of VA's needs<br>• Additional time to re-design and scale eHMP to COTS solution | • Requires modernizing a single instance of VistA software prior to implementing, which will add at minimum an additional 12 months | • Out-of-the-box functionalities fulfilling >80% of VA's needs<br>• Estimate 18-24 months to IOC ~ Pilot Site post acquisition |

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| Decision Factor | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| | Pilot Site post acquisition | • Estimate 18-24 months to IOC ~ Pilot Site post acquisition | • Estimate 24-36 months to IOC ~ Pilot Site post acquisition | |
| **Interoperability with other health systems** | • All top tier COTS vendors meet multiple interoperability standards (e.g., FHIR) to create longitudinal record | • Same as Option 1: COTS. Also, JLV provides a static view of external records, but does not create the longitudinal record<br>• eHMP to provide longitudinal record | • Interoperability capability would have to be built into the commercialized VistA solution | • All top tier COTS vendors meet multiple interoperability standards (e.g., FHIR) to create longitudinal record |
| **Flexibility** | • VA administered cloud increases VA flexibility to access 3rd party vendors (e.g., best in class population health) | • Same as Option 1 for COTS<br>• eHMP for new capabilities over time, dependent on development time, which may exceed market timeliness | • Vendor administered cloud decreases VA flexibility to access 3rd party vendors (e.g., best in class population health) because vendors may have pre-existing agreements. | • Vendor administered cloud decreases VA flexibility to access 3rd party vendors (e.g., best in class population health) because vendors may have pre-existing agreements. |
| **Modernity** | • Industry leading software that regularly upgrades based on best practices and industry innovation<br>• Fully integrated solution with modern team based communications | • Same as Option 1 for COTS<br>• eHMP functionality would need to be de-conflicted of overlapping capability and then integrated with the COTS product. | • Vendor's commitment to continuous upgrade contingent on ability to sell the solution at other clients and make a profit<br>• VA may have to invest or enter into risk sharing arrangements if the vendor is not able to sell the solution to a critical mass to break even | • Same as Option 1: COTS |
| **Tailorability** | • COTS out-of-the-box capabilities allow software configuration to meet end-user practice preference (e.g., physician note templates)<br>• Code level change (customization) incurs additional cost | • Same as Option 1: COTS<br>• eHMP adds capability to tailor because it is a VA developed and managed product | • Highest level of tailorability<br>• May require additional cost to purchase leading business and clinical workflows from 3rd party entities | • Same as Option 1: COTS, except code level change (customization) may not be possible because software may be shared by other clients of the COTS vendor (e.g., DoD) |
| **IT Strategic Alignment** | • Aligns with all the strategic priorities except cloud is VA administered | • Does <u>not</u> align with the following strategic priorities: buy first, reduce IT footprint | • Aligns with all IT priorities | • Aligns with all IT priorities |
| **Cost** | • Total = $16.2B<br>• Includes $184M for VA cloud hosting | • Total = $18.7B<br>• Includes $525M for eHMP cost | • Total = $11.9B<br>• Assumes $830M software costs absorbed by vendor | • $16.0B<br>• VA does not incur hosting costs |
| **Relative Risk** | • Medium risk since vendors implement their solutions in this manner routinely | • Higher risk due to continued reliance on internally developed software | • High risk due to limited partner viability or appetite | • Medium risk since vendors have SaaS models in place |

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# 4.0 Cost Assessment

Grant Thornton applied a three step approach to develop high-level cost estimates for each option under consideration:

- Applied the analogous costing methodology as defined by the Government Accountability Office (GAO) Cost Estimating and Assessment Guide[12]
- Met with EHR vendors, applied assumptions for software implementation in VA and requested non-attributable, rough order of magnitude (ROM) estimates from each
- Applied industry research and benchmarks for large-scale EHR and management information system implementations to identify and price various cost centers typical of these implementations

We provide a 15-year cost estimate for this analysis. The first ten years will be implementation years, as discussed in the timeline section below. The last five years provide an estimate for what VA may expect for annual software licensing and maintenance fees.

## *4.1 Analogous Cost Methodology*

Grant Thornton used the analogous methodology for the following reasons:

- There are few data points available to consider in assessing cost for an EHR implementation in an organization the size of VA. Two analogous implementations include the DoD acquisition of Cerner and the Kaiser Permanente implementation of Epic. These were determined to be analogous due to the similar care delivery model, supporting a dedicated patient population through all care delivery. In addition, the total patient population for the three are similar.
- Since VA is in the early stages of planning the EHR modernization, specific business and technical requirements are not available to provide the basis of an engineering cost build-up.
- The timeframe available for analysis to support the cost estimate is relatively short for such a large and complex organization.
- At this stage in the decision, a ROM cost estimate is sufficient for the four options as the final solution costs will be highly dependent on the vendor chosen and could change during the vendor selection process as the vendor addresses VA's specific needs.

In assessing the DoD and Kaiser implementations, Grant Thornton determined that the total number of enrolled patients provided a reasonable benchmark in performing an analogous estimate. This assessment yielded the approximately $10.6B 10-year estimate used in the VA Digital Platform (VDP) paper provided to VA in December 2016.[13]

## *4.2 Vendor Discussions*

To further refine the estimate for this paper, Grant Thornton engaged commercial EHR vendors to provide ROM estimates for the cost of software implementation and ongoing maintenance for VA. Grant Thornton provided the vendors a list of general assumptions and conditions for the EHR implementation scenario stipulating length of implementation, modules included and type of system solution offering. Upon review of the vendor-provided ROMs, it became apparent that these estimates generally agreed with the estimate delivered in the VDP report.

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## 4.3 Industry Research and Benchmarking

The analogous methodology and vendor quotes produces top-line price estimates (e.g., total cost of implementation). In order to break the top-line cost into appropriate cost centers, we applied a further cost allocation breakdown developed through a survey of industry leaders who recently went through an EHR implementation. The cost breakdown we developed is in Figure 8.

**Figure 8. Cost Allocation of Software Based on Industry Survey**

| Cost Component | Cost Allocation |
|---|---|
| **Software** | 28% |
| **Vendor Team & Support** | 41% |
| **IT Infrastructure HW & SW (Hosting)** | 6% |
| **Systems Integration** | 3% |
| **Application Support** | 11% |
| **End user devices** | 2% |
| **User training at Go-Live** | 8% |
| **Other Project Cost** | 1% |
| Total | 100% |

Next, due to the size and complexity of VA, we determined that a prime integrator would be required to support preparation for and implementation of the EHR. We identified an appropriate benchmark presented at the Health Information Management Systems Society (HIMSS) and applied it to our model. As shown in Figure 9, the effort of a prime integrator relates to the software cost with a ratio of 1.83:1.

**Figure 9. Prime Integrator Cost (HIMSS)**

| HIMSS Component | Percent Cost |
|---|---|
| **Software** | 30% |
| **Labor** | 55% |
| **Quotient** | 1.83 |

The final industry benchmark consists of a cost scalar derived from data provided by EHR in Practice[55]. Grant Thornton studied available data for both traditional and SaaS EHR implementations and based upon that data, derived a scalar which we applied to the COTS cost to determine the cost for SaaS implementation and post-go-live costs. The data showed that implementation costs for SaaS are approximately .79 those of a traditional implementation. However, ongoing licensing fees for the SaaS software and services is approximately two times the cost of the software in a traditional implementation.

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## 4.4 Option-Specific Costs

*Option 1: COTS – Option 1: COTS* utilized the above methodology to determine the overall cost and breakdown to cost centers. We first rationalized multiple vendor quotes by breaking the quotes down against various cost types and then developed an average cost among all vendors. Next, we applied the benchmark cost allocations to determine appropriate costs for each cost center, and then added the prime integrator cost. Finally, we applied our implementation timeline and allocated the implementation phase costs across the ten year implementation phase, followed by five years of annual software costs.

*Option 2: COTS + eHMP* – This option carried the costs from *Option 1: COTS* since they both include implementation of a COTS EHR solution in a VA operated cloud environment. In order to cost the eHMP component of Option 2: COTS + eHMP, Grant Thornton utilized an internal VA estimate for the cost to deliver Version 2.0 of the eHMP to all users. This estimate was provided in a briefing to the Presidential Transition Team earlier this fiscal year. The estimate provided a one-time first-year cost of $96.6M to scale the product for use by all interested users and $30.6M for each year thereafter for 14 years for a total 15-year cost of $525M.[16] Note that this cost assumes no additional development activity.

*Option 3: Commercialized VistA – Option 3: Commercialized VistA* began with a similar costing methodology to *Option 1: COTS* above. We assessed the vendor quotes to determine an appropriate price for the implementation and post-implementation phases of the project and allocated the costs according to our benchmarks listed above. We then assessed the impact of the commercialization agreement. *Option 3: Commercialized VistA* entails an agreement between VA and a commercial partner. The partner would be responsible for upgrading the technology to meet all VA-identified clinical priorities, and to bring the technology up to industry standard. Because of the significant investment necessary to accomplish this goal, we assumed a trade-off arrangement between VA and the vendor. The vendor would make the initial investment to modernize the system. Since the vendor would then be able to market the product commercially, they have an interest in the modernization effort. VA also would benefit greatly, because they transition to a familiar product and ease the concerns of many employees who are invested in the VistA application. We therefore determined that the vendor would apply 50 percent of the cost to modernize the product to their VA agreement, while self-funding the other portion. We therefore added the VA portion of this modernization cost to the implementation phase of the cost model to account for the added cost of modernization.

Grant Thornton studied the VistA 4 Roadmap to determine the total cost to modernize VistA and meet VA's clinical priorities. Our full assessment is provided in Appendix D. As per above, 50 percent of that total was applied to the cost estimate for VA.

*Option 4: COTS SaaS* – To determine the cost of *Option 4: COTS SaaS*, we applied the industry benchmarked scalar model noted in the previous section to *Option 1: COTS* above. Note that per the scalar, while the implementation phase for *Option 4: COTS SaaS* is less costly, ongoing software costs are much higher. Therefore, although the 15 year model we present shows a lower cost for COTS SaaS, this option will become more expensive over its lifetime.

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## *4.5 Estimated Implementation Timeline*

We applied a 10-year implementation time frame as the basis for the cost estimate. We selected ten years due to the size and complexity of VA, allowing adequate planning and preparation time, as well as time for appropriate alpha and beta testing prior to full roll out. Our assumed timeline includes appropriate planning for the following:

- 12-18 months for preparation, planning and Project Management Office (PMO) stand-up for the implementation
- Beta test at one facility for the next 12-18 months to deploy the future Health IT/EHR in VA:
    - Capture clinical and business requirements and standardize workflows across the facility
    - Translate clinical data and design requirements to technical specifications required for build
    - Map standard reporting capabilities to clinical and operational requirements and develop custom reports as appropriate
    - Develop a robust testing methodology to including testing data flow across vendor and VA applications and outside in the community
    - Conduct integrated clinical use case testing, including regression and community connections
    - Conduct training of clinical and operational end users
    - Determine appropriate support for activation and deployment activities
- Alpha test for 12-24 months that includes expansion to other facilities in the beta site Veteran Integrated Service Network (VISN), and additional facilities in other VISNs to control for VISN variability
    - Confirm lessons learned based from the beta site on clinical adoption and interoperability with community providers utilizing Agile methodologies
    - Conduct user review and acceptance analysis of standardized clinical and business processes developed and implemented at the beta test site
    - Determine key drivers for the time duration would be deployment of standardized clinical workflow, training and testing
- Begin national rollout of the implementation phase.

**Figure 10. Estimated Adoption Timeline**

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| # of Hospitals | 0 | 1 | 7 | 10 | 25 | 25 | 25 | 25 | 25 | 25 |

In order to show the annual maintenance cost for the modern EHR system, we then added five years to our estimate, so the total estimate provided is for 15 years, the first 10 of which is implementation.

## *4.6 VA Costs*

VA will also incur internal costs to support the migration to a new, modern EHR. These include data migration costs, change management, and funding a PMO to act on VA's behalf (the PMO can either be staffed with internal VA resources, or through a contract).

To determine the cost of data migration, we analyzed a previous effort where VA was able to complete comprehensive data migration for 66 sites.[14] We assumed a similar level of effort per

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facility would be required to migrate the full 130 instances of VistA. We aligned the timeline for data migration with the implementation timeline from above to determine the total number of sites VA must migrate each year and the total cost of migration.

To cost the change management portion, we leveraged our technical knowledge against a body of industry experience, as well as change management costs illustrated in the eHMP 2.0 rollout program. Change management costs are approximately 25 percent of a total projects aggregate cost, therefore a factor of 25 percent was applied to the overall project cost to calculate the change management cost.

PMO costs were determined by leveraging Grant Thornton's industry experience as well as analysis of pertinent Office of Management and Budget (OMB) Form 300s and select research into other large scale ERP, EHR and information technology implementation projects to determine an appropriate benchmark. Our analysis indicates PMO costs are generally between 15-20 percent of the overall project costs. We assumed the high-end due to the inherent complexity of the scale of VA and a factor of 20 percent was applied to calculate to the PMO cost.

## *4.7 Complexity Factor*

Finally, due to the early stage of decision-making at VA, many factors that impact overall cost are not well understood. These factors include:

- Specific business and clinical requirements, which may identify additional software or integration needs, which may increase overall cost.
- A readiness assessment, which we recommend below, may identify additional internal costs such as infrastructure improvements or increased change management costs.
- Additional development needs in eHMP or VistA modernization.

We therefore added a 20 percent complexity factor for *Option 2: COTS + eHMP* and *Option 3: Commercialized VistA* and a 15% complexity factor for *Option 1: COTS* and *Option 4: COTS SaaS* to account for unknown costs that are likely to arise over the planning period.

Figure 11 provides the detailed breakdown of costs, per our analysis.[15] Appendix D provides full detail of the steps associated with developing each cost center, and the calculations performed.

**Figure 11. 15-year Costs Associated with Four Options**

| Cost Center | Option #1: COTS | Option #2: COTS + JLV/eHMP | Option #3: Commercialized VistA | Option #4: COTS SaaS |
|---|---|---|---|---|
| **Vendor Costs** | | | | |
| Software | $1,179,240,741 | $1,179,240,741 | $194,372,093 | $931,600,185 |
| Vendor Team & Support | $1,726,745,370 | $1,726,745,370 | $284,616,279 | $1,364,128,843 |
| IT Infrastructure HW & SW | $252,694,444 | $252,694,444 | $41,651,163 | $199,628,611 |
| Systems Integration | $126,347,222 | $126,347,222 | $20,825,581 | $99,814,306 |
| Application Support | $463,273,148 | $463,273,148 | $76,360,465 | $365,985,787 |
| End user devices | $84,231,481 | $84,231,481 | $13,883,721 | $66,542,870 |
| User training at Go-Live | $336,925,926 | $336,925,926 | $55,534,884 | $266,171,481 |

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| | | | | |
|---|---|---|---|---|
| Other Project Cost | $42,115,741 | $42,115,741 | $6,941,860 | $33,271,435 |
| eHMP (*Option 2: COTS + eHMP* only) | $0 | $525,000,000 | $0 | $0 |
| VistA Modernization (*Option 3: Commercialized VistA* only) | $0 | $0 | $813,340,000 | $0 |
| **Software Implementation Cost** | **$4,211,574,074** | **$4,736,574,074** | **$1,507,526,047** | **$3,327,143,519** |
| | | | | |
| Post-Go-Live Software Cost | $1,332,060,606 | $1,332,060,606 | $1,170,000,000 | $2,664,121,212 |
| | | | | |
| **Vendor Total** | **$5,543,634,680** | **$6,068,634,680** | **$2,677,526,047** | **$5,991,264,731** |
| | | | | |
| **Services Cost** | | | | |
| Change Management Cost | $1,052,893,519 | $1,527,858,025 | $1,109,047,840 | $1,109,047,840 |
| Data Migration Cost | $505,382,301 | $505,382,301 | $505,382,301 | $505,382,301 |
| Prime Integrator | $2,161,941,358 | $2,161,941,358 | $1,707,933,673 | $1,707,933,673 |
| VA PMO Cost | $2,315,962,964 | $2,565,954,091 | $2,328,407,136 | $2,328,407,136 |
| Cloud Hosting | $184,673,700 | $184,673,700 | $0 | $0 |
| **Services Subtotal** | **$6,220,853,842** | **$6,945,809,474** | **$5,650,770,949** | **$5,650,770,949** |
| Contingency | $2,352,897,704 | $2,602,888,831 | $1,665,659,399 | $2,328,407,136 |
| **Sub-Total** | **$14,117,386,226** | **$15,617,332,985** | **$9,993,956,395** | **$13,970,442,816** |
| Complexity Factor | $2,117,607,934 | $3,123,466,597 | $1,998,791,279 | $2,095,566,422 |
| **Grand Total** | **$16,234,994,160** | **$18,740,799,583** | **$11,992,747,674** | **$16,066,009,238** |

## 5.0 Summary of Findings

Grant Thornton utilized our technology adoption approach to assess various options for VA's modernized EHR. The assessment identified the clinical and IT priorities, benefits, risks and costs of each of four options for EHR modernization presented by VA. Our assessment found significant overlap in capability with respect to clinical priorities, and for the most part, alignment with VA's IT priorities. Options differentiate to a greater extent when assessed against the real and potential benefits and risks. These provide a framework against which VA leaders may weigh the options against one another, and informed the decision-criteria discussed in the Executive Summary. While Grant Thornton was not asked to provide a specific recommended option, our analysis provides objective information upon which a decision may be based.

Figure 12 provides a summary of each option's alignment with VA's clinical and technology priorities, as well as the relative benefits and risks associated.

**Figure 12. Alignment with Clinical Priorities & IT Strategic Direction**

| Evaluation Factors | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| Clinical priorities | | | | |
| IT strategic direction | | | | |

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| | | | | |
|---|---|---|---|---|
| Benefits | HIGH | HIGH | HIGH* | HIGH* |
| Risk | MEDIUM | HIGH | HIGH | MEDIUM |

Complete Partial Limited Not Aligned

*Rating assumes VA inserts appropriate language into the contract to guarantee access to and control of data as well as ability to connect third-party software at will.

In addition, Figure 13 provides the high-level cost breakdown of each option.

**Figure 13. Costs of Four Options**

| Cost Component | Option 1: COTS | Option 2: COTS + eHMP | Option 3: Commercialized VistA | Option 4: COTS SaaS |
|---|---|---|---|---|
| | | **Vendor Costs** | | |
| Software Implementation Cost | $4,211,574,074 | $4,736,574,074 | $1,507,526,047 | $3,327,143,519 |
| Maintenance & Support Cost | $1,332,060,606 | $1,332,060,606 | $1,170,000,000 | $2,664,121,212 |
| **Vendor Total** | **$5,543,634,680** | **$6,068,634,680** | **$2,677,526,047** | **$5,991,264,731** |
| | | **Services Cost** | | |
| Change Management Cost | $1,052,893,519 | $1,527,858,025 | $1,109,047,840 | $1,109,047,840 |
| Data Migration Cost | $505,382,301 | $505,382,301 | $505,382,301 | $505,382,301 |
| Prime Integrator | $2,161,941,358 | $2,161,941,358 | $1,707,933,673 | $1,707,933,673 |
| VA PMO Cost | $2,315,962,964 | $2,565,954,091 | $2,328,407,136 | $2,328,407,136 |
| Cloud Hosting | $184,673,700 | $184,673,700 | - | - |
| **Services Subtotal** | **$6,220,853,842** | **$6,945,809,474** | **$5,650,770,949** | **$5,650,770,949** |
| Contingency | $2,352,897,704 | $2,602,888,831 | $1,665,659,399 | $2,328,407,136 |
| **Subtotal** | **$14,117386,226** | **$15,617,332,985** | **$9,993,956,395** | **$13,970,442,816** |
| Complexity Factor | $2,117,607,934 | $3,123,466,597 | $1,998,791,279 | $2,095,566,422 |
| **Grand Total** | **$16,234,994,160** | **$18,740,799,583** | **$11,992,747,674** | **$16,066,009,238** |

## 6.0 Recommendations

EHR modernization is a journey. While Grant Thornton makes no recommendation on which specific option VA should pursue, no matter the choice, the following is recommended in order to inform downstream decisions such as vendor selection (should a COTS solution be involved in the modern EHR), continued development of eHMP and other factors:

- *Technical readiness assessment:* During interviews, a number of VA personnel expressed confidence that VA had the necessary network infrastructure, bandwidth and other technical capabilities to move to the cloud or adopt enterprise-wide SaaS solutions. However, there were others including VA leadership, both nationally and in the field, who expressed reservations regarding the organization having the network capacity and bandwidth to support the EHR in the cloud. We recommend that VA conduct a study to validate these statements. Readiness assessment must also include facilities, data centers and security components.

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- *Technical evaluation of eHMP:* During the interviews, some of the VA personnel shared their optimism that eHMP could help bridge the gap that currently exists around transparency and interoperability both across the different instances of VistA and also between VHA, DoD and the community providers. However, independent assessments of the technology and Grant Thornton's analysis of eHMP program documentation raise concerns as to the long-term viability of the product. A complete, independent assessment of eHMP from a technological standpoint is recommended to determine if it is scalable in its current form, and if not, the necessary additional cost to restructure the product so that it is scalable. In addition, it is also recommended that the assessment include eHMP's ability to integrate with COTS EHR solutions the way it promises to integrate with VistA.

- *Acquisition approach:* VA has specific and critical needs that impact any solution VA chooses. It is critical that VA's needs are properly documented in the clinical and technical requirements of any procurement. This needs to be supported by robust business and technical architectures (capability maps, process models), systems quality factors, service level agreements and enterprise design. In addition, contractual requirements must also address any needs VA has, such as ownership of and access to data. These contractual requirements should be assessed and included as requirements in the solicitation. Cost models are validated and Independent Government Cost Estimates (IGCE) are established. This must include garnering best practices and lessons learned from the DoD Genesis acquisition. It may also include proof of concepts, controlled pilots and phased rollouts.

- *Systems engineering and program management plan:* This should include strategy for requirements management, interface analysis, usability and human factors, architecture analysis and documentation, end-to-end testing, continuous risk management, development of performance metrics and an integrated master plan/schedule (IMP/IMS).

- *System (application) and hardware inventory:* OI&T should conduct a detailed assessment and inventory or each clinical location to ensure all software is catalogued to understand interface requirements. Additionally a detailed desktop, printer and ancillary hardware inventory needs to be conducted as all of these devices will need to be evaluated against any of the strategic options for future usability.

The studies and actions we recommend above will have an impact on the total cost to implement a solution. The readiness assessment may uncover additional necessary investment to improve the performance and bandwidth of the network infrastructure. The systems engineering and program management plan may also increase cost as additional requirements are identified the PMO or vendor must address. The results of these studies may also impact our findings from a benefits and risks standpoint, as significant change in network or organizational improvements to support the transition may introduce risks not assessed. However, these actions are critical to support the successful implementation of any solution.

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# 8.0 Appendix A: Macro Assumptions

In assessing the options, Grant Thornton made the following assumptions:

- Grant Thornton used the Health Information Management Systems Society (HIMSS) definition of an EHR, which states: "The Electronic Health Record (EHR) is a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting. Included in this information are patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data and radiology reports. The EHR automates and streamlines the clinician's workflow. The EHR has the ability to generate a complete record of a clinical patient encounter - as well as supporting other care-related activities directly or indirectly via interface - including evidence-based decision support, quality management, and outcomes reporting."
- VA will implement the EHR as a component of the overall VA Digital Platform (VDP), as described in the strategy document published in 2016 "VA Digital Platform Strategy for Next Generation of Care at the VHA." The VDP establishes a platform on which the EHR operates with other management information systems, such as human resources, financial management and customer relationship management, as well as external EHRs used in the healthcare community, to include DoD. In addition, through the VDP, VA will be able to adopt other tools available in the market to augment core EHR capabilities.
- This assessment focused on the EHR components of VistA only (core clinical, clinical ancillary and revenue cycle). This paper does not address the modernization of other components of VistA such as police and security, financial management, supply chain or others. Appendix E contains a list of current VistA modules that constitute the EHR.
- In assessing implementation costs, the continued carrying costs for maintaining the VistA EHR were deemed to be equal no matter the option selected, therefore they were not considered during this analysis.
- VA currently houses backup copies of electronic health records locally at VA Medical Centers (VAMCs) in the event of network disruptions, in addition to hardware for the provision of the new EHR product. There will be minimal, if any, net new hardware costs incurred as part of the transition to a modern EHR.
- This assessment is based upon strategic needs of the organization, from both a clinical and technological perspective. Detailed business and clinical requirements are not yet defined. The cost assessment therefore uses an analogous methodology and provides a Rough Order of Magnitude (ROM) cost estimate. Additionally, based upon our analysis, the DoD and Kaiser Permanente EHR adoptions are analogous projects.
- Industry benchmarks related to the adoption of new EHRs are relevant to this assessment. Benchmarks include the relative percentage of costs attributed to software, hardware, change management and other factors, as well as the proportional cost of SaaS models versus traditional deployment.
- Three of the four options include the adoption of a COTS EHR solution. Although all clinical and IT priorities can be satisfied by COTS software, a single COTS vendor may not address all equally. Therefore, VA may choose to adopt a vendor for a majority of the EHR components and then add, through the VDP, best-in-class capabilities available through other vendors in order to fully meet its clinical and IT priorities.

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# 9.0 Appendix B: Stakeholder Interview Findings

## *9.1 Clinical Stakeholder Findings*

In order to understand the experience of clinicians using CPRS and VistA for both clinical and research work, several qualitative interviews were conducted with VHA clinicians (both physicians and nurses), including some who had expertise and leadership roles in health informatics and health information technology implementation. The VHA interviews were led by the MITRE collaboration with Grant Thornton. While the majority of clinicians expressed that they are able to collaborate well with other clinicians in order to provide excellent care to Veterans, numerous themes were compiled after these discussions regarding ways in which an EHR solution improve Veteran and clinician experience.

Based on multiple EHR vendor interviews conducted by Grant Thornton, it was felt that all four strategic options could support the needs and requirements of VHA clinicians and leadership. This section highlights essential themes that clinicians expressed with regard to selection and implementation of a modern EHR.

### 9.1.1 Leadership

*Key Messages*: Clinicians articulated a feeling that there is a lack of central governance and that the problems are greater than just EHR choice. Many felt that:

- The *change management* aspect of an EHR transition is significant and the VA needs to be committed to understanding workflows in order to improve the experience for Veterans and clinicians
- Some providers feel significant *trust between clinicians and IT has been lost over time* with respect to partnership in VistA and CPRS development. Part of this is related to the fact that EHR improvements are hampered by budget and approval processes, and additionally, disconnect exists between VA facilities and IT with respect to business planning.
- Regardless of past issues, a number of the clinicians expressed a need for *shared partnership with IT* to deliver quality Veteran-centric care
- Clinicians also feel that the *contracting process is too long* and bureaucratic and needs attention because by the time tools are eventually developed, they are obsolete.

### 9.1.2 Clinical Workflow

*Key Messages*: Providers desire modern EHR capabilities that are intuitive, efficient and allow the clinician to spend more time delivering direct care to the patient. The following are key themes shared during the interviews:

- There is *lack of single-sign on*, which makes it frustrating to go back and forth between different applications
- There is no ability for physicians to easily see their schedules and those of trainees they are supervising. This makes it *difficult to plan their day* because for example, they cannot see if a patient has canceled and then adjust.
- Multiple clinicians mentioned that they need an *integrated way for patient information* to be presented on an EHR screen that *interfaces with clinical decision support tools* and makes *documentation streamlined* and accurate
- Despite the recognition that alerts and reminders are important parts of patient safety, there are often *too many screens and clicks that clinicians must encounter*. One nurse noted that the computer admission

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protocol takes up to two hours for an intensive care unit patient, and 45 minutes for a floor patient, significant time sinks for a nurse who has multiple patients and time-sensitive responsibilities

In addition to the above, there were more focused comments shared such as:

- Because of the decentralized nature of IT, facilities have taken to implement local solutions (both designed internally by local VA IT personnel and COTS products). One provider provided an example that while the COTS solution for their emergency department (ED) worked very well and allowed them to easily see recent Veteran ED visits and reasons, this system did not interface with CPRS. As such, if a patient was admitted to the hospital, an admitting physician could not easily see the ED record (information is saved in cumbersome PDFs).
- There Mixed feedback was shared regarding CPRS usability, with some providers expressing that they felt CPRS was very easy to use and intuitive (multiple providers noted that it worked very well for pharmacy) while others felt that COTS solutions were much more user-friendly and capable.

### 9.1.3 Team-Based Care/PACT

*Key Messages*: As discussed previously, VA has a strong commitment to providing effective team-based care for Veterans through the PACT initiative. Each PACT "teamlet" is comprised of a Veteran, a primary care provider (physician, physician assistant, or nurse practitioner), a registered nurse who functions as a care manager for the team, a licensed practical nurse or medical assistant, and a clerical assistant.[19–21]VA research has already shown that improved relationships with Veterans and speed of care received were noted positives of PACT.[19,20]Despite all of this, CPRS does not support PACT well. VA clinicians have created work-arounds to address these deficiencies, but one group of VA providers detailed several EHR features that would be beneficial in order to support team-based care (Figure B-1).

- Providers are not able to directly communicate through the EHR outside of patient records. A workaround that many use today is adding additional signers to patient notes, which creates an alert to another provider to sign that note, but does not allow for a direct specific message to that provider which is in the EHR but not in a patient note.
- There is no good way to manage panels of patients or cohorts based on clinical condition because of limitations in VistA's architecture.

**Figure B-1. Clinical Team Needs for Team-Based Panel Management**[22]

| Clinical Needs | Relevant Technical Capability |
|---|---|
| Allow user to group patients by a specific clinical condition. | The system should have multidimensional report capability, allowing the user to specify time period, patient group, and selected clinical data at a patient level. |
| Provide summary Data on key clinical variables (e.g. lab tests, prescriptions) that are used as markers of quality of care for a group of patients. | Reports need to be able to summarize numerator and denominator information for the patient group of interest. |
| Need resources to facilitate patient outreach (e.g., personalized patient letters or handouts) | The database system should be able to link pertinent information at a patient level, and provide an "on-demand" synopsis per individual patient. |
| Ability to easily track care across time. | The database system should be able to access clinical data in a longitudinal fashion at the patient level. |

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| Clinical Needs | Relevant Technical Capability |
|---|---|
| Facilitate collaboration among interdisciplinary providers. | The system must have a user interface that supports the needs of interdisciplinary clinical team members. |
| Provide timely data. | Data extraction from the electronic health record should be timely (preferably on a daily basis). |
| Need to be able to enter clinic-specific orders and requests. | Interface must have dual-way information flow between panel management tool and electronic medical record. |

### 9.1.4 Analytics and Research

*Key Messages*: The desire for improved analytics and easier methods of accessing data for both clinical improvements and research were recurring themes expressed by clinicians and informaticists.

- Though many providers emphasized that the volume of data available for Veterans is impressive, *extracting this data usefully can be difficult and slow*.
- Clinicians described *difficulty with obtaining access to databases* and data warehouses and even once they do, they are *not user friendly*. Databases that users create often do not work outside a specific facility.
- Physicians note that they are expected to monitor their productivity but cannot view real-time metrics. Relatedly, users explained that it takes significant amounts of time to run reports that are needed quickly, which greatly hinders prospective research.

### 9.1.5 Mental Health

*Key Messages*: Mental health is an area of distinct importance to VA; there is a long history of programs and interventions to support Veterans, who at higher risk for mental health conditions in general, and others specifically such as post-traumatic stress disorder (PTSD) and suicide. Talking with providers allowed better understanding of some of the technology related challenges experienced by practitioners in this division.

- Veterans receive care from many providers and *coordination of care is difficult* to manage across multiple sites. This is especially critical at times of transition such as when Veterans are leaving active duty and are particularly vulnerable. Clinicians felt that there need to be *better methods for stratifying risk levels of patients* and tracking their care within an EHR.
- Providers would also like the *ability to easily code more detailed information* (e.g. the particular type of therapy provided or assessment completed.
- Documentation is highly narrative, and providers suggested that more *standardized ways of documenting health information* would be helpful.
- From the Veteran perspective, providers recommended *incorporating Veteran input and goals*, interventions and a care plan and allowing these to be integrated with the EHR. Currently, there are numerous self-assessment tools for Veterans but they do not connect with the EHR.

### 9.1.6 Interoperability

*Key Messages*: Many providers expressed numerous difficulties with sharing patient information outside the VA.

- Providers note that the majority of the time, if a patient is seen in the community, when their records are obtained they are largely in paper format and scanned into the EHR. They are linked as images/PDFs and *not integrated with the Veteran's clinical information* in CPRS, so they cannot be linked with clinical decision support tools or reminders.

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- Providers note that if Walgreens and CVS can add immunization data into CPRS, it would be beneficial if other community providers could as well.
- Clinicians want *tools that connect with each other* better, such as kiosks or tablets into which Veterans can enter information and communicate with the EHR.

## *9.2 Validation of Findings with VHA Executive Leaders*

Grant Thornton attended a VHA leadership dinner that included discussions surrounding the EHR Strategic Assessment. Along with seeking insights and feedback, a survey was administered to VHA leadership to compile stakeholder feedback and clinical priorities that were both discovered and considered throughout the stakeholder interviews and assessment period.

In the first part of the survey, participants were asked to identify which stakeholder feedback criteria resonated with them. Stakeholder feedback was narrowed down to the following categories; culture, communications, mental health, analytics and measurement, usability/tailorability, community care interviews, and package level discussion. The captured results are in Figure B-2 below.

**Figure B-2. VHA Leadership Comments**

| | Description | Resonates (Number of times box was checked) | Percentage of results |
|---|---|---|---|
| Culture | There is a cultural legacy of partnership between clinicians and developers. Clinicians appreciate the ability to customize locally, working with developers to implement modifications to their instances of VistA. Several clinicians expressed satisfaction with this capability, and fear losing it with an enterprise COTS system. | 18 | 55% |
| | Many clinicians will accept a change and are ready for a decision to be made. They are, however, reticent about the organization's ability to make a decision and successfully implement it. | 20 | 61% |
| | Some concern of an exodus from VA for retirement eligible clinicians as they do not want to go through a difficult transition at this stage in their career. | 8 | 24% |
| Communications | *Team-Based Care:* Communication between services is difficult now, so they have work arounds where they enter notes into the record and ask for a co-signature so another provider sees it and can respond. Need secure communications tools so the care team can interact without using the patient's record to do so. | 16 | 48% |
| | *With community providers:* Care coordination and communication goes beyond just the care team. Communication with the patient, community providers, and others is important. Need a system that is easier to use for all parties. In the interview with Karen Hudgins, she noted that they are now up with encrypted email with community providers. | 21 | 64% |
| | *With the Veteran:* Current capabilities with MyHealtheVet are clunky and hard to use. The Epic solution was brought up as a very good tool, used throughout the industry. VA should look to that type of solution to communicate with Veterans. Focus on mobile, getting ready for the younger generations. | 14 | 42% |

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| | | | |
|---|---|---|---|
| | *Information Sharing:* We overprotect the data and have too many security requirements that get in the way. Providers feel that it hinders their ability to perform their work. Other organizations are able to share data much more freely, why can't VA? | 18 | 55% |
| **Mental Health** | Providers want better tools to support care coordination within and across medical centers – High risk patients often receive care at multiple locations | 22 | 67% |
| | Ability to interact with Veterans outside the care setting and receive information. This includes the use of mobile technologies to support self-help and transfer of information to the provider. | 19 | 58% |
| | Existing system is limited in the ability to provide care planning at the level VA needs. Providers however do not believe commercial products have the answer – most systems do not address mental health as completely as VA. | 9 | 27% |
| **Analytics and Measurement** | Informaticists generally agreed that they appreciated the ability to extract and analyze data for clinical and research purposes with VistA and would want this to continue. | 17 | 52% |
| | Clinicians expressed difficulty conducting analysis at the patient or cohort level with FileMan. They need to be able to dynamically analyze data at the patient, cohort, population, and eventual genomic level. | 19 | 58% |
| | From a measures standpoint, it is important to be able to measure performance. However, simply looking at care metrics isn't sufficient to truly measure performance. Canned reports are not able to provide the information needed. Clinicians want to make sure they can perform analysis beyond what is available from a canned report. | 17 | 52% |
| | While enterprise analytics is seen as a positive with VistA, at the provider level, they don't have the analytics capability they need (described by one clinician with VistA development experience that this is a challenge with MUMPS). Describe downloading data from FileMan, which takes a long time, then having to export to excel and work with it a lot to get what they need from the data. | 14 | 42% |
| | Looking for dashboards to support patient care, analytics and decision support | 3 | 9% |
| **Usability and Tailorability** | Clinicians liked the ability to develop tailored solutions in VistA and were concerned that commercial products will not allow the level of customization they are used to. | 10 | 30% |
| | Current system is not as user friendly as it could be. There are too many clicks necessary to get where you need to go, and too many screens to navigate. Solution should better align with how physicians work to smooth the process. | 21 | 64% |
| | Information coming from outside providers need to be a part of the record rather than having to go to different places. Provided example where Walgreens and CVS can now populate the record. Why not other providers? | 23 | 70% |
| | General discussion of data availability is that current system has data in too many places, requiring the provider to jump between screens/systems to view information. | 12 | 36% |
| | Reminders – Not aligned to specialty or need. All reminders hit the PCP, which puts them into a mindless clicking mentality. Reminders should go to the clinician that needs it, not just to the PCP. | 18 | 55% |

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| | | | |
|---|---|---|---|
| Innovations | Hospitals/VISNs are bringing in their own capabilities to bridge the gaps in technology (e.g., Cerner Lab). Lack of enterprise focus on new capabilities. | 11 | 33% |
| | Feeling that OI&T is unable to support innovations, so the field has to do it. Example was given related to VistA multiple instances – Region 1 has built new capabilities in VistA (screens, workflows, etc.) and other regions can't take it in because OI&T can't always migrate these capabilities across the country. | 20 | 61% |
| | Need to have a multi-disciplinary approach to IT innovation to understand how professionals work/work together. | 17 | 52% |
| | One common theme on the future is having the medical record self-populate the information a physician needs to know coming into the visit, have the record "tell" the doctor the important/salient points and lead them through the encounter using decision support tools. | 19 | 58% |
| Community Care interviews | There are currently five different legislative authorities for community care. This will make any claims management system hard to implement without customization. They are planning to merge the authorities into one authority, but not there yet. That would help with business rules around when to/not to pay. | 14 | 42% |
| | Care coordination is also important with non-VA providers. Stakeholders talked about secure communications/encrypted email. They recently deployed that capability, but would like to do more to improve collaboration and coordination between providers. | 17 | 52% |
| | Aligning what VA pays to community providers with third-party claims is important. Must be able to identify first and third-party claims received that can be charged to Veterans' insurance companies. | 14 | 42% |
| Package-Level Discussion | Pharmacy – 80% of prescriptions filled by Consolidated Mail Outpatient Pharmacy (CMOP). The solution needs to account for this. It has to be an enterprise system that allows for CMOP and local staff to see everything. Feeling is that commercial products can support this, but there should still be an eye towards VA-specific needs. | 17 | 52% |
| | Lab professionals articulated significant deficiencies with the lab package. The lab package has not been updated in a long time. VistA has difficulty importing lab data and updates cannot easily be made because they will break in other instances of VistA. They feel they need a relational database to handle their lab data. There is no lab information system and they are using middleware patches and products to try to manage this. They view VistA as archaic and a security risk with respect to lab. Other deficiencies in the current system include: microbiology, barcode reading, and order management. | 21 | 64% |

In the second part of the survey, participants were asked to rank the following clinical priorities on a scale of 1 to 5. Clinical priorities were grouped as care approaches unique to VA, workflow, team based care/PACT, analytics/research, mental health, and interoperability. Figure B-3 looks at the number of times a clinical priority was considered for ranking.

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**Figure B-3. VHA Leadership Survey**

| Category | Number of Times Ranked | Percentage of Rankings |
|---|---|---|
| **Care Approaches Unique to VA** | | |
| Configuration required to address Federal requirements while serving a unique population base e.g., pharmacy, tele-health, mental health | 1 | 20% |
| | | |
| **Workflow** | | |
| Single location for Veteran information – whether VA or community generated records. | 16 | 52% |
| Improved tele-health, mobile and web-based tools/technologies for managing Veteran care | 8 | 26% |
| Scheduling ease for Veterans and providers | 11 | 34% |
| | | |
| **Team-based care / PACT** | | |
| Improved care coordination | 17 | 45% |
| Improved communication tools | 7 | 30% |
| Management of Veteran cohorts – supporting Veteran groups with similar health concerns | 2 | 40% |
| | | |
| **Analytics / Research** | | |
| Clinical decision and cognitive analytics support - care for an individual Veteran | 12 | 35% |
| Population health - leveraging large data sets to improve care for groups | 11 | 24% |
| Performance improvement - tracking outcomes between VA facilities/regions | 4 | 24% |
| Ability to easily access data for clinical and research purposes | 6 | 24% |
| | | |
| **Mental health** | | |
| Seamless integration of mental health into EHR | 12 | 28% |
| | | |
| **Interoperability** | | |
| Seamless bi-directional exchange of data with DoD, community providers, etc. | 21 | 40% |

## *9.3 OI&T Stakeholder Findings*

In order to understand the experience of OI&T staff, both leadership and technical, qualitative interviews were conducted throughout the strategic assessment. These stakeholder interviews were led by Grant Thornton in collaboration with MITRE Corporation. The purpose of these interviews were to better understand how the four potential strategic options align with the following OI&T's

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stated priorities: single-view of Veteran and data management, strategic sourcing, buy-first approach, cloud-based, reduced IT footprint, interoperable with VistA, COTS, DoD, community care providers, etc.

### 9.3.1 Clinician Input into EHR Design

*Key Messages*: Providers had concerns about the ability of a commercial product to take into consideration VHA clinicians' wants and needs in the implementation process. Stakeholders explained that during the original development of VistA and CPRS, clinicians and end users priorities and practices were strongly taken into consideration. It is *very important to VA clinicians to have say* in their clinical practices, workflows, tools, and processes that support them.

### 9.3.2 Absence of Data Standardization

*Key Messages*: The current VistA environment is lacking data standardization across VHA sites.

- Stakeholders suggested having every VAMC running the same code base *without pulling away facilities' abilities* to do their own specific processes.
- At the data level, *standardization is important* for sharing data between VAMCs and elsewhere (DoD/community). A key concern surrounding data standardization and the VA, is that the primary problem with instituting standards is that control is currently siloed into non-interconnected regional data stores

### 9.3.3 Questioning Contractor Value

*Key Messages:* Third-party contractors are not providing true value to the VA. Stakeholders said that *contracts are limiting in nature*, which they feel prevents meaningful work from occurring. This restriction along with the contractor's unfamiliarity with VistA, and requirements not being effectively communicated, leads to inefficiency and poor results.

### 9.3.4 Development of Business Requirements

*Key Messages:* Developers expressed throughout the interviews that business processes and requirements created are not useful to developers but rather primarily designed for congressional needs and OI&T and VHA leaderships' priorities. Stakeholders felt OI&T and VHA leadership should develop of business requirements that allow for successful projects and mitigate change in project scope and direction.

### 9.3.5 Difficult System Navigation

*Key Messages:* Navigating between modules and search functions within the current system architecture is *extremely difficult* due to multiple log-ins and fire walls. Stakeholders expressed interest in incorporating single sign-on, and application interconnectivity into the new solution that VA decides to move forward with.

### 9.3.6 Network Capacity to Support New Solution

*Key Messages:* Several stakeholders expressed concern about limitations in VA's network inhibit future development

- lack of network segmentation by asset class was mentioned by one stakeholder

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- A concern expressed during one interview was that VA's network does not have the available bandwidth required by commercial systems.
- Another stakeholder expressed concern in regards to network capacity stating that VA's network is not reliable or standardized, which can result in concurrency problems. It is very important that the VA system be designed to operate natively in an asynchronous environment.

## *9.4 Stakeholders Interviewed*

**Figure B-4.VHA Stakeholders**

| Name | Title |
|---|---|
| Amy Colon | Program Manager, Pharmacy Benefits Management Services |
| Anthony P. Morreale, PharmD | Assistant Chief Consultant for Clinical Pharmacy Services & Healthcare |
| Blake J. Lesselroth MD, MBI | Hospitalist and Informaticist |
| Brook Watts, MD | Senior Advisor for Health informatics |
| Carrie Patton | Clinical Implementation Coordinator |
| Cathy Davis, RN | Chief Nurse, Primary Care |
| Charles Demosthenes, MD | Physician Lead, Analytics and Connected Care |
| Christopher Lacey, PharmD | Associate Chief, Clinical Pharmacy |
| Daniel Papell, PharmD | Pharmacist Clinical Application Coordinator |
| Bill Weppner, MD, MPH | Primary Care Chief |
| Karen Hudgins | Director, Community Care Transformation |
| Kathleen Lysell, PsyD | National Mental Health Director For Informatics |
| Michael Icardi, MD | National Director of Pathology and Laboratory Medicine Services |
| Monica Lypson MD, MHPE | Director, Medical and Dental Education |
| Steve Fihn, MD, MPH | Director, Clinical System Development and Evaluation |
| Steve Lieberman, MD | Assistant Deputy Under Secretary for Health for Access to Care |
| Tim Heimann, PharmD | Chief, Pharmacy Service |
| Eric Burgess | Associate Chief Financial Officer for Managerial Cost Accounting, VHA Office of Finance |
| Jianji Yang, PhD | Lead Data Architect and Informaticist |
| Joan Clifford, DNP | Deputy Assistant for Deputy Under Secretary for Health for Access to Care |
| Judy McConnachie, MPH | Administrative Director, Clinical Business Intelligence |
| Laura J. Kroupa, MD | Chief Medical Informatics Officer |
| Linda McConnell, MSN | Chief Nursing Officer |
| Lynn Sanders, PharmD | Associate Chief Consultant, Clinical Informatics and Pharmacy Re-Engineering, Pharmacy Benefits Management |
| Michael A. Valentino, MHSA, RPh | Chief Consultant Pharmacy, Pharmacy Benefits Management Services |
| Michael L. Davis | Executive Director, Access & Clinic Administration Program, VHA |
| Neil C. Evans, MD | Chief Officer, Connected Care |
| Rachel B. Ramoni, DMD, ScD | Chief Research & Development Officer |
| Rob Silverman, PharmD | Assistant Chief Consultant, PBM Clinical Informatics |
| Richard Barrow, BSN, MSHI | Nursing Informaticist |
| Rob Silverman, PharmD | Assistant Chief Consultant, PBM Clinical Informatics |
| Sheila Ochylski, DNP | Chief Nursing Informatics Officer |
| Shilpa Patel-Teague, MHA | Director for Clinical Programs, VHA |
| Thomas Emmendorfer, Pharm.D | Deputy Chief Consultant, Pharmacy Benefits Management Services |

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| | |
|---|---|
| Uche S. Uchendu, MD | Chief Officer, Office of Health Equity |
| Virginia S. Torrise, Pharm.D | Deputy Chief Consultant, Professional Practice and Clinical Informatics, Pharmacy Benefits Management |
| William Gunnar, MD, JD, FACHE | National Director of Surgery |
| William P. Patterson, MD, MSS | Network Director |

**Figure B-5. OI&T Stakeholders**

| Name | Title |
|---|---|
| Annette Gibbs-Skervin | Executive Director, Strategic Sourcing Transformation Management |
| Bill James | Deputy Assistant Secretary, Enterprise Program Management Office |
| Cynthia Bias | ASD VistA Evolution eHMP Product Manager |
| Daniel Carroll | IT Program Manager |
| Eugene Guglielmo | Senior Advisor, Health Data Management |
| Jack Galvin | Executive Director , End User Operations |
| Jason Hawsey | IT Specialist |
| Joel Russell | IT Specialist |
| John Short | Program Executive, VistA Evolution; Acting Deputy Director, DoD/VA Interagency Program Office |
| Keith Michael | VistA UX Product Manager |
| Kevin Meldrum | IT Specialist |
| Melanie Buechler | IT Specialist |
| Patrick Redington | IT Specialist |
| Roger Sigley | Program Manager |
| Roopangi Kadakia | Chief Cloud Strategist |
| Vanessa Davis | Health Product Support Director |
| Vitalia Devlin | Division Director, Health Product Support Clinical Product Support |

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# 10.0 Appendix C: Identification of Applicable Market Trends

Grant Thornton reviewed industry publications and research regarding the future direction of health IT and healthcare delivery. Publications and research included information from Gartner, Forrester and peer-reviewed medical journals. The following are trends identified as applicable to VA's EHR decision.

## *10.1 Precision Medicine*

VA has long been a leader in research that incorporates new technologies in order to improve the care of Veterans. Precision medicine is defined as "treatments targeted to the needs of individual patients on the basis of genetic, biomarker, phenotypic, or psychosocial characteristics that distinguish a given patient from other patients with similar clinical presentations. Inherent in this definition is the goal of improving clinical outcomes for individual patients and minimizing unnecessary side effects for those less likely to have a response to a particular treatment."[23] In 2009, VA began pilot work to plan for the Million Veterans Project, with the goal of improving understanding of health, disease, and the complex interplay between genetics, environment, and behavior. As of August 2016, more than 500,000 veterans have been enrolled.[24–26] Precision medicine aims to increase quality/speed of clinically relevant analysis and interpretation of complex biological information both for VA patients and elsewhere.[27] Recent VA studies proposed and in progress use precision medicine to target advances in diagnosis and treatment of conditions as diverse as lung cancer, kidney disease, substance abuse disorders, PTSD, cardiovascular disease, and vision loss.[25,27]

In order to support precision medicine as it is used more widely in the clinical rather than solely research setting, there are several technical requirements for an EHR. In addition to development of data standards for genetic test results, there need to be common data formats using standardized medical terminologies.[28] EHRs should be able to populate genetic and pharmacogenomics data and integrate with clinical decision support tools. Assistance with medication dosing, facilitation of orders, improved alerts and reminders, display of relevant information, and workflow support are some of the efficiencies that can be realized.[28,29] EHRs' interfacing with research data warehouses will also allow cross-population queries and improvements in individual patients' care through analysis of larger patient data sets.[30]

## *10.2 Telehealth Services*

As healthcare delivery transitions more and more to settings other than hospitals, the healthcare industry continues to innovate. Telehealth and Internet of Things and wearable technologies have the potential to transform care. Telehealth can be defined as "a broad variety of technologies and tactics to deliver virtual medical, health, and education services. Telehealth is not a specific service, but a collection of means to enhance care and education delivery."[31] Telehealth functionalities have been integrated in EHR systems and are already showing promising results in terms of patient satisfaction, cost reduction, and efficiency for providers.[32–34] Medicare has provided rural health guidelines highlighting services that can be provided via telehealth and are reimbursable.[35]

VA continues to develop ways of providing care to Veterans while improving quality, efficiency, and convenience. Approximately 25 percent of all Veterans live in predominantly rural areas, and they

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are disproportionately older, which creates opportunities for new types of care.[36,37] Approximately 30 percent of Veterans have no access to the internet, and this group is also disproportionately older.[38]

VA Telehealth Services uses both synchronous (e.g. real-time videoconferencing between patients and a care team, remote medical device monitoring) and asynchronous (e.g. acquirement of and transmission of medical data for later review by providers, patient video education modules) communication to supplement face-to-face appointments and make receiving care more convenient for Veterans. Connected Care, which resulted from merging VA's Telehealth Services and Connected Health, is part of VA's efforts to streamline VA's digital health technologies to enrich Veteran care.[7,8] Connected Care is comprised of VA Telehealth Services, MyHealtheVet, VA Mobile Health, and the VHA Innovation Program. VA Telehealth Services uses both synchronous (e.g. real-time videoconferencing between patients and a care team, remote medical device monitoring) and asynchronous (e.g. acquirement of and transmission of medical data for later review by providers, patient video education modules) communication to supplement face-to-face appointments and make receiving care more convenient for Veterans.[7,8] Research shows that these initiatives have improve Veteran satisfaction by reducing travel and wait times.[8,9] In addition, providers endorse improved access, care coordination, and quality of care.[9] MyHealtheVet is VA's personal health record (PHR) which allows Veterans to record and view medical information, order medication refills, and send messages to their care team. VA Mobile Health develops apps to create new ways for Veterans and care teams to interact and coordinate care on mobile platforms. Finally, the VHA Innovation Program leverages both VA employees and private sector professionals to develop new ideas that improve VHA care and service to Veterans.[7,8]

In order to maximize the benefit of these care delivery mechanisms, an EHR must be able to manage multiple different types of communication. In addition to synchronous (e.g. real-time video transmission, remote patient data monitoring) and asynchronous (store-and-forward) transmission, integration of mobile adjuncts and wearable devices (Internet of Things) need to be considered. VA has shown interest in incorporating medical devices and Internet of Things into patient care responsibly, and is investigating ways to ensure the security of these devices.[39,40]

## *10.3 Advanced Computing*

Advanced computing is leading to new evolutions in medical diagnosis, prognosis, and treatment. Artificial Intelligence (AI), defined broadly as "a branch of computer science dealing with the simulation of intelligent behavior in computers or the capability of a machine to imitate intelligent human behavior" is being utilized by the healthcare industry to power clinical decision support and diagnostic tools.[41,42] Technologies like machine learning (including deep learning/neural networks) and natural language processing, are being applied to parse clinical notes, text elements of lab values and other relevant data from the EHR and other clinical sources in order to enhance a physician's diagnostic and treatment capabilities and in some cases to actually act as a caregiver via mobile technologies.[42–44] AI tools (including large-scale implementations like Google's DeepMind and IBM's Watson) accomplish this by incorporating large amounts of clinical and subclinical data and then leveraging their high capacity processing capability in order to analyze this data and provide relevant information to the physician. Machine learning has the potential to assist physicians with differential diagnosis, treatment options suggestions and recommendations.[42,45,46]

Internally, VA Informatics and Computing Infrastructure (VINCI) is an initiative that provides computing resources to improve researchers' access to large amounts of Veteran data to facilitate analysis while protecting privacy and security. VINCI is also engaged in developing an ecosystem for

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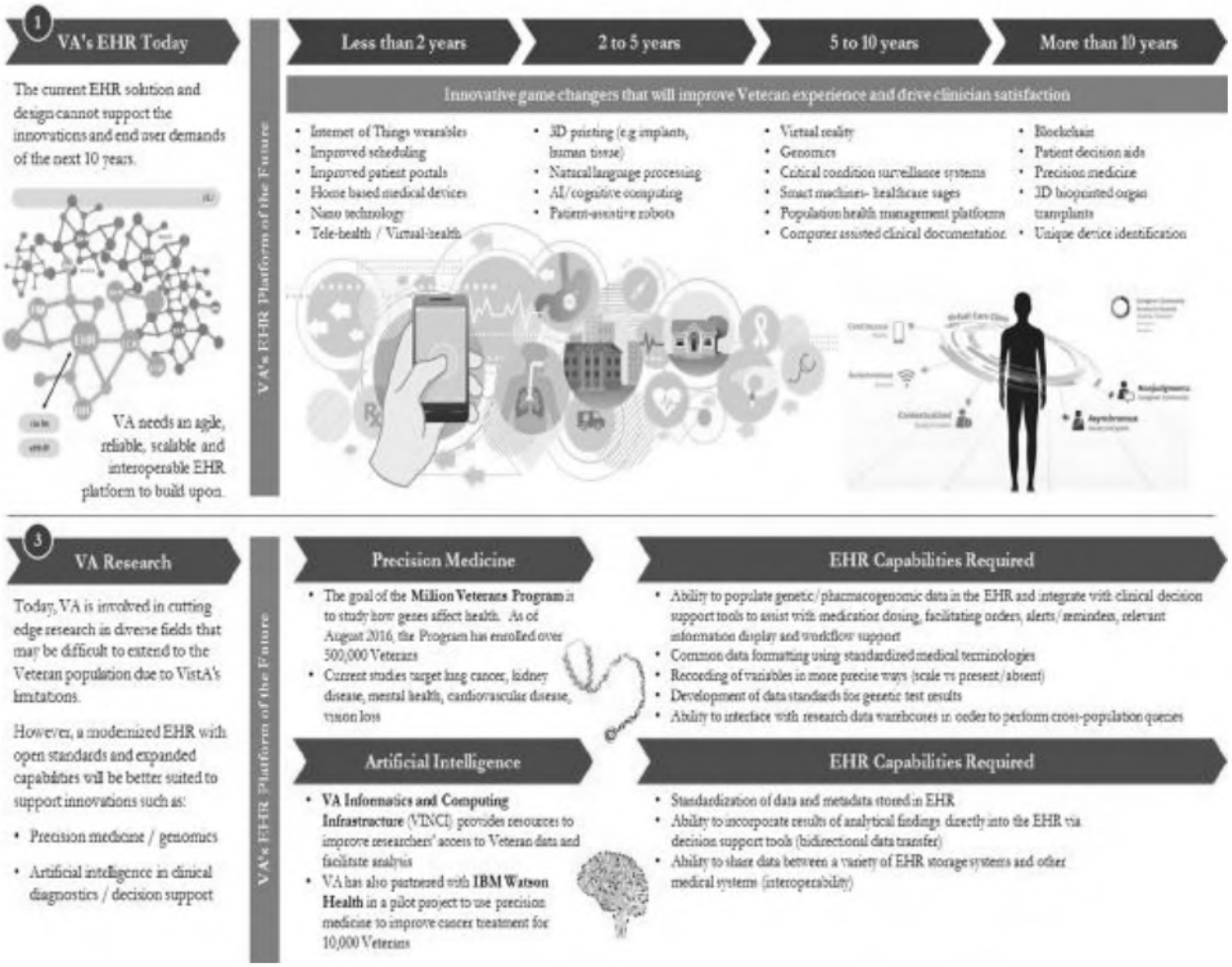
natural language processing that would ideally interface with VA's EHR[47–49] Research projects already in progress by VA researchers include: using reinforcement learning (one type of AI) with mobile health tools to manage chronic pain, employing natural language processing to assess treatment performance for patients with congestive heart failure.[43,44] Recently, VA engaged in a public-private partnership with IBM Watson in a pilot project to use precision medicine to improve cancer treatment for 10,000 Veterans.[50,51]

In order to employ these technologies clinically, there needs to be standardization of data and metadata that is stored in EHRs, the ability to incorporate results of analytical findings directly into an EHR via clinical decision support tools in a bidirectional manner, and the ability to communicate between a variety of EHR and other medical storage systems.[46]

## *10.4 Delivering Patient Care through Innovation*

The graphic below (Figure C-1) looks at the current state of VA, including its EHR package and on-going research activities in conjunction with a view of potential future innovative game changers and the required modern EHR capabilities that will improve Veteran experience and drive clinician satisfaction.

**Figure C-1. VA EHR Transformation**[52]

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# 11.0 Appendix D: Calculation of Cost Estimates

## *11.1 Option 1: COTS EHR*

| Option 1: COTS | Outcome |
|---|---|
| COTS Vendor total costs years 1-15 | 1. COTS Cost Break down for Implementation Phase of the Software costs. Based on a survey of leading industry EHR provides |

| Cost Components | Included in COTs Quote | Cost Allocation |
|---|---|---|
| Software | Yes | 28% |
| Vendor Team & Support | Yes | 41% |
| Systems Integration | Yes | 3% |
| IT Infrastructure HW & SW | No | 6% |
| Application Support | No | 11% |
| End user devices | No | 2% |
| User training at Go-Live | No | 8% |
| Other Project Cost | No | 1% |
| **Total** | **-** | **100%** |

2. Used an average of serval vendor ROM estimates for a COTS implementation average of $3.03B, this number was used as the basis for the estimate. This was divided by software (28%), Vendor Team & Support (41%) and Systems Integration (3%) for the total 10-year Implementation Cost of $4.21B. The $4.21B was then multiplied by the cost allocation for the given area to determine the component cost of these areas:

- Total Vendor Cost = $\frac{\$3,032,333,333}{72\%}$ = $4,211,574,074
- Software = 28% x $4,211,574,074 = $1,179,240,741
- Vendor Team & Support = 41% x $4,211,574,074 = $1,726,745,370
- IT Infrastructure HW & SW = 6% x $4,211,574,074 = $252,694,444
- Systems Integration = 3% x $4,211,574,074 = $126,347,222
- Application Support = 11% x $4,211,574,074 = $463,273,148
- End user devices = 2% x $4,211,574,074 = $84,231,481
- User training at Go-live = 8% x $4,211,574,074 = $336,925,926
- Other Project Cost = 1% x $4,211,574,074 = $42,115,741

3. The implementation timeline was assumed to be 13 instances of VistA per year for 10 years to cover all 130 instances of VistA at VA. The annual implementation cost per year were determined by the following calculation:
   - Software = 10% x $1,179,240,741= $117,924,074
   - Vendor Team & Support = 10% x $1,726,745,370= $172,674,537

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- IT Infrastructure HW & SW = 10% x $252,694,444= $25,269,444
- Systems Integration = 10% x $126,347,222= $12,634,722
- Application Support = 10% x $463,273,148= $46,327,315
- End user devices = 10% x $84,231,481= $8,423,148
- User training at Go-live = 10% x $336,925,926 = $33,692,593
- Other Project Cost = 10% x $42,115,741= $4,211,574

4. Annual Maintenance and Support costs were derived from the vendor quotes by calculating the total amount of facilities per year being supported throughout the vendor's implementation phase and dividing non-service vendor costs by it.

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Fac/yr | 0 | 1 | 7 | 10 | 25 | 25 | 25 | 25 | 25 | 25 |
| Total Fac/yr | | 1 | 8 | 18 | 43 | 68 | 93 | 118 | 143 | 168 |

| | |
|---|---|
| Total Facility Live Years | 660 |
| 10 Year Costs | $1,097,000,000 Net Total 10 Year Cost |
| Per Year Per Facility Cost | $1,662,121 = $1,097,000,000/660 |
| Annual Cost for 168 Hospitals | $279,236,363 = 1,662,121 * 168 Hospitals |
| Total Post Implementation M&S | $1,396,181,818 = 279,236,363 * year 11-15. |

However, as the number obtained is averaged with other vendor supplied numbers, post-implementation the annual cost are an average of $266,412,121 per year.

5. Data mapping costs were from previous efforts, VA was able to complete comprehensive data migration tasks at 66 sites in 6 years and 10 months. The resources for this effort were 20 FTE, plus 200hrs of overtime per instance; this corresponds to 7.47 sites per year. In order to meet VA's current mapping goals of 130 instances within 8-years, VA will need to map 16.25 sites per year; this is an increase of 218% over the previous effort. As the limiting factor effecting integration is available FTEs, VA will need to scale-up staffing to 43.52 FTEs, while maintaining 200hrs of available overtime per instance.
   1. Supporting Calculation:[14]
      - 5.1.1 Historical Data
        - 5.1.1.1 66 sites mapped / 6.833 years of effort = 7.47 site per year
        - 5.1.1.2 130 Total VistA Instances / 8 year project = 16.25 sites per year
        - 5.1.1.3 Subsequently a 218% faster project is need, the limiting constraint is assumed to be labor.
        - 5.1.1.4 20 FTE for original project tempo * 218% = 43.52 FTE needed
        - 5.1.1.5 ((FTE * Salary Level * Instances) + (Hourly Salary * OT Hours * Instances)) = $505,382,301

| ***FTE Required*** | ***Salary Level (GS13 , DC Locality)*** | ***Total VistA Instances to Migrate*** | ***Hourly Salary + OT*** | ***OT hours*** |
|---|---|---|---|---|
| 43.52 | $89,033 | 130 | $64.20 | 200 |
| **Migration Phase(Single Instance)** | **Per Site Cost** | **Notation** | | |
| Data Mapping | $3,887,556 | Calculated as ((FTE * Salary Level * Instances) + (Hourly Salary * OT Hours * Instances))/130 #This is how we did the data | | |

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| | | | |
|---|---|---|---|
| | | | mapping cost for the VDP |
| | Total Cost to Migrate a Single Instance | $3,887,556 | Sum of all component costs |
| | Total Cost to Migrate All VistA Instances | $505,382,301 | Per instance cost multiplied by number of instances |

**Total 15-year Project Costs**

6. To calculate the total 15-year project cost the following calculations were used.
   - Total 10-year Vendor Cost= sum of the Vendor total cost (software component costs plus annual maintenance and support costs) for years 1 through 10.
   - Change management cost was assumed to be 25% given the scale and complexity of VA
     Change management cost= $\frac{\text{Total 10-year Vendor Cost}}{0.75}$ x 0.25 = $1,052,893,519
   - Data migration cost were determined to be $505,382,301
   - Post-Implementation Software Cost = sum of the support totals for years 11-15 = $1,332,060,606
   - Prime Integrator = Software cost x (11/6) = $2,161,941,358
   - VA PMO= ((10-year Vendor cost + Change Management Cost + Data Migration Cost + Post-Implementation Software Cost + Prime Integrator)/0.8)x (0.2) = $2,315,962,964
   - Cloud Hosting:
     - This model assumes VA's storage, RAM and needed processing cores are equivalent to the values stated in the VDP Whitepaper, page 28.
     - AWS GovCloud estimates were utilized for values. As hosting is a commodity within industry, these costs were deemed representative of the industry

| Storage Average (TB) | RAM (GB) | Cores |
|---|---|---|
| 729.3 | 17,160 | 4290 |

Storage Cost (per TB/mo) $656,370 (729.3TB x $0.9 $0.9 Storage cost per TB)
Storage Cost Per year $7,876,440 (Storage cost per month x 12)

Each x1 server node has 72 cores.
4290 cores/72 = 59.58. Hosts are dedicated so 60 blades are needed

Node cost is $73,919 per year/per node [17,18]

Processing Cost per Year:
(Assume x1 Nodes
Dedicated Host, Up-Front Pay) $4,435,140 (Cost Per-node x Needed Nodes)

Total 1-year Cost $12,311,580 ( Cost Per-TB + Processing Cost)
Total 10-year Cost $123,115,800
Total 15-year Cost $184,673,700

   - Contingency was 20% of the total of 10-year Vendor cost + Change Management Cost + Data Migration Cost + Post- Implementation Software Cost + Prime Integrator + VA PMO + cloud hosting = $2,352,897,704
   - **Total 15-year Cost $14,117,386,226**

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## 11.2 Option 2: COTS with eHMP

<table>
<tr><th>Costing Step</th><th>Outcome</th></tr>
<tr><td>COTS Costing</td><td>For the COTS portion of Option 2: COTS + eHMP, the same costing approach was used as in Option 1: COTS</td></tr>
<tr><td>eHMP</td><td>The eHMP component was costed using data provided by VA leadership<br>The Year 1 Startup cost are as followed:
<table>
<tr><th>Start Up Cost</th><th>Year 1</th></tr>
<tr><td>Hosting at a Commercial Cloud- Services (OM)</td><td>$ 18,000,000</td></tr>
<tr><td>Operational Support- Services (OM)</td><td>$ 7,000,000</td></tr>
<tr><td>Software license Renewal (OM)</td><td>$ 4,000,000</td></tr>
<tr><td>New SW Licenses (DME)</td><td>$ 22,000,000</td></tr>
<tr><td>Cloud Migration- Services (DME)</td><td>$ 8,000,000</td></tr>
<tr><td>WAN Connection- Equipment (DME)</td><td>$ 11,000,000</td></tr>
<tr><td>Wan-Telecommunication Services (OM)</td><td>$ 1,600,000</td></tr>
<tr><td>VHA-Org. Change Management (OCM)</td><td>$ 25,000,000</td></tr>
<tr><td>Total</td><td>$ 96,600,000</td></tr>
</table>
The Recurring eHMP Costs for Year 2 to Year 15
<table>
<tr><th>Recurring Cost</th><th>Year 1</th></tr>
<tr><td>Hosting at a Commercial Cloud- Services (OM)</td><td>$ 18,000,000</td></tr>
<tr><td>Operational Support- Services (OM)</td><td>$ 7,000,000</td></tr>
<tr><td>Software license Renewal (OM)</td><td>$ 4,000,000</td></tr>
<tr><td>Wan-Telecommunication Services (OM)</td><td>$ 1,600,000</td></tr>
<tr><td>Total</td><td>$ 30,600,000</td></tr>
</table>
The total 15 year costs were determined to be $525,000,000</td></tr>
<tr><td>Adding COTs and eHMP</td><td>The eHMP costs were added to the COTS cost for the 15-year total.
<table>
<tr><th>Years</th><th>eHMP</th><th>COTs</th></tr>
<tr><td>1</td><td>$96,600,000</td><td>$421,157,407</td></tr>
<tr><td>2</td><td>$30,600,000</td><td>$421,157,407</td></tr>
<tr><td>3</td><td>$30,600,000</td><td>$421,157,407</td></tr>
</table></td></tr>
</table>

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| | | | |
|---|---|---|---|
| | 4 | $30,600,000 | $421,157,407 |
| | 5 | $30,600,000 | $421,157,407 |
| | 6 | $30,600,000 | $421,157,407 |
| | 7 | $30,600,000 | $421,157,407 |
| | 8 | $30,600,000 | $421,157,407 |
| | 9 | $30,600,000 | $421,157,407 |
| | 10 | $30,600,000 | $421,157,407 |
| | 11 | $30,600,000 | $266,945,425 |
| | 12 | $30,600,000 | $266,945,425 |
| | 13 | $30,600,000 | $266,945,425 |
| | 14 | $30,600,000 | $266,945,425 |
| | 15 | $30,600,000 | $266,945,425 |
| | **Total 15-year Costs** | | **$6,068,634,680** |
| | *assuming average COTs Vendor Costs | | |

| | | | | |
|---|---|---|---|---|
| Total Project Costs Calculation | The total project costs were calculated as in the same method as in Option 1: COTS. | | | |
| | **Total 15-year Project Cost** | | **Total Cost** | **% of Total Cost** |
| | Total 10-year Vendor Cost | $ | 4,583,574,074 | 29% |
| | Change Management Cost | $ | 1,527,858,025 | 10% |
| | Data Migration Cost | $ | 505,382,301 | 3% |
| | Post-Implementation Software Cost | $ | 1,485,060,606 | 10% |
| | Prime Integrator | $ | 2,161,941,358 | 14% |
| | VA PMO | $ | 2,565,954,091 | 16% |
| | Cloud Hosting | $ | 184,673,700 | 1% |
| | **Subtotal** | **$** | **13,014,444,155** | 83% |
| | Contingency (20%) | $ | 2,602,888,831 | 17% |
| | **Total 15-year Cost** | **$15,617,332,985** | | |

## *11.3 Option 3: Commercialization of VistA*

| Costing Step | Outcome |
|---|---|
| VistA Calculations | As in the other analysis, a vendor ROM estimate for EHR implementation of $554M was used as the basis; this number was divided by the percentage cost centers for: software (28%), Vendor Team & Support (41%), Systems Integration (3%) and Go-Live training (8%) for a total Vendor Cost of $694,186,047.<br><br>An identical distribution of EHR cost centers where utilized as in the commercial SaaS (Option 4: COTS SaaS) model. |

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Total Vendor Cost=

- Total Vendor Cost = $\frac{\$554,000,000}{80\%}$ = $694,186,047

The $694,186,047 was then multiplied by the cost allocation for the given area to determine the component cost of these areas:

| Costs Components | Cost Allocation | Component | |
|---|---|---|---|
| Software | 28% | $ | 194,372,093 |
| Vendor Team & Support | 41% | $ | 284,616,279 |
| IT Infrastructure HW & SW | 6% | $ | 41,651,163 |
| Systems Integration | 3% | $ | 20,825,581 |
| Application Support | 11% | $ | 76,360,465 |
| End user devices | 2% | $ | 13,883,721 |
| User training at Go-Live | 8% | $ | 55,534,884 |
| Other Project Cost | 1% | $ | 6,941,860 |
| **Total** | | **$** | **694,186,047** |

The annual maintenance and support costs was calculated for each year by the formula:

- Annual Maintenance & Support Cost= $\frac{1}{\text{\# of Instances Implemented}}$ x $1,800,000 (average cost M&S per VistA instance)

The annual maintenance cost for the implementation phase (years 1-10) were included in the cost estimate.

VistA Modernization

VistA 4 Evolution Cost Centers were pulled from the VistA 4 Life Cycle Cost Estimate document.

The relevant cost centers were determined to be:

| | | |
|---|---|---|
| Government Program Management | $ | 54,630,000 |
| Program Management-Contractor | | |
| System Engineering | $ | 84,200,000 |
| API Exposure | $ | 36,960,000 |
| API Exposure 2.0 | $ | 8,780,000 |
| API Exposure 2.0-Phase II | $ | 6,390,000 |
| Clinical Capabilities- EHR Certification 2014 | $ | 859,890,000 |
| Clinical Decision Support | $ | 23,450,000 |
| Clinician Services (Misc. clinical modules) | $ | 30,520,000 |
| Clinician Services Lab/Pharmacy | $ | 97,910,000 |
| Clinician Services Phase II | $ | 71,600,000 |
| Clinician User Interfaces | $ | 85,530,000 |
| eHMP Enterprise Wide Deployment | | |

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| | | | |
|---|---|---|---|
| | Enhancements to Scheduling Module | $ | 4,090,000 |
| | FileMan Modernization | $ | 1,370,000 |
| | Immunization Module | $ | 15,920,000 |
| | Interoperability/Data Standard (FileMan) | $ | 29,010,000 |
| | Interoperability/Data Standard (Pharmacy) | $ | 64,620,000 |
| | Laboratory Module Enhancements | $ | 28,170,000 |
| | Laboratory Module Modernization | $ | 30,500,000 |
| | Pharmacy Module | $ | 25,100,000 |
| | Radiology | $ | 29,580,000 |
| | Scheduling Module | $ | 8,520,000 |
| | Specialty Clinical Modules (Women's Health) | $ | 21,050,000 |
| | Veteran Authorization and Preferences | $ | 7,090,000 |
| | VistA Immunization Enhancement | $ | 1,800,000 |
| | VistA Service Assembler- Phase II | | |
| | VistA Services Assembler | | |
| | **Total** | **$** | **1,626,680,000** |
| | It was assumed a risk sharing of 50:50 would occur between VA and the commercial vendor, which lowered this amount to $813,340,000.<br>This was then distributed over a 10-year implementation period on an equal basis of 10% per year, or $81,334,000 annually throughout implementation. | | |
| 15-Year Project Costs | To calculate the total 15-year project cost the following calculations were used.<br>• Total 10-year Vendor Cost= sum of the Vendor total cost (software component costs plus annual maintenance and support costs) for years 1 through 10 = $1,507,526,047<br>• Change management cost was assumed to be 25% given the scale and complexity of VA Change management cost= Total 10-year Vendor Cost / 0.75 x 0.25 = $1,109,047,840<br>• Data migration cost were determined to be $505,382,301 with the same methodology as in the rest of the Options as VistA does not have a common model and enforced data standards.<br>• Post-Implementation Software Cost = sum of support costs total for years 11-15 = $1,170,000,000<br>• Prime Integrator = Software cost x (11/6) = $1,707,933,673<br>• VA PMO costs = ((10-year Vendor cost + Change Management Cost + Data Migration Cost + Post- Implementation Software Cost + Prime Integrator)/0.8)x (0.2) = $2,328,407,136<br>• Contingency was calculated at 20% of the total of 10-year Vendor cost + Change Management Cost + Data Migration Cost + Post- Implementation Software Cost + Prime Integrator + VA PMO = $1,665,659,399<br>• Total 15-year costs are calculated at = $9,993,956,395 | | |

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## 11.4 Option 4: SaaS

| Costing Step | Outcome |
|---|---|
| Vendor ROM Cost | Used an average of serval vendor ROM estimates for a COTS implementation average of $3.03B, this number was used as the basis for the estimate. This number was then multiplied by a scalar factor of .79 in order to adjust the cost COTS average to a SaaS implementation number. |

Scalars are derived as follows:

| | *Implementation Costs* | *Yearly Cost (After Year 1)* | *5-yr TCO* |
|---|---|---|---|
| **Non-SaaS:** | 33000 | 4000 | 48000 |
| **SaaS:** | 26000 | 8000 | 58000 |
| **Factor:** | 0.787878788 | 2 | 1.208333333 |
| **Narrative:** | Implementation costs (including 1st year licensing cost) for a SaaS option is 79% of what is would be for a COTS option | Annual recurring costs for a SaaS option are 200% of what it would be for a COTS option | This is built out to a 5-year model. At this resolution, SaaS is more expensive than COTS by about %21 |

Total SaaS Implementation Costs = Vendor Average * .79 = $2,395,543,333.33

This was divided by software (28%), Vendor Team & Support (41%) and Systems Integration (3%) for the total 10-year Implementation Cost of $3.3B. The $3.3B was then multiplied by the cost allocation for the given area to determine the component cost of these areas:

Total SaaS Vendor Cost=

- Total Vendor Cost = $\frac{\$2,395,543,333}{72\%}$ = $3,327,143,519

The software cost components were determined by the following calculations. These were then scaled over the course of the 10-year implementation and 5-year post-go-live phase.

- Software = 28% x $3,327,143,519 = $931,600,185
- Vendor Team & Support = 41% x $3,327,143,519 = $1,364,128,843
- IT Infrastructure HW & SW = 6% x $3,327,143,519 = $199,628,611
- Systems Integration = 3% x $3,327,143,519 = $99,814,306
- Application Support = 11% x $3,327,143,519 = $365,985,787
- End user devices = 2% x $3,327,143,519 = $66,542,870
- User training at Go-live = 8% x $3,327,143,519 = $266,171,481
- Other Project Cost = 1% x $3,327,143,519 = $33,271,435

| Year | Number of Hospitals |
|---|---|
| 1 | 0 |
| 2 | 1 |
| 3 | 7 |

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| | |
|---|---|
| 4 | 10 |
| 5 | 25 |
| 6 | 25 |
| 7 | 25 |
| 8 | 25 |
| 9 | 25 |
| 10 | 25 |
| 11 | - |
| 12 | - |
| 13 | - |
| 14 | - |
| 15 | - |

The annual maintenance and support costs was calculated for each year by the formula:

- Annual Maintenance & Support Cost= $\frac{1}{\text{\# of Hospitals Implemented}}$ x $532,824,242 (average cost)

- The vendor provided a range of annual maintenance post-go-live of $220,000,000-$300,000,000. These costs were averaged $266,412,121, as per the method utilized for implementation, this number was then multiplied by a scalar factor of 2 to yield: $532,824,242

**15-year project Cost**

To calculate the total 15-year project cost the following calculations were used.

- Total 10-year Vendor Cost= sum of the Vendor total cost (software component costs plus annual maintenance and support costs) for years 1 through 10 = $3,327,143,519
- Change management cost was assumed to be 25% given the scale and complexity of VA
  Change management cost= $\frac{\text{Total 10-year Vendor Cost}}{0.75}$ x 0.25 = $1,109,047,840
- Data migration cost were determined to be $505,382,301 with the same methodology as in Option 1: COTS.
- Post-Implementation Software Cost = sum of the support totals for years 11-15 = $2,664,121,212
- Prime Integrator = Software cost x (11/6) = $1,707,933,673
- VA PMO= ((10-year Vendor cost + Change Management Cost + Data Migration Cost + Post-Implementation Software Cost + Prime Integrator)/0.8)x (0.2) = $2,328,407,136
- Contingency was 20% of the total of 10-year Vendor cost + Change Management Cost + Data Migration Cost + Post- Implementation Software Cost + Prime Integrator + VA PMO = $2,328,407,136
- Total 15-Year Cost = $13,970,442,816

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## 12.0 Appendix E: VistA Packages

The table below provides a complete list of VistA packages. Modules specific to EHR are bolded and italicized.

| Package Type | Package Name | Package Name |
|---|---|---|
| Clinical | Admission Discharge Transfer (ADT) | Methicillin Resistant Staph Aurerus (MRSA) |
| Clinical | Ambulatory Care Reporting | Mobile Electronic Documentation (MED) |
| Clinical | Anticoagulation Management Tool (AMT) | Mobile Scheduling Applications Suite (MBAA) |
| Clinical | Automated Service Connected Designation (ASCD) | Multiple Sclerosis Surveillance Registry (MSSR) |
| Clinical | Bar Code Expansion (BCE) | Nationwide Health Information Network Adapter (NHIN) |
| Clinical | Beneficiary Travel | ***Nursing*** |
| Clinical | Blind Rehabilitation | Nutrition and Food Service (NFS) |
| Clinical | ***Care Management*** | ONCOLOGY |
| Clinical | Clinical Case Registries | Patient Appointment Info. Transmission (PAIT) |
| Clinical | ***Clinical Procedures*** | ***Patient Assessment Documentation Package (PADP)*** |
| Clinical | Clinical/Health Data Repository (CHDR) | ***Patient Care Encounter (PCE)*** |
| Clinical | ***Computerized Patient Record System (CPRS)*** | Patient Centered Management Module (PCMM Web) |
| Clinical | ***CPRS: Adverse Reaction Tracking (ART)*** | ***Patient Record Flags*** |
| Clinical | ***CPRS: Authorization Subscription Utility (ASU)*** | Pharm: Automatic Replenish / Ward Stock (AR/WS) |
| Clinical | ***CPRS: Clinical Reminders*** | Pharm: Bar Code Medication Administration (BCMA) |
| Clinical | ***CPRS: Consult/Request Tracking*** | Pharm: Benefits Management (PBM) |
| Clinical | ***CPRS: Health Summary*** | Pharm: Consolidated Mail Outpatient Pharmacy |
| Clinical | ***CPRS: Problem List*** | Pharm: Controlled Substances |
| Clinical | ***CPRS: Text Integration Utility (TIU)*** | Pharm: Data Management (PDM) |
| Clinical | Dentistry | Pharm: Drug Accountability |
| Clinical | Electronic Wait List | Pharm: Inpatient Medications |
| Clinical | Emergency Department Integration Software (EDIS) | Pharm: National Drug File (NDF) |
| Clinical | Functional Independence Measurement (FIM) | Pharm: Outpatient Pharmacy |
| Clinical | Group Notes | Pharm: Prescription Practices (PPP) |
| Clinical | HDR - Historical (HDR-Hx) | Primary Care Management Module (PCMM) |
| Clinical | Health Management Platform | Prosthetics |
| Clinical | Home Based Primary Care (HBPC) | ***Quality Audiology and Speech Analysis and Reporting (QUASAR)*** |
| Clinical | Home Telehealth | Radiology / Nuclear Medicine |
| Clinical | Immunology Case Registry (ICR) | RAI/MDS |
| Clinical | ***Incomplete Records Tracking (IRT)*** | Registries Airborne Hazard Open Burn Pit (AHOBPR) |
| Clinical | ***Intake and Output*** | Registries Military Eye Vision Injury (MEVIR) |
| Clinical | Laboratory | Remote Order Entry System (ROES) |
| Clinical | Laboratory: Anatomic Pathology | Scheduling |

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| | | |
|---|---|---|
| Clinical | Laboratory: Blood Bank | Shift Handoff Tool |
| Clinical | Laboratory: Blood Bank Workarounds | Social Work |
| Clinical | Laboratory: Electronic Data Interchange (LEDI) | Spinal Cord Dysfunction |
| Clinical | Laboratory: Emerging Pathogens Initiative (EPI) | Standards & Terminology Services (STS) |
| Clinical | Laboratory: Howdy Computerized Phlebotomy Login Process | Surgery |
| Clinical | Laboratory: National Laboratory Tests (NLT) Documents and LOINC Request Form | Traumatic Brain Injury (TBI) |
| Clinical | Laboratory: Point of Care (POC) | ***Virtual Patient Record*** |
| Clinical | Laboratory: Universal Interface | VistA Imaging System |
| Clinical | Laboratory: VistA Blood Establishment Computer Software (VBECS) | VistAWeb |
| Clinical | Lexicon Utility | Visual Impairment Service Team (VIST) |
| Clinical | ***Medicine*** | ***Vitals / Measurements*** |
| Clinical | Mental Health | Women's Health |
| Financial-Administrative | ***Accounts Receivable (AR)*** | Hospital Inquiry (HINQ) |
| Financial-Administrative | Auto Safety Incident Surv Track System (ASISTS) | ICD-9-CM |
| Financial-Administrative | Automated Information Collection System (AICS) | IFCAP |
| Financial-Administrative | Automated Medical Information Exchange (AMIE) | ***Incident Reporting*** |
| Financial-Administrative | ***Bed Management Solution (BMS)*** | ***Income Verification Match (IVM)*** |
| Financial-Administrative | ***Clinical Monitoring System*** | ***Integrated Billing (IB)*** |
| Financial-Administrative | ***Compensation and Pension Record Interchange (CAPRI)*** | ***Integrated Patient Funds*** |
| Financial-Administrative | Current Procedural Terminology (CPT) | Library |
| Financial-Administrative | Decision Support System (DSS) Extracts | Occurrence Screen |
| Financial-Administrative | ***Diagnostic Related Group (DRG) Grouper*** | Patient Representative |
| Financial-Administrative | Electronic Claims Management Engine (ECME) | Personnel and Accounting Integrated Data (PAID) |
| Financial-Administrative | Engineering (AEMS / MERS) | Police and Security |
| Financial-Administrative | ***Enrollment Application System*** | Quality Management Integration Module |
| Financial-Administrative | Equipment / Turn-In Request | Record Tracking |
| Financial-Administrative | Event Capture System (ECS) | Release of Information (ROI) Manager |
| Financial-Administrative | ***Fee Basis*** | Veterans Identification Card (VIC/PICS) |
| Financial-Administrative | Fugitive Felon Program (FFP) | Voluntary Service System (VSS) |
| Financial-Administrative | Generic Code Sheet (GCS) | WebHR |
| Financial-Administrative | Health Eligibility Center (HEC) | Wounded Injured and Ill Warrior |

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| | | |
|---|---|---|
| HealtheVet | Breast Care Registry | Pharm: Medication Order Check Healthcare Application (MOCHA) |
| HealtheVet | Clinical Information Support System (CISS) | Pharm: Pharmacy Data Update (DATUP) |
| HealtheVet | Electronic Signature (ESig) | Pharm: Pharmacy Enterprise Customization System (PECS) |
| HealtheVet | HealtheVet Web Services Client (HWSC) | Pharm: Pharmacy Product System - National (PPS-N) |
| HealtheVet | MyHealtheVet | Registries |
| HealtheVet | National Utilization Management Integration (NUMI) | ***Spinal Cord Injury and Disorders Outcomes (SCIDO)*** |
| HealtheVet | ***Occupational Health Record-keeping System (OHRS)*** | VA Enrollment System (VES) |
| HealtheVet | Patient Advocate Tracking System (PATS) | Veterans Personal Finance System (VPFS) |
| HealtheVet | Person Services | VHA Point Service (Kiosks) |
| Infrastructure | ***Capacity Management Tools*** | M-to-M Broker |
| Infrastructure | Duplicate Record Merge: Patient Merge | Name Standardization |
| Infrastructure | Electronic Error and Enhancement Reporting (E3R) | National Online Information Sharing (NOIS) |
| Infrastructure | Enterprise Exception Log Service (EELS) | National Patch Module (NPM) |
| Infrastructure | FatKAAT | Network Health Exchange (NHE) |
| Infrastructure | FileMan | Patient Data Exchange (PDX) |
| Infrastructure | FileMan Delphi Components (FMDC) | Remote Procedure Call (RPC) Broker |
| Infrastructure | Health Data Informatics | Resource Usage Monitor (RUM) |
| Infrastructure | HL7 (VistA Messaging) | Single Sign on/User Context (SSO/UC) |
| Infrastructure | Institution File Redesign (IFR) | SlotMaster (Kernel ZSLOT) |
| Infrastructure | KAAJEE | SQL Interface (SQLI) |
| Infrastructure | Kernel | Standard Files and Tables |
| Infrastructure | Kernel Delphi Components (KDC) | Statistical Analysis of Global Growth (SAGG) |
| Infrastructure | Kernel Toolkit | Survey Generator |
| Infrastructure | Kernel Unwinder | System Toolkit (STK) |
| Infrastructure | List Manager | VistA Data Extraction Framework (VDEF) |
| Infrastructure | MailMan | VistA System Monitor (VSM) |
| Infrastructure | Master Patient Index (MPI) | VistALink |
| Infrastructure | Medical Domain Web Services (MDWS) | XML Parser (VistA) |

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Document ID: 0.7.1705.52612

From: Cashour, Curtis
</o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=dba510634baa46a085e28c62c254093f-cashour, cu>
To: Sandoval, Camilo J.
</o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=91cab99711134d5898a778ab468532fc-sandoval, c>
Cc: Ullyot, John
</o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=c02392d86764480bb90e3854a5f3cbbb-ullyot, joh>; Wagner, John (Wolf)
</o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=2ea81beb53184e9681d18d786ac92fe1-wagner, joh>
Bcc:
Subject: RE: EHR Modernization
Date: Thu Oct 25 2018 13:25:25 EDT
Attachments:

---

Cam - Please respond to his email with the following:

Thanks, Isaac. I refer you to Curt.Cashour@va.gov for comment.

From: Sandoval, Camilo J.
Sent: Thursday, October 25, 2018 12:59 PM
To: Cashour, Curtis <Curt.Cashour@va.gov>
Cc: Ullyot, John <John.Ullyot@va.gov>; Wagner, John (Wolf) <John.Wolf.Wagner@va.gov>
Subject: FW: EHR Modernization

No comment

---

Camilo Sandoval

202-461-6910

From: Isaac Arnsdorf [mailto:Isaac.Arnsdorf@propublica.org]
Sent: Thursday, October 25, 2018 12:43 PM
To: Sandoval, Camilo J. <Camilo.Sandoval@va.gov>
Subject: [EXTERNAL] Re: EHR Modernization

Hi Cam, just making sure you saw this. Looking forward to hearing from you. Thanks!

From: Isaac Arnsdorf <Isaac.Arnsdorf@propublica.org> on behalf of Isaac Arnsdorf <Isaac.Arnsdorf@propublica.org>
Date: Tuesday, October 23, 2018 at 1:05 PM
To: "Camilo.Sandoval@va.gov" <Camilo.Sandoval@va.gov>
Subject: EHR Modernization

Cam,

I'm interested in speaking with you for an in-depth article about the EHR modernization. My questions for you are:

1.Why did you transfer from Treasury to VA?
2.How do you know Ike Perlmutter?
3.Why do you have a standing daily call with Ike Perlmutter?
4.Why do you keep a spreadsheet tracking projects for Perlmutter?
5.Why did you tell Perlmutter that he shouldn't trust Shulkin on the Cerner contract because Shulkin was positioning himself for a post-government job? What evidence do you have to support this allegation?
6.Why did you tell people that Shulkin planned to sign the Cerner contract on March 29?
7.How did you know ahead of time that Shulkin would be fired that week?
8.Why did you become executive in charge of OI&T?
9.What experience do you have in health care IT?
10.Why did you, John Windom and Rich Stone meet about ousting Genevieve Morris?
11.Why didn't Genevieve Morris want you to come to the kickoff event?
12.Why do you walk around the office in socks or flip flops?
13.Why have you canceled speaking engagements as executive in charge?
14.Why did you move back into the CIO office from the OEHRM? What have these repeated moves cost taxpayers?

Thanks,

Isaac

Isaac Arnsdorf

ProPublica

917.512.0256

203.464.1409

isaac@propublica.org

Document ID: 0.7.1705.52604

From: Sandoval, Camilo J. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=91cab99711134d5898a778ab468532fc-sandoval, c>
To: Cashour, Curtis </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=dba510634baa46a085e28c62c254093f-cashour, cu>
Cc: Ullyot, John </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=c02392d86764480bb90e3854a5f3cbbb-ullyot, joh>; Wagner, John (Wolf) </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=2ea81beb53184e9681d18d786ac92fe1-wagner, joh>
Bcc:
Subject: FW: EHR Modernization
Date: Thu Oct 25 2018 12:58:55 EDT
Attachments:

---

No comment

---

Camilo Sandoval

202-461-6910

From: Isaac Arnsdorf [mailto:Isaac.Arnsdorf@propublica.org]
Sent: Thursday, October 25, 2018 12:43 PM
To: Sandoval, Camilo J. <Camilo.Sandoval@va.gov>
Subject: [EXTERNAL] Re: EHR Modernization

Hi Cam, just making sure you saw this. Looking forward to hearing from you. Thanks!

From: Isaac Arnsdorf <Isaac.Arnsdorf@propublica.org> on behalf of Isaac Arnsdorf <Isaac.Arnsdorf@propublica.org>
Date: Tuesday, October 23, 2018 at 1:05 PM
To: "Camilo.Sandoval@va.gov" <Camilo.Sandoval@va.gov>
Subject: EHR Modernization

Cam,

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4.Why do you keep a spreadsheet tracking projects for Perlmutter?
5.Why did you tell Perlmutter that he shouldn't trust Shulkin on the Cerner contract because Shulkin was positioning himself for a post-government job? What evidence do you have to support this allegation?
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11.Why didn't Genevieve Morris want you to come to the kickoff event?
12.Why do you walk around the office in socks or flip flops?
13.Why have you canceled speaking engagements as executive in charge?
14.Why did you move back into the CIO office from the OEHRM? What have these repeated moves cost taxpayers?

Thanks,

Isaac

Isaac Arnsdorf

ProPublica

917.512.0256

203.464.1409

isaac@propublica.org

Document ID: 0.7.1705.52602

From: Sandoval, Camilo J. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=91cab99711134d5898a778ab468532fc-sandoval, c>

To: Cashour, Curtis </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=dba510634baa46a085e28c62c254093f-cashour, cu>; Connell, Lawrence B. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=a3e7233376344045980ad214122389f4-connell, la>; Windom, John H. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=43f78d00b4a04d0492dbbf83ea188342-windom, joh>; Stone, Richard A., MD </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=bd16619615d64adea22e45e63ff6462a-stone, rich>

Cc: Ullyot, John </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=c02392d86764480bb90e3854a5f3cbbb-ullyot, joh>; Hutton, James </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=a7da07a304d245cca9fca81fbc0da800-hutton, jam>; Eason, William J. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=f90c9ec8badb4538afbfe0b7a69f4422-eason, will>; Snyder, Jill </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=0b6e91ef72ee4a05acc63873c64570e1-snyder, jil>; Screen, Gina </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=777aa6921e794e42a45a07d8235767c5-screen, gin>

Bcc:

Subject: RE: // for approval // Interview with Secretary Wilkie about EHR implementation

Date: Thu Oct 25 2018 12:58:25 EDT

Attachments:

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I'm good here

---

Camilo Sandoval

202-461-6910

From: Cashour, Curtis
Sent: Thursday, October 25, 2018 12:56 PM

To: Connell, Lawrence B. <Lawrence.Connell@va.gov>; Windom, John H. <John.Windom@va.gov>; Stone, Richard A., MD <Richard.Stone2@va.gov>; Sandoval, Camilo J. <Camilo.Sandoval@va.gov>
Cc: Ullyot, John <John.Ullyot@va.gov>; Hutton, James <James.Hutton@va.gov>; Eason, William J. <William.Eason@va.gov>; Snyder, Jill <Jill.Snyder@va.gov>; Screen, Gina <Gina.Screen@va.gov>
Subject: RE: // for approval // Interview with Secretary Wilkie about EHR implementation

Cam?

From: Connell, Lawrence B.
Sent: Wednesday, October 24, 2018 3:50 PM
To: Windom, John H. <John.Windom@va.gov>; Cashour, Curtis <Curt.Cashour@va.gov>; Stone, Richard A., MD <Richard.Stone2@va.gov>; Sandoval, Camilo J. <Camilo.Sandoval@va.gov>
Cc: Ullyot, John <John.Ullyot@va.gov>; Hutton, James <James.Hutton@va.gov>; Eason, William J. <William.Eason@va.gov>; Snyder, Jill <Jill.Snyder@va.gov>; Screen, Gina <Gina.Screen@va.gov>
Subject: RE: // for approval // Interview with Secretary Wilkie about EHR implementation

My only comment would be to change “tall tales” to read “false statements” or “inaccurate statements”

My $.02.

Larry Connell

Chief of Staff

Veterans’ Health Administration

lawrence.connell@va.gov

202.461.7016

From: Windom, John H.
Sent: Wednesday, October 24, 2018 3:07 PM
To: Cashour, Curtis <Curt.Cashour@va.gov>; Stone, Richard A., MD <Richard.Stone2@va.gov>; Sandoval, Camilo J. <Camilo.Sandoval@va.gov>
Cc: Connell, Lawrence B. <Lawrence.Connell@va.gov>; Ullyot, John <John.Ullyot@va.gov>; Hutton, James <James.Hutton@va.gov>; Eason, William J. <William.Eason@va.gov>; Snyder, Jill <Jill.Snyder@va.gov>; Screen, Gina <Gina.Screen@va.gov>
Subject: RE: // for approval // Interview with Secretary Wilkie about EHR implementation

Reads fine to me. Thank you.

---

Vr
John

Sent with Good (www.good.com)

---

From: Cashour, Curtis
Sent: Wednesday, October 24, 2018 9:26:03 AM
To: Stone, Richard A., MD; Sandoval, Camilo J.; Windom, John H.
Cc: Connell, Lawrence B.; Ullyot, John; Hutton, James; Eason, William J.; Snyder, Jill; Screen, Gina
Subject: // for approval // Interview with Secretary Wilkie about EHR implementation

Folks - Please see below from ProPublica. The reporter has asked for interviews with SecVA, Cam, and Dr. Stone. In lieu of interviews, we recommend the below. Let us know if you have any issues or edits. Thanks.

We welcome the opportunity to discuss any allegations from named current or former employees. But due to Privacy Act restrictions, in order to comment on specific complaints from any current or former employees, we would need their written consent (by having them fill out and return this form) to discuss all aspects of their job performance.

Can you provide that consent? If you cannot, please note in your story that those making these allegations refused to allow VA to comment on them.

Allegation: The article will be an in-depth look at the dysfunction and turmoil that are undermining the VA's effort to transform its electronic health records.

Response: The premise of your article is false.

VA's electronic health record modernization (EHRM) efforts thus far have been successful and we are confident they will continue to be successful. While that may not comport with the tall tales you are hearing from disgruntled former employees, all of those people – whether they left by choice or not – no longer work at VA for a reason.

VA has made a historic decision to modernize its electronic health record system to provide our nation's Veterans with seamless care as they transition from military service to Veteran status and when they choose to use community care.

While past administrations and VA secretaries failed to achieve this longstanding goal, the Trump

administration and Secretary Wilkie succeeded.

VA established the Office of Electronic Health Record Modernization (OEHRM) to ensure VA successfully prepares for, deploys and maintains the new EHR solution and the health IT tools dependent upon it.

The OEHRM Executive Director is Mr. John Windom, who has been with the effort since its inception and has the necessary expertise and institutional knowledge to lead this initiative effectively.

Prior to joining VA, Windom was a program manager for the Program Executive Office of the Defense Healthcare Management Systems (DHMS).

He led his team to acquire, test, integrate and deploy a new EHR to replace DoD's legacy system in support of over 9.6 million military service members and other beneficiaries.

As Secretary Wilkie has said, "The new EHR system will be interoperable with DOD, while also improving VA's ability to collaborate and share information with community care providers. This will ease the burden on service members as they transition from military careers and will be supported by multiple medical providers throughout their lives.

"The EHR will give health care providers a full picture of patient medical history, driving better clinical outcomes. It will also help us identify Veterans proactively who are at higher risk for issues, such as opioid addiction and suicide, so health care providers can intervene earlier and save lives."

Curt Cashour

Press Secretary

Department of Veterans Affairs

202-461-7388

Curt.Cashour@va.gov

@curtcashour

From: Isaac Arnsdorf [mailto:Isaac.Arnsdorf@propublica.org]
Sent: Tuesday, October 23, 2018 1:04 PM
To: Cashour, Curtis <Curt.Cashour@va.gov>
Cc: Snyder, Jill <Jill.Snyder@va.gov>

---

Subject: [EXTERNAL] Re: Interview with Secretary Wilkie about EHR implementation

Hi Curt,

Nice to hear from you again.

I will direct questions to you for Secretary Wilkie, Dr. Stone and John Windom.

The article will be an in-depth look at the dysfunction and turmoil that are undermining the VA's effort to transform its electronic health records. As a recent internal progress report said, the program is "Yellow trending towards Red."

1.Discussing his April 20 meeting with Ike Perlmutter, Bruce Moskowitz and Marc Sherman, why did Secretary Wilkie tell senators he "went against their wishes, because I approved it," when they were not opposed to the EHR modernization — in fact, they were the ones who set the process in motion?
2.Why does Secretary Wilkie's joint statement on interoperability discuss "a single, seamlessly integrated electronic health record" that "maximizes commercial health record interoperability" instead of "seamless care," which was the justification for the sole-source contract?
3.What, in the Secretary's view, is the different between a "seamlessly integrated EHR" and "seamless care"?
4.Who in the Office of Electronic Health Records Modernization has the appropriate qualifications or experience to lead this program?
5.Why is OEHRM housed in the secretary's office rather than inside VHA, even though experts advised putting clinicians in charge?
6.Why did Secretary Wilkie tell Dr. Stone to back off the EHR implementation and focus instead on the MISSION Act implementation?
7.Why does the IT steering committee have nobody representing VA doctors?
8.How is the Secretary mitigating infighting between OEHRM, VHA and OI&T?
9.Why is the VA replicating the DoD's unsuccessful governance structure of a program office run by contracting officers and accountability spread across a health division and an IT division?
10.Why is the Secretary considering having the VA follow DoD's lead on the EHR implementation?
11.Why is the Secretary considering James Ellzy for CMO or CHIO? How can a non-VA person be the champion for VA clinicians?
12.Why should DoD lead the EHR implementation even though VA will be the bigger user and has different needs?
13.Why does Windom want to copy DoD's workflows, over the objection of VA clinicians and industry experts?
14.When the VA asked Cerner to assess the overlap between the two departments' needs, why did Cerner instead assess DoD's adherence to Cerner's commercial baselines?
15.Why did Cerner's cost and schedule estimates assume the VA would match the DoD's implementation?
16.Why would the VA import the DoD's workflows when the DoD's workflows failed at the DoD's IOC sites?
17.How is the VA learning from the DoD's mistakes? For example, how will routing trouble tickets directly to Cerner solve the problem of overwhelming volume and lack of on-site support?
18.How is the VA addressing Cerner's lack of functionality for some of VA's core specialties such as

Agent Orange exposure, spinal cord injury, PTSD and military sexual trauma?
19.How is the VA addressing Cerner's functionality in other areas, such as optometry and telehealth, that DoD and VA clinicians have identified as inadequate?
20.How is the VA addressing the fact that DoD's cyber security specifications will interfere with some of Cerner's usability functions? Is the VA still planning to match DoD's cyber security specifications?
21.How is the VA addressing Cerner's incomplete data migration plan, which an internal report said raises patient safety issues?
22.Does the VA plan to migrate ALL patient data to the new platform, or only the past three years, like DoD?
23.In early 2018, why did Don McGahn call Jim Byrne to tell him not to sign off on the Cerner contract?
24.Why didn't Marc Sherman become a Special Government Employee to review the Cerner contract?
25.Why was Genevieve Morris detailed to VA for 30 days?
26.What was her assessment of the Cerner contract?
27.Why did Secretary Wilkie determine the contract was ready to sign in May?
28.Why did Morris stay at VA to take over OEHRM? Was her background working on small-scale ambulatory EHR implementations sufficient for this role?
29.Morris agreed to stay for one year, but the GAO says a change of this size requires a leader to stay for five to seven years. Also, OEHRM's own management plan says "the program must be perceived to be stable." How can the VA achieve this, when the office's leader was only supposed to stay for one year, and ended up staying less than two months?
30.Why were the VA's own health IT experts blocked from working on the EHR implementation?
31.Why did OEHRM want its own staff to lead the clinical councils, even though experts advised putting clinicians in charge?
32.Why did VHA clinicians say they didn't have time to join the councils? How can the program succeed without buy-in from VHA leadership?
33.Why did Dr. Stone, John Windom and Camilo Sandoval meet about unseating Morris?
34.Why did Windom block information from getting to Morris?
35.Why did the VA spend $874,000 on the formal kickoff event?
36.Why did the VA cut the staff in the OEHRM?
37.Why is Windom qualified to lead OEHRM despite lacking health care experience?
38.Why is Windom rejecting clinicians' input, against the advice of industry experts?
39.At the Sept. 13 House subcommittee hearing, Chairman Banks asked Windom, "Is there anyone working in the Office of EHR Modernization who has managed an EHR implementation in a large health system to its completion?" Windom answered yes. Who are these people?
40.Who are the experts that Booz Allen is providing who have EHR implementation experience?
41.On the Booz Allen contract, what is the breakdown of the work done by junior aides versus senior experts?
42.Does Jim Byrne have the skill set to oversee the OEHRM as acting deputy secretary?
43.Why did Windom and Dr. Stone make a truce to let Dr. Stone run the medical aspects as long as Windom stayed nominally in charge?
44.Why did Camilo Sandoval move back into the CIO's office after moving into the OEHRM? What was the cost to taxpayers of these repeated office moves?
45.Why hasn't the VA accepted the offer of KLAS research on what makes EHR implementations successful?

Thanks,

Isaac

Isaac Arnsdorf

ProPublica

917.512.0256

203.464.1409

isaac@propublica.org

From: "Cashour, Curtis" <Curt.Cashour@va.gov>
Date: Monday, October 22, 2018 at 10:30 AM
To: Isaac Arnsdorf <Isaac.Arnsdorf@propublica.org>
Subject: RE: Interview with Secretary Wilkie about EHR implementation

Hi, Isaac.

What are your findings?

What questions do you have?

Thanks,

Curt Cashour

Press Secretary

Department of Veterans Affairs

202-461-7388

Curt.Cashour@va.gov

@curtcashour

From: Isaac Arnsdorf [mailto:Isaac.Arnsdorf@propublica.org]
Sent: Monday, October 22, 2018 9:51 AM
To: VA Public Affairs <VAPublicAffairs@va.gov>; VA Public Affairs <VAPublicAffairs@va.gov>
Cc: Cashour, Curtis <Curt.Cashour@va.gov>
Subject: [EXTERNAL] Interview with Secretary Wilkie about EHR implementation

Hi,

I'm writing to request an interview with Secretary Wilkie about the EHR implementation. I'm preparing an in-depth article based on extensive reporting, and I'm eager to discuss my findings with the Secretary. I hope you will grant this request since the EHR is one of the department's top priorities.

Thanks,

Isaac

Isaac Arnsdorf

ProPublica

917.512.0256

203.464.1409

isaac@propublica.org

Document ID: 0.7.1705.52599

From: Cashour, Curtis
</o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=dba510634baa46a085e28c62c254093f-cashour, cu>

To: Connell, Lawrence B.
</o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=a3e7233376344045980ad214122389f4-connell, la>; Windom, John H. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=43f78d00b4a04d0492dbbf83ea188342-windom, joh>; Stone, Richard A., MD
</o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=bd16619615d64adea22e45e63ff6462a-stone, rich>; Sandoval, Camilo J.
</o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=91cab99711134d5898a778ab468532fc-sandoval, c>

Cc: Ullyot, John
</o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=c02392d86764480bb90e3854a5f3cbbb-ullyot, joh>; Hutton, James </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=a7da07a304d245cca9fca81fbc0da800-hutton, jam>; Eason, William J.
</o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=f90c9ec8badb4538afbfe0b7a69f4422-eason, will>; Snyder, Jill </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=0b6e91ef72ee4a05acc63873c64570e1-snyder, jil>; Screen, Gina </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=777aa6921e794e42a45a07d8235767c5-screen, gin>

Bcc:

Subject: RE: // for approval // Interview with Secretary Wilkie about EHR implementation

Date: Thu Oct 25 2018 12:55:40 EDT

Attachments:

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Cam?

From: Connell, Lawrence B.
Sent: Wednesday, October 24, 2018 3:50 PM
To: Windom, John H. <John.Windom@va.gov>; Cashour, Curtis <Curt.Cashour@va.gov>; Stone, Richard A., MD <Richard.Stone2@va.gov>; Sandoval, Camilo J. <Camilo.Sandoval@va.gov>
Cc: Ullyot, John <John.Ullyot@va.gov>; Hutton, James <James.Hutton@va.gov>; Eason, William J. <William.Eason@va.gov>; Snyder, Jill <Jill.Snyder@va.gov>; Screen, Gina <Gina.Screen@va.gov>
Subject: RE: // for approval // Interview with Secretary Wilkie about EHR implementation

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Chief of Staff

Veterans’ Health Administration

lawrence.connell@va.gov

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Curt Cashour

Press Secretary

Department of Veterans Affairs

202-461-7388

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Sent: Tuesday, October 23, 2018 1:04 PM
To: Cashour, Curtis <Curt.Cashour@va.gov>
Cc: Snyder, Jill <Jill.Snyder@va.gov>
Subject: [EXTERNAL] Re: Interview with Secretary Wilkie about EHR implementation

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Thanks,

Isaac

Isaac Arnsdorf

ProPublica

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203.464.1409

isaac@propublica.org

From: "Cashour, Curtis" <Curt.Cashour@va.gov>
Date: Monday, October 22, 2018 at 10:30 AM
To: Isaac Arnsdorf <Isaac.Arnsdorf@propublica.org>
Subject: RE: Interview with Secretary Wilkie about EHR implementation

Hi, Isaac.

What are your findings?

What questions do you have?

Thanks,

Curt Cashour

Press Secretary

Department of Veterans Affairs

202-461-7388

Curt.Cashour@va.gov

@curtcashour

From: Isaac Arnsdorf [mailto:Isaac.Arnsdorf@propublica.org]
Sent: Monday, October 22, 2018 9:51 AM
To: VA Public Affairs <VAPublicAffairs@va.gov>; VA Public Affairs <VAPublicAffairs@va.gov>
Cc: Cashour, Curtis <Curt.Cashour@va.gov>
Subject: [EXTERNAL] Interview with Secretary Wilkie about EHR implementation

Hi,

I'm writing to request an interview with Secretary Wilkie about the EHR implementation. I'm preparing an in-depth article based on extensive reporting, and I'm eager to discuss my findings with the Secretary. I hope you will grant this request since the EHR is one of the department's top priorities.

Thanks,

Isaac

Isaac Arnsdorf

ProPublica

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203.464.1409

isaac@propublica.org

Document ID: 0.7.1705.52594

From: Isaac Arnsdorf <isaac.arnsdorf@propublica.org>
To: Sandoval, Camilo J. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=91cab99711134d5898a778ab4685 32fc-sandoval, c>
Cc:
Bcc:
Subject: [EXTERNAL] Re: EHR Modernization
Date: Thu Oct 25 2018 12:42:55 EDT
Attachments:

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Hi Cam, just making sure you saw this. Looking forward to hearing from you. Thanks!

From: Isaac Arnsdorf <Isaac.Arnsdorf@propublica.org> on behalf of Isaac Arnsdorf <Isaac.Arnsdorf@propublica.org>
Date: Tuesday, October 23, 2018 at 1:05 PM
To: "Camilo.Sandoval@va.gov" <Camilo.Sandoval@va.gov>
Subject: EHR Modernization

Cam,

I'm interested in speaking with you for an in-depth article about the EHR modernization. My questions for you are:

1.Why did you transfer from Treasury to VA?
2.How do you know Ike Perlmutter?
3.Why do you have a standing daily call with Ike Perlmutter?
4.Why do you keep a spreadsheet tracking projects for Perlmutter?
5.Why did you tell Perlmutter that he shouldn't trust Shulkin on the Cerner contract because Shulkin was positioning himself for a post-government job? What evidence do you have to support this allegation?
6.Why did you tell people that Shulkin planned to sign the Cerner contract on March 29?
7.How did you know ahead of time that Shulkin would be fired that week?
8.Why did you become executive in charge of OI&T?
9.What experience do you have in health care IT?
10.Why did you, John Windom and Rich Stone meet about ousting Genevieve Morris?
11.Why didn't Genevieve Morris want you to come to the kickoff event?
12.Why do you walk around the office in socks or flip flops?
13.Why have you canceled speaking engagements as executive in charge?
14.Why did you move back into the CIO office from the OEHRM? What have these repeated moves cost taxpayers?

Thanks,

Isaac

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Document ID: 0.7.1705.51384

From: Connell, Lawrence B. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=a3e7233376344045980ad214122389f4-connell, la>

To: Windom, John H. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=43f78d00b4a04d0492dbbf83ea188342-windom, joh>; Cashour, Curtis </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=dba510634baa46a085e28c62c254093f-cashour, cu>; Stone, Richard A., MD </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=bd16619615d64adea22e45e63ff6462a-stone, rich>; Sandoval, Camilo J. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=91cab99711134d5898a778ab468532fc-sandoval, c>

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Bcc:

Subject: RE: // for approval // Interview with Secretary Wilkie about EHR implementation

Date: Wed Oct 24 2018 15:50:16 EDT

Attachments:

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Isaac Arnsdorf

ProPublica

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203.464.1409

isaac@propublica.org

From: "Cashour, Curtis" <Curt.Cashour@va.gov>
Date: Monday, October 22, 2018 at 10:30 AM
To: Isaac Arnsdorf <Isaac.Arnsdorf@propublica.org>
Subject: RE: Interview with Secretary Wilkie about EHR implementation

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Curt Cashour

Press Secretary

Department of Veterans Affairs

202-461-7388

Curt.Cashour@va.gov

@curtcashour

From: Isaac Arnsdorf [mailto:Isaac.Arnsdorf@propublica.org]
Sent: Monday, October 22, 2018 9:51 AM
To: VA Public Affairs <VAPublicAffairs@va.gov>; VA Public Affairs <VAPublicAffairs@va.gov>
Cc: Cashour, Curtis <Curt.Cashour@va.gov>
Subject: [EXTERNAL] Interview with Secretary Wilkie about EHR implementation

Hi,

I'm writing to request an interview with Secretary Wilkie about the EHR implementation. I'm preparing an in-depth article based on extensive reporting, and I'm eager to discuss my findings with the Secretary. I hope you will grant this request since the EHR is one of the department's top priorities.

Thanks,

Isaac

Isaac Arnsdorf

ProPublica

917.512.0256

203.464.1409

isaac@propublica.org

Document ID: 0.7.1705.51282

From: Windom, John H. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=43f78d00b4a04d0492dbbf83ea188342-windom, joh>

To: Cashour, Curtis </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=dba510634baa46a085e28c62c254093f-cashour, cu>; Stone, Richard A., MD </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=bd16619615d64adea22e45e63ff6462a-stone, rich>; Sandoval, Camilo J. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=91cab99711134d5898a778ab468532fc-sandoval, c>

Cc: Connell, Lawrence B. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=a3e7233376344045980ad214122389f4-connell, la>; Ullyot, John </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=c02392d86764480bb90e3854a5f3cbbb-ullyot, joh>; Hutton, James </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=a7da07a304d245cca9fca81fbc0da800-hutton, jam>; Eason, William J. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=f90c9ec8badb4538afbfe0b7a69f4422-eason, will>; Snyder, Jill </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=0b6e91ef72ee4a05acc63873c64570e1-snyder, jil>; Screen, Gina </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=777aa6921e794e42a45a07d8235767c5-screen, gin>

Bcc:

Subject: RE: // for approval // Interview with Secretary Wilkie about EHR implementation

Date: Wed Oct 24 2018 15:07:08 EDT

Attachments:

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Reads fine to me. Thank you.
Vr
John

Sent with Good (www.good.com)

---

From: Cashour, Curtis
Sent: Wednesday, October 24, 2018 9:26:03 AM
To: Stone, Richard A., MD; Sandoval, Camilo J.; Windom, John H.

Cc: Connell, Lawrence B.; Ullyot, John; Hutton, James; Eason, William J.; Snyder, Jill; Screen, Gina
Subject: // for approval // Interview with Secretary Wilkie about EHR implementation

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We welcome the opportunity to discuss any allegations from named current or former employees. But due to Privacy Act restrictions, in order to comment on specific complaints from any current or former employees, we would need their written consent (by having them fill out and return this form) to discuss all aspects of their job performance.

Can you provide that consent? If you cannot, please note in your story that those making these allegations refused to allow VA to comment on them.

Allegation: The article will be an in-depth look at the dysfunction and turmoil that are undermining the VA's effort to transform its electronic health records.

Response: The premise of your article is false.

VA's electronic health record modernization (EHRM) efforts thus far have been successful and we are confident they will continue to be successful. While that may not comport with the tall tales you are hearing from disgruntled former employees, all of those people – whether they left by choice or not – no longer work at VA for a reason.

VA has made a historic decision to modernize its electronic health record system to provide our nation's Veterans with seamless care as they transition from military service to Veteran status and when they choose to use community care.

While past administrations and VA secretaries failed to achieve this longstanding goal, the Trump administration and Secretary Wilkie succeeded.

VA established the Office of Electronic Health Record Modernization (OEHRM) to ensure VA successfully prepares for, deploys and maintains the new EHR solution and the health IT tools dependent upon it.

The OEHRM Executive Director is Mr. John Windom, who has been with the effort since its inception and has the necessary expertise and institutional knowledge to lead this initiative effectively.

---

Prior to joining VA, Windom was a program manager for the Program Executive Office of the Defense Healthcare Management Systems (DHMS).

He led his team to acquire, test, integrate and deploy a new EHR to replace DoD's legacy system in support of over 9.6 million military service members and other beneficiaries.

As Secretary Wilkie has said, "The new EHR system will be interoperable with DOD, while also improving VA's ability to collaborate and share information with community care providers. This will ease the burden on service members as they transition from military careers and will be supported by multiple medical providers throughout their lives.

"The EHR will give health care providers a full picture of patient medical history, driving better clinical outcomes. It will also help us identify Veterans proactively who are at higher risk for issues, such as opioid addiction and suicide, so health care providers can intervene earlier and save lives."

Curt Cashour

Press Secretary

Department of Veterans Affairs

202-461-7388

Curt.Cashour@va.gov

@curtcashour

From: Isaac Arnsdorf [mailto:Isaac.Arnsdorf@propublica.org]
Sent: Tuesday, October 23, 2018 1:04 PM
To: Cashour, Curtis <Curt.Cashour@va.gov>
Cc: Snyder, Jill <Jill.Snyder@va.gov>
Subject: [EXTERNAL] Re: Interview with Secretary Wilkie about EHR implementation

Hi Curt,

Nice to hear from you again.

I will direct questions to you for Secretary Wilkie, Dr. Stone and John Windom.

The article will be an in-depth look at the dysfunction and turmoil that are undermining the VA's effort to transform its electronic health records. As a recent internal progress report said, the program is "Yellow trending towards Red."

1.Discussing his April 20 meeting with Ike Perlmutter, Bruce Moskowitz and Marc Sherman, why did Secretary Wilkie tell senators he "went against their wishes, because I approved it," when they were not opposed to the EHR modernization — in fact, they were the ones who set the process in motion?
2.Why does Secretary Wilkie's joint statement on interoperability discuss "a single, seamlessly integrated electronic health record" that "maximizes commercial health record interoperability" instead of "seamless care," which was the justification for the sole-source contract?
3.What, in the Secretary's view, is the different between a "seamlessly integrated EHR" and "seamless care"?
4.Who in the Office of Electronic Health Records Modernization has the appropriate qualifications or experience to lead this program?
5.Why is OEHRM housed in the secretary's office rather than inside VHA, even though experts advised putting clinicians in charge?
6.Why did Secretary Wilkie tell Dr. Stone to back off the EHR implementation and focus instead on the MISSION Act implementation?
7.Why does the IT steering committee have nobody representing VA doctors?
8.How is the Secretary mitigating infighting between OEHRM, VHA and OI&T?
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10.Why is the Secretary considering having the VA follow DoD's lead on the EHR implementation?
11.Why is the Secretary considering James Ellzy for CMO or CHIO? How can a non-VA person be the champion for VA clinicians?
12.Why should DoD lead the EHR implementation even though VA will be the bigger user and has different needs?
13.Why does Windom want to copy DoD's workflows, over the objection of VA clinicians and industry experts?
14.When the VA asked Cerner to assess the overlap between the two departments' needs, why did Cerner instead assess DoD's adherence to Cerner's commercial baselines?
15.Why did Cerner's cost and schedule estimates assume the VA would match the DoD's implementation?
16.Why would the VA import the DoD's workflows when the DoD's workflows failed at the DoD's IOC sites?
17.How is the VA learning from the DoD's mistakes? For example, how will routing trouble tickets directly to Cerner solve the problem of overwhelming volume and lack of on-site support?
18.How is the VA addressing Cerner's lack of functionality for some of VA's core specialties such as Agent Orange exposure, spinal cord injury, PTSD and military sexual trauma?
19.How is the VA addressing Cerner's functionality in other areas, such as optometry and telehealth, that DoD and VA clinicians have identified as inadequate?
20.How is the VA addressing the fact that DoD's cyber security specifications will interfere with some of Cerner's usability functions? Is the VA still planning to match DoD's cyber security specifications?
21.How is the VA addressing Cerner's incomplete data migration plan, which an internal report said raises patient safety issues?
22.Does the VA plan to migrate ALL patient data to the new platform, or only the past three years, like DoD?
23.In early 2018, why did Don McGahn call Jim Byrne to tell him not to sign off on the Cerner contract?
24.Why didn't Marc Sherman become a Special Government Employee to review the Cerner contract?
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26.What was her assessment of the Cerner contract?
27.Why did Secretary Wilkie determine the contract was ready to sign in May?
28.Why did Morris stay at VA to take over OEHRM? Was her background working on small-scale ambulatory EHR implementations sufficient for this role?
29.Morris agreed to stay for one year, but the GAO says a change of this size requires a leader to stay for five to seven years. Also, OEHRM's own management plan says "the program must be perceived to be stable." How can the VA achieve this, when the office's leader was only supposed to stay for one year, and ended up staying less than two months?
30.Why were the VA's own health IT experts blocked from working on the EHR implementation?
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34.Why did Windom block information from getting to Morris?
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37.Why is Windom qualified to lead OEHRM despite lacking health care experience?
38.Why is Windom rejecting clinicians' input, against the advice of industry experts?
39.At the Sept. 13 House subcommittee hearing, Chairman Banks asked Windom, "Is there anyone working in the Office of EHR Modernization who has managed an EHR implementation in a large health system to its completion?" Windom answered yes. Who are these people?
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41.On the Booz Allen contract, what is the breakdown of the work done by junior aides versus senior experts?
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ProPublica

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From: "Cashour, Curtis" <Curt.Cashour@va.gov>

---

Date: Monday, October 22, 2018 at 10:30 AM
To: Isaac Arnsdorf <Isaac.Arnsdorf@propublica.org>
Subject: RE: Interview with Secretary Wilkie about EHR implementation

Hi, Isaac.

What are your findings?

What questions do you have?

Thanks,

Curt Cashour

Press Secretary

Department of Veterans Affairs

202-461-7388

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Document ID: 0.7.1705.51212

From: Cashour, Curtis
</o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=dba510634baa46a085e28c62c254093f-cashour, cu>

To: Stone, Richard A., MD
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</o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=f90c9ec8badb4538afbfe0b7a69f4422-eason, will>; Snyder, Jill </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=0b6e91ef72ee4a05acc63873c64570e1-snyder, jil>; Screen, Gina </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=777aa6921e794e42a45a07d8235767c5-screen, gin>

Bcc:

Subject: // for approval // Interview with Secretary Wilkie about EHR implementation

Date: Wed Oct 24 2018 12:26:03 EDT

Attachments:

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Press Secretary

Department of Veterans Affairs

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Date: Monday, October 22, 2018 at 10:30 AM
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Curt Cashour

Press Secretary

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Document ID: 0.7.1705.51185

From: Windom, John H. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=43f78d00b4a04d0492dbbf83ea188342-windom, joh>
To: Tucker, Brooks </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=24ae47cff629405aa8557cc2cc792903-tucker, bro>; Byrne, Jim </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=7689411eb8ab4e31a9eb8c1ac06b077f-byrne, jame>; Powers, Pamela </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=f6021d9c02594b52bc57194848ca7ef6-powers, pam>
Cc: Ullyot, John </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=c02392d86764480bb90e3854a5f3cbbb-ullyot, joh>; Sandoval, Camilo J. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=91cab99711134d5898a778ab468532fc-sandoval, c>; Stone, Richard A., MD </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=bd16619615d64adea22e45e63ff6462a-stone, rich>
Bcc:
Subject: RE: Interview with Secretary Wilkie about EHR implementation
Date: Wed Oct 24 2018 11:26:36 EDT
Attachments:

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Thank you fir sharing. I did not realize my selection was based on a truce. I have far more power than I ever imagined. For the record and as you know, I serve at the pleasure of the Secretary and VA leadership. No false sense of power here.
Vr
John

Sent with Good (www.good.com)

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From: Tucker, Brooks
Sent: Wednesday, October 24, 2018 7:12:52 AM
To: Windom, John H.; Byrne, Jim; Powers, Pamela
Cc: Ullyot, John; Sandoval, Camilo J.; Stone, Richard A., MD
Subject: RE: Interview with Secretary Wilkie about EHR implementation

For edification, Bill Mallison asked Question # 43 yesterday during the EHRM briefing to 4 Corners PSMs.

From: Windom, John H.
Sent: Wednesday, October 24, 2018 7:16 AM
To: Byrne, Jim <Jim.Byrne@va.gov>; Powers, Pamela <Pamela.Powers@va.gov>
Cc: Ullyot, John <John.Ullyot@va.gov>; Sandoval, Camilo J. <Camilo.Sandoval@va.gov>; Stone, Richard A., MD <Richard.Stone2@va.gov>; Tucker, Brooks <Brooks.Tucker@va.gov>
Subject: FW: Interview with Secretary Wilkie about EHR implementation

DEPSEC/CoS:

The Hill engagements went very well yesterday. Congressman Banks made a surprise visit to the second two hour session accompanying Bill Mallison and stayed for about an hour. The DoD Politico article came up as did the Joint Memorandum. I believe we addressed both very well. Overall, I do not believe our sessions could have gone much better. Thank you for your leadership and comments during the prep session Monday.

I received the below questions from my Comms lead while on the Hill yesterday, and after reviewing do not believe we should respond to a single one of the questions. Clearly a compilation of rhetoric, untruths, inaccuracies and the comments from disgruntled/angry people. I literally find all of the questions to be without truth or accuracy. I served on six Navy ships and deployed on the ground to Iraq twice in my 34 year Naval career, and cannot remember an assault by the enemy as divisive as what appears to be comments fueled by present or past employees.

Thank you for your confidence in my leadership and unwavering support of my efforts and the efforts of the OEHRM team. We will continue to you press forward. It is great to be on the side of RIGHT!

Very respectfully,

John

John H. Windom, Senior Executive Service (SES)

Office of Electronic Health Record Modernization (OEHRM)

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From: Snyder, Jill
Sent: Tuesday, October 23, 2018 1:31 PM
To: Windom, John H. <John.Windom@va.gov>
Cc: Snyder, Jill <Jill.Snyder@va.gov>
Subject: FW: Interview with Secretary Wilkie about EHR implementation

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Sent: Tuesday, October 23, 2018 1:04 PM
To: Cashour, Curtis <Curt.Cashour@va.gov>
Cc: Snyder, Jill <Jill.Snyder@va.gov>
Subject: [EXTERNAL] Re: Interview with Secretary Wilkie about EHR implementation

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I will direct questions to you for Secretary Wilkie, Dr. Stone and John Windom.

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To: Isaac Arnsdorf <Isaac.Arnsdorf@propublica.org>
Subject: RE: Interview with Secretary Wilkie about EHR implementation

Hi, Isaac.

What are your findings?

What questions do you have?

Thanks,

Curt Cashour

Press Secretary

Department of Veterans Affairs

202-461-7388

Curt.Cashour@va.gov

@curtcashour

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Sent: Monday, October 22, 2018 9:51 AM
To: VA Public Affairs <VAPublicAffairs@va.gov>; VA Public Affairs <VAPublicAffairs@va.gov>
Cc: Cashour, Curtis <Curt.Cashour@va.gov>
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Document ID: 0.7.1705.51155

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</o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=24ae47cff629405aa8557cc2cc792903-tucker, bro>
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Bcc:
Subject: RE: Interview with Secretary Wilkie about EHR implementation
Date: Wed Oct 24 2018 10:12:52 EDT
Attachments:

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For edification, Bill Mallison asked Question # 43 yesterday during the EHRM briefing to 4 Corners PSMs.

From: Windom, John H.
Sent: Wednesday, October 24, 2018 7:16 AM
To: Byrne, Jim <Jim.Byrne@va.gov>; Powers, Pamela <Pamela.Powers@va.gov>
Cc: Ullyot, John <John.Ullyot@va.gov>; Sandoval, Camilo J. <Camilo.Sandoval@va.gov>; Stone, Richard A., MD <Richard.Stone2@va.gov>; Tucker, Brooks <Brooks.Tucker@va.gov>
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To: Byrne, Jim </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=7689411eb8ab4e31a9eb8c1ac06b077f-byrne, jame>; Powers, Pamela </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=f6021d9c02594b52bc57194848ca7ef6-powers, pam>

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ProPublica

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From: "Cashour, Curtis" <Curt.Cashour@va.gov>
Date: Monday, October 22, 2018 at 10:30 AM
To: Isaac Arnsdorf <Isaac.Arnsdorf@propublica.org>
Subject: RE: Interview with Secretary Wilkie about EHR implementation

Hi, Isaac.

What are your findings?

What questions do you have?

Thanks,

Curt Cashour

Press Secretary

Department of Veterans Affairs

202-461-7388

Curt.Cashour@va.gov

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From: Isaac Arnsdorf [mailto:Isaac.Arnsdorf@propublica.org]
Sent: Monday, October 22, 2018 9:51 AM
To: VA Public Affairs <VAPublicAffairs@va.gov>; VA Public Affairs <VAPublicAffairs@va.gov>
Cc: Cashour, Curtis <Curt.Cashour@va.gov>
Subject: [EXTERNAL] Interview with Secretary Wilkie about EHR implementation

Hi,

I'm writing to request an interview with Secretary Wilkie about the EHR implementation. I'm preparing an in-depth article based on extensive reporting, and I'm eager to discuss my findings with the Secretary. I hope you will grant this request since the EHR is one of the department's top priorities.

Thanks,

Isaac

Isaac Arnsdorf

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From: Windom, John H. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=43f78d00b4a04d0492dbbf83ea188342-windom, joh>
To: Sandoval, Camilo J. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=91cab99711134d5898a778ab468532fc-sandoval, c>
Cc:
Bcc:
Subject: FW: Interview with Secretary Wilkie about EHR implementation
Date: Tue Oct 23 2018 20:53:49 EDT
Attachments:

Fyi.

John H. Windom, Senior Executive Service (SES)

Office of Electronic Health Record Modernization (OEHRM)

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Washington, DC 20420

John.Windom@va.gov

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(b)(6) @va.gov Office: 202-382-3792

From: Snyder, Jill
Sent: Tuesday, October 23, 2018 1:31 PM
To: Windom, John H. <John.Windom@va.gov>
Cc: Snyder, Jill <Jill.Snyder@va.gov>
Subject: FW: Interview with Secretary Wilkie about EHR implementation

Mr. Windom,

Below is a very large list of questions from Propublica, I am working to divide up between Cerner, OEHRM, OIT, and VHA. I have already spoken with Curt and we have a way forward, but I wanted to you to see the questions as soon as possible. Happy to discuss.

Thanks,

Jill

From: Isaac Arnsdorf [mailto:Isaac.Arnsdorf@propublica.org]
Sent: Tuesday, October 23, 2018 1:04 PM
To: Cashour, Curtis <Curt.Cashour@va.gov>
Cc: Snyder, Jill <Jill.Snyder@va.gov>
Subject: [EXTERNAL] Re: Interview with Secretary Wilkie about EHR implementation

Hi Curt,

Nice to hear from you again.

I will direct questions to you for Secretary Wilkie, Dr. Stone and John Windom.

The article will be an in-depth look at the dysfunction and turmoil that are undermining the VA's effort to transform its electronic health records. As a recent internal progress report said, the program is "Yellow trending towards Red."

1.Discussing his April 20 meeting with Ike Perlmutter, Bruce Moskowitz and Marc Sherman, why did Secretary Wilkie tell senators he "went against their wishes, because I approved it," when they were not opposed to the EHR modernization — in fact, they were the ones who set the process in motion?
2.Why does Secretary Wilkie's joint statement on interoperability discuss "a single, seamlessly integrated electronic health record" that "maximizes commercial health record interoperability" instead of "seamless care," which was the justification for the sole-source contract?
3.What, in the Secretary's view, is the different between a "seamlessly integrated EHR" and "seamless care"?
4.Who in the Office of Electronic Health Records Modernization has the appropriate qualifications or experience to lead this program?
5.Why is OEHRM housed in the secretary's office rather than inside VHA, even though experts advised putting clinicians in charge?

6.Why did Secretary Wilkie tell Dr. Stone to back off the EHR implementation and focus instead on the MISSION Act implementation?
7.Why does the IT steering committee have nobody representing VA doctors?
8.How is the Secretary mitigating infighting between OEHRM, VHA and OI&T?
9.Why is the VA replicating the DoD's unsuccessful governance structure of a program office run by contracting officers and accountability spread across a health division and an IT division?
10.Why is the Secretary considering having the VA follow DoD's lead on the EHR implementation?
11.Why is the Secretary considering James Ellzy for CMO or CHIO? How can a non-VA person be the champion for VA clinicians?
12.Why should DoD lead the EHR implementation even though VA will be the bigger user and has different needs?
13.Why does Windom want to copy DoD's workflows, over the objection of VA clinicians and industry experts?
14.When the VA asked Cerner to assess the overlap between the two departments' needs, why did Cerner instead assess DoD's adherence to Cerner's commercial baselines?
15.Why did Cerner's cost and schedule estimates assume the VA would match the DoD's implementation?
16.Why would the VA import the DoD's workflows when the DoD's workflows failed at the DoD's IOC sites?
17.How is the VA learning from the DoD's mistakes? For example, how will routing trouble tickets directly to Cerner solve the problem of overwhelming volume and lack of on-site support?
18.How is the VA addressing Cerner's lack of functionality for some of VA's core specialties such as Agent Orange exposure, spinal cord injury, PTSD and military sexual trauma?
19.How is the VA addressing Cerner's functionality in other areas, such as optometry and telehealth, that DoD and VA clinicians have identified as inadequate?
20.How is the VA addressing the fact that DoD's cyber security specifications will interfere with some of Cerner's usability functions? Is the VA still planning to match DoD's cyber security specifications?
21.How is the VA addressing Cerner's incomplete data migration plan, which an internal report said raises patient safety issues?
22.Does the VA plan to migrate ALL patient data to the new platform, or only the past three years, like DoD?
23.In early 2018, why did Don McGahn call Jim Byrne to tell him not to sign off on the Cerner contract?
24.Why didn't Marc Sherman become a Special Government Employee to review the Cerner contract?
25.Why was Genevieve Morris detailed to VA for 30 days?
26.What was her assessment of the Cerner contract?
27.Why did Secretary Wilkie determine the contract was ready to sign in May?
28.Why did Morris stay at VA to take over OEHRM? Was her background working on small-scale ambulatory EHR implementations sufficient for this role?
29.Morris agreed to stay for one year, but the GAO says a change of this size requires a leader to stay for five to seven years. Also, OEHRM's own management plan says "the program must be perceived to be stable." How can the VA achieve this, when the office's leader was only supposed to stay for one year, and ended up staying less than two months?
30.Why were the VA's own health IT experts blocked from working on the EHR implementation?
31.Why did OEHRM want its own staff to lead the clinical councils, even though experts advised putting clinicians in charge?
32.Why did VHA clinicians say they didn't have time to join the councils? How can the program succeed without buy-in from VHA leadership?
33.Why did Dr. Stone, John Windom and Camilo Sandoval meet about unseating Morris?
34.Why did Windom block information from getting to Morris?
35.Why did the VA spend $874,000 on the formal kickoff event?
36.Why did the VA cut the staff in the OEHRM?
37.Why is Windom qualified to lead OEHRM despite lacking health care experience?
38.Why is Windom rejecting clinicians' input, against the advice of industry experts?
39.At the Sept. 13 House subcommittee hearing, Chairman Banks asked Windom, "Is there anyone working in the Office of EHR Modernization who has managed an EHR implementation in a large health system to its completion?" Windom answered yes. Who are these people?

40.Who are the experts that Booz Allen is providing who have EHR implementation experience?
41.On the Booz Allen contract, what is the breakdown of the work done by junior aides versus senior experts?
42.Does Jim Byrne have the skill set to oversee the OEHRM as acting deputy secretary?
43.Why did Windom and Dr. Stone make a truce to let Dr. Stone run the medical aspects as long as Windom stayed nominally in charge?
44.Why did Camilo Sandoval move back into the CIO's office after moving into the OEHRM? What was the cost to taxpayers of these repeated office moves?
45.Why hasn't the VA accepted the offer of KLAS research on what makes EHR implementations successful?

Thanks,

Isaac

Isaac Arnsdorf

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From: Sandoval, Camilo J. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=91cab99711134d5898a778ab468532fc-sandoval, c>
To: Windom, John H. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=43f78d00b4a04d0492dbbf83ea188342-windom, joh>
Cc:
Bcc:
Subject: FW: EHR Modernization
Date: Tue Oct 23 2018 20:53:02 EDT
Attachments:

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#12 is the best one ♀

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Camilo Sandoval
917-544-1298

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From: Sandoval, Camilo J.
Sent: Tuesday, October 23, 2018 3:47:12 PM
To: Cashour, Curtis
Cc: Ullyot, John; Wagner, John (Wolf)
Subject: FW: EHR Modernization

Curtis—

Possibly coming your way… and as always no comment.

Thanks

Camilo

From: Isaac Arnsdorf [mailto:Isaac.Arnsdorf@propublica.org]
Sent: Tuesday, October 23, 2018 1:05 PM
To: Sandoval, Camilo J. <Camilo.Sandoval@va.gov>
Subject: [EXTERNAL] EHR Modernization

Cam,

I'm interested in speaking with you for an in-depth article about the EHR modernization. My questions for you are:

1.Why did you transfer from Treasury to VA?
2.How do you know Ike Perlmutter?
3.Why do you have a standing daily call with Ike Perlmutter?
4.Why do you keep a spreadsheet tracking projects for Perlmutter?
5.Why did you tell Perlmutter that he shouldn't trust Shulkin on the Cerner contract because Shulkin was positioning himself for a post-government job? What evidence do you have to support this allegation?
6.Why did you tell people that Shulkin planned to sign the Cerner contract on March 29?
7.How did you know ahead of time that Shulkin would be fired that week?
8.Why did you become executive in charge of OI&T?
9.What experience do you have in health care IT?
10.Why did you, John Windom and Rich Stone meet about ousting Genevieve Morris?
11.Why didn't Genevieve Morris want you to come to the kickoff event?
12.Why do you walk around the office in socks or flip flops?
13.Why have you canceled speaking engagements as executive in charge?
14.Why did you move back into the CIO office from the OEHRM? What have these repeated moves cost taxpayers?

Thanks,

Isaac

Isaac Arnsdorf

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Document ID: 0.7.1705.50460

From: Sandoval, Camilo J. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=91cab99711134d5898a778ab468532fc-sandoval, c>
To: Cashour, Curtis </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=dba510634baa46a085e28c62c254093f-cashour, cu>
Cc: Ullyot, John </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=c02392d86764480bb90e3854a5f3cbbb-ullyot, joh>; Wagner, John (Wolf) </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=2ea81beb53184e9681d18d786ac92fe1-wagner, joh>
Bcc:
Subject: FW: EHR Modernization
Date: Tue Oct 23 2018 18:47:12 EDT
Attachments:

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Curtis—

Possibly coming your way… and as always no comment.

Thanks

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Document ID: 0.7.1705.50458

From: None
To: Cashour, Curtis </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=dba510634baa46a085e28c62c254093f-cashour, cu>
Cc: Ullyot, John </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=c02392d86764480bb90e3854a5f3cbbb-ullyot, joh>; Wagner, John (Wolf) </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=2ea81beb53184e9681d18d786ac92fe1-wagner, joh>; Powers, Pamela </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=f6021d9c02594b52bc57194848ca7ef6-powers, pam>
Bcc:
Subject: FW: EHR Modernization
Date: Tue Oct 23 2018 18:42:40 EDT
Attachments:

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Curtis—
Possibly coming your way… all nonsense as always, and no comment :)

Thanks
Camilo

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Isaac Arnsdorf
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From: Isaac Arnsdorf <isaac.arnsdorf@propublica.org>
To: Sandoval, Camilo J. </o=exchangelabs/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=91cab99711134d5898a778ab4685 32fc-sandoval, c>
Cc:
Bcc:
Subject: [EXTERNAL] EHR Modernization
Date: Tue Oct 23 2018 13:05:04 EDT
Attachments:

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Isaac

Isaac Arnsdorf

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Document ID: 0.7.1705.30470

From: Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=vacosandoc>
To: Myklegard, Drew </o=va/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=vacomykled>
Cc: James, Bill </o=va/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=vacojamesb2>; Tibbits, Paul A. </o=va/ou=va martinsburg/cn=recipients/cn=vacotibbip>
Bcc:
Subject: Mitre Report
Date: Sun Oct 14 2018 17:15:58 EDT
Attachments: VA EHRM Interoperability Review Report Jan 2018 FINAL.PDF

Drew—

Not sure if I shared or if you have seen this report previously. It's a little dated (pre Cerner acquisition), but the topics are still valid. Also, Bill may have mentioned that last week in Kansas City we met with folks from CareQuality and CommonWell. I foresee in the very near future a meeting (led by you in November:) where we invite all the key stakeholders internally (OEHRM, VHA, VBA, NCA) and externally (HHS, CMS, DoD, IPO, WH, Cerner + their HIE's) to discuss strategy and roadmap to achieve national interoperability.

Very exciting stuff... look forward to supporting you lead this effort. Please let me know how I can help.

Thanks

Camilo

Topic Area: VA Definition of Interoperability ..... 3

Topic Area: Commit to Full VA-DoD Interoperability ..... 4

Topic Area: Leverage Current and Future Standards..... 6

Topic Area: Commit to Open, Standards-Based APIs ..... 7

Topic Area: Use Community Care Contracts to Foster Interoperability..... 9

Topic Area: Additional Contract Changes ..... 11

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Owner: Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc>
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Last Modified: Sun Oct 14 16:15:58 CDT 2018

ACQUISITION SENSITIVE

# Department of Veterans Affairs Electronic Health Modernization

# Request for Proposal Interoperability Review Report

Authors: Jay J. Schnitzer, M.D., Ph.D.

(b)(6)

MITRE

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**Document Number: MTR180033**
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**McLean, VA**
**January 2018**

**Sponsor:**
Department of Veterans Affairs

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# VA EHRM RFP Interoperability Review Report

January 31, 2018

MITRE

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# Executive Summary

This Review Report presents responses to three requests from the Department of Veterans Affairs (VA) to MITRE related to the topic of interoperability within the VA Electronic Health Record Modernization Request for Proposal:

I. Conduct an external Interoperability Review Panel to review the interoperability language in the existing Request for Proposal (RFP),

II. Engage an independent and unbiased legal expert to identify the specific changes to the RFP language necessary to implement the recommendations from the Interoperability Review Panel, and

III. Visit the University of Pittsburgh Medical Center to understand the existing operational multi-vendor solution and interoperability solutions for applicability and scalability to the VA.

## I. Interoperability Review Panel

In support of the Secretary of Veterans Affairs, David J. Shulkin, M.D., The MITRE Corporation convened and hosted a VA Electronic Health Record Modernization (EHRM) Request for Proposal (RFP) Interoperability Review Panel on January 5, 2018, at MITRE's McLean headquarters. The invited external senior electronic health record (EHR) interoperability subject matter experts (the Panel) reviewed the interoperability language in the existing RFP and developed joint suggestions and recommendations for VA to consider for incorporation to support the successful execution of a new commercial EHR contract with industry. The Panel affirmed that the primary goal should be seamless Veteran-centric healthcare achieved through true EHR interoperability. Achieving this goal rests on three overarching principles that should be supported by interoperability language in the RFP: 1) free and open access to data, 2) an ecosystem that provides fair access to third parties by creating a level playing field, and 3) a seamless Veteran and health provider (clinician) experience. Four categories of recommendations from the Panel (the first three to the interoperability language in the RFP, and the fourth for future VA contracts) will enable VA to realize this goal on the basis of the underlying principles: 1) commit to full VA-Department of Defense (DoD) interoperability, 2) leverage current and future standards, 3) commit to open, standards-based application programming interfaces (APIs), and 4) use Care in the Community contracts to foster interoperability.

For the first category (commit to full VA-DoD interoperability), the Panel agreed that the Determination and Findings signed by Secretary Shulkin on June 1, 2017, represented the correct approach to interoperability within VA and between VA and DoD. The Panel strongly endorsed the proposed VA "API Gateway" language. The most important specific recommendations included:

- Define the degree of interoperability the solution will provide, ranging from basic file sharing to fully interchangeable, integrated and functionally identical patient records.

Suggest that the Contractor conduct an annual Interoperability Self-Assessment against current and future standards that shall be specified by the VA; and

- The contract language should include the following elements:
  - performance measures to hold Cerner accountable for reducing the administrative burden in clinician workflow with the objective of increasing efficiency,
  - ability for bulk data export based on standards, with no proprietary formats (e.g., Flat FHIR [Fast Healthcare Interoperability Resources]), and
  - "push" capability to insert patient data back into the VA EHR / Cerner database.

For the second category (leverage current and future standards), the following specific recommendations were among the most important:

- Require that Cerner implement all standards as defined by VA, current and future,
- Engage Cerner as an advocate of the VA and DoD position in all relevant standards-making bodies, and
- Ensure that VA and Veterans have complete access to data.

For the third category (commit to open, standards-based APIs), the Panel voiced the following recommendations:

- Establish clear publishing and access service requirements,
- Provide a VA application platform that supports APIs from third party providers with no barrier to entry, and
- Require implementation of clinical decision support (CDS) Hooks to invoke decision support from within a clinician's EHR workflow.

The body of this report contains multiple additional specific recommendations.

## II. Recommendations for RFP Changes

MITRE engaged Morrison & Foerster, LLP as the independent and unbiased legal expert to identify the specific changes to the RFP language necessary to implement the recommendations from the Interoperability Review Panel. Appendix C presents all recommended changes to the RFP.

## III. Observations from University of Pittsburgh Medical Center Site Visit

A delegation from VA and MITRE traveled to Pittsburgh, Pennsylvania, on January 19, 2018, for a meeting with representatives from University of Pittsburgh Medical Center (UPMC) Enterprises to discuss aspects of EHR interoperability that UPMC has successfully implemented over the past several years. The report includes an overview of those practices.

## IV. Closing Thoughts and Suggested Next Steps

The Panelists noted that VA cannot achieve true future EHR interoperability through the Cerner RFP alone, or through technology alone. The state of practice today shares only a small portion of available patient data. For VA to succeed in the future, multiple other components must be present and aligned: innovation, policy, standards, customer buy-in, and legislation, to name a few.

The following next steps are recommended for VA consideration:

1. Complete the RFP revisions, conduct appropriate negotiations with the Contractor expeditiously, and complete the contract process as planned. Stand firm during negotiations to maximize ease of access to data and data models for building third party APIs, applications, and services for future community innovations.
2. Continue to work with other federal government agencies and departments with similar interoperability interests and concerns, including, but not limited to, the White House, DoD, Food and Drug Administration (FDA), Centers for Medicare and Medicaid Services (CMS), Office of the National Coordinator for Health Information Technology (ONC), and other parts of the Department of Health and Human Services, to align approaches to EHR interoperability and the development and support of standards government-wide.
3. Support future innovation approaches, including concepts such as an Interoperability Laboratory and outreach to the broader innovation ecosystem (major medical centers, academia, traditional and non-traditional healthcare providers, startups, individual entrepreneurs, others). It is critical to align the innovations planned in VA's Digital Veterans Platform to the VA EHR innovation efforts to ensure consistent continuous improvements to clinician and Veteran health experiences.
4. Create an External Review Panel to provide expert continuous guidance, review, and feedback over the course of the implementation, to help capture best practices from the expert community going forward. Conduct ongoing demonstrations of end-to-end Veteran use cases requiring data sharing across organizational boundaries to validate improvements in Veteran healthcare and reduction of burden for healthcare providers. VA and Contractor will ensure that Federal Advisory Committee Act (FACA) guidelines are followed in leveraging any external review panels.

# Table of Contents

Background....1
I. Interoperability Review Panel....2
Introduction....2
Goal....2
Methodology/Approach....2
Topic Area: VA Definition of Interoperability....3
Topic Area: Commit to Full VA-DoD Interoperability....4
Topic Area: Leverage Current and Future Standards....6
Topic Area: Commit to Open, Standards-Based APIs....7
Topic Area: Use Community Care Contracts to Foster Interoperability....9
Topic Area: Additional Contract Changes....11
II. Recommendations for RFP Changes....12
III. Observations from University of Pennsylvania Medical Center Site Visit....13
IV. Closing Thoughts and Suggested Next Steps....16
Appendix A: Interoperability Review Forum Participants....17
Appendix B: RFP Language for Purchasing Extensible Health IT....19
Appendix C: Recommended RFP Interoperability Language Changes....22
Appendix D: Acronyms....42

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## Background

The Department of Veterans Affairs (VA) plans to establish seamless care for Veterans throughout the health care provider market. Seamless care requires interoperability between the Department of Defense (DoD), VA, VA affiliates, community partners, electronic health record (EHR) providers, healthcare providers, and vendors. VA directed The MITRE Corporation to independently review the capability of Cerner's proposed EHR solution to seamlessly transmit health records between EHR systems supporting healthcare providers who both use and contribute patient data to a Veteran's health record, to include Veterans Choice Program (VCP) community-care service providers and VA affiliates. This Review Report presents responses to three requests:

I. Conduct an external Interoperability Review Panel to review the interoperability language in the existing Request for Proposal (RFP),

II. Engage an independent and unbiased legal expert to identify the specific changes to the RFP language necessary to implement the recommendations from the Interoperability Review Panel, and

III. Visit the University of Pittsburgh Medical Center to understand the existing operational multi-vendor solution and interoperability solutions for applicability and scalability to VA.

# I. Interoperability Review Panel

## Introduction

In support of the Secretary of Veterans Affairs, David J. Shulkin, M.D., MITRE convened and hosted a VA Electronic Health Record Modernization (EHRM) Request for Proposal (RFP) Interoperability Review Panel on January 5, 2018, at MITRE's McLean, VA headquarters. MITRE invited external senior EHR interoperability subject matter experts (hereafter referred to as Panelists) to review the interoperability language in the existing RFP and to develop joint suggestions and recommendations for VA to consider incorporating into the RFP to support the successful execution of a new commercial EHR contract with industry. Eleven Panelists took part in person, and several senior government executives observed the process (see Appendix A for the full list of participants).

## Goal

The Interoperability Review Panel sought to provide Secretary Shulkin and his senior leadership team with insights into key best practices and guidance from national experts regarding EHR interoperability. The Panel evaluated the corresponding language in the draft RFP based on successful business transformations and implementations of a new commercial EHR system across a distributed hospital and provider network. This section of the report summarizes the outcome of the Panel: expert recommendations that will inform VA's interoperability contract language. The document also provides actionable and specific best practice recommendations and rationales to enable successful acquisition and implementation of EHR interoperability.

## Methodology/Approach

The first part of the session, which lasted for five hours, was conducted as a fish-bowl exercise and was guided by Chatham House Rule. The Panelists sat at a center table, with VA and other government observers sitting at surrounding tables. The second part, which lasted two hours, consisted of a summary debrief to the Secretary and senior VA leadership. The Secretary could ask questions and engage with the Panel throughout the second session. MITRE moderated the session to elicit inputs from all Panelists and to drive alignment toward consensus in the recommendations.

The agenda for the first portion of the session was structured to elicit inputs from all Panelists, with notes captured on-screen as redlines to the RFP interoperability language to ensure recommendations accurately reflected the Panelists' contributions. Subsequently, in a facilitated discussion, the Panelists grouped their recommendations into specific categories in real time. The second portion, as noted, provided opportunities for the Secretary to discuss the recommendations in additional detail.

This section of the report summarizes the discussion that took place. It highlights actionable changes to the interoperability language contained in the RFP and additional recommendations and lessons learned that can enable interoperability of the VA EHRM solution. Text boxes

throughout the report present direct quotations from Panelists. To ensure participant confidentiality, MITRE has destroyed the transcript and event recording used to develop this report.

## Topic Area: VA Definition of Interoperability

> *The key to modernization is creating greater interoperability with Governmental partners, including DoD, in a way that focuses efforts in support of the Veteran's journey, beginning with their military service. We will partner with others to ensure Veterans can get their benefits, care, and services consistently, easily, and with excellent customer service, no matter where they are throughout their lives. VA will work with local communities, and with other Federal, State, Tribal, and Local Government entities to ensure Veterans get what they need. VA will also continue to leverage the private sector where appropriate and needed to deliver the very best outcomes for Veterans.*
>
> – draft VA 2018–2024 Strategic Plan

### Enable data sharing, interoperability, and agility through data standardization

VA needs to allow data sharing among various business applications, such as appointment scheduling and business intelligence, as well as ensure transportability of information between sites. Panelists advised VA to leverage and support the best-in-class innovation currently in use within the VA culture. VA must also enable interoperability as the Department integrates the EHR into other supporting systems, both within the VA network and with external health service providers. Agility is necessary for adoption of future innovative technologies and/or if VA wants to upgrade or change the EHR approach. The Panelists cautioned that the current EHR technology is already 20 years old and, as with all industries and information technology (IT) solutions, many possibly disruptive technologies exist on the horizon.

> "It really optimizes transportability of best practices, because if you are trying to transfer best practices from one site to another and you have the same system where the best practice is going to land, then it is much easier."

The session began with a discussion on interoperability as currently defined by VA (Figure 1). Prior to establishing a roadmap to inform a nationwide plan to advance health data interoperability, VA must first ensure system-wide interoperability across the Department. Throughout the Review Panel session, the Panelists described and referred to this concept as "Level 1 Interoperability" throughout the Review Panel session; it includes migration of Veteran data from ~130 instances of the Veterans Health Information Systems and Technology Architecture (VistA) to one VA platform.

**Figure 1. VA Definition of EHR Interoperability**

"Level 2 Interoperability," as described in the Panel discussion, addresses the ability for VA to leverage the same Cerner platform used by DoD to ensure seamless care from active service to Veteran status. Once this capability is implemented, the clinical data transformation will allow a true longitudinal view of a Veteran's record as he or she transitions from DoD to VA for care and other critical services such as benefit adjudication.

"Level 3 Interoperability" will allow both VA and DoD to take an important step toward transforming electronic patient data exchange on a national scale. With the utilization of community healthcare providers via the VA Community of Care initiative and DoD's Tricare network providers, VA has the opportunity to drive interoperability between DoD and VA as well as with the extensive network of healthcare providers that serve our Nation's Veterans, active duty service members, and their beneficiaries.

True nationwide EHR interoperability for the entire United States is the ultimate goal, and the Panelists agreed that VA and DoD could reach this goal if the three aforementioned levels of interoperability are achieved. Here, VA has the opportunity to drive clinical transformation and instantiation of a complete EHR for all patients at the national level.

## Topic Area: Commit to Full VA-DoD Interoperability

The Panel focused primarily on reviewing the interoperability language within the RFP for the Cerner contract. However as described in Interoperability Levels 1 and 2, the commitment to the seamless integration of VA and DoD health data represents the foundation required to realize interoperability with private sector

> "You really have to get the basics done first. Let's just make absolutely sure that the interoperability between DoD and VA [is achieved]."

healthcare providers.[1] It is important to note that the interoperability levels can be addressed simultaneously and should not be separated, as they must be integrated to efficiently achieve the larger future data sharing ecosystem.

## Specify the expectations for interoperability between DoD and VA

During discussions about the expectation that Cerner will provide a single EHR solution to be shared by both DoD and VA, the Panel raised concerns about the lack of specificity in the contract language. Current interoperability data standards address a subset of the Veteran's clinical record and VA has the opportunity to ensure Cerner provides interoperability of all discrete data, at a minimum, between VA and DoD. Adopting the same platform would increase seamless sharing, but the Panel stated that VA should take additional action to ensure that such sharing is realized. The DoD and VA systems should use proprietary database-to-database interoperability if necessary, to maximize interoperability between those two systems. These systems should be configured to meet the distinct needs of each while being connected to each other in a native database-to-database method as necessary, leveraging open interoperability standards wherever possible. As a result, clinicians should experience no differences when they move from a VA system to a DoD system. These data should also be computable, or be made computable according to a specific schedule. VA should consider adding language to the RFP that specifically defines the degree of interoperability the solution will provide, ranging from basic file sharing to fully interchangeable, integrated and functionally identical patient records.

The Panelists also stated that, for VA and DoD collectively, the contractual language should include the following requirements:

- Performance measures to hold Cerner accountable for reducing the administrative burden in clinician workflow with the objective of increasing efficiency
- Capability for bulk data export based on standards, with no proprietary formats (e.g., Flat FHIR [Fast Healthcare Interoperability Resources])
- "Push" capability to insert new patient data back into the VA EHR / Cerner database.

## Pivot the RFP to be Veteran-centric and not system-centric

The Panelists discussed the impact of EHR implementations on clinician workflow, describing the issue as one of approaching the implementation as an IT system implementation rather than the preferred Veteran- or clinician-centric implementation. The current RFP appears to be written in a system-centric way rather than leveraging use-cases to describe the Veteran or clinician experience or workflow to characterize the requirement. The Panelists recommended that VA incorporate use-cases to characterize requirements and amend the RFP language to emphasize the Veteran-centric objectives. In addition, Panelists noted that VA should recognize that EHRs do not currently maximize efficient clinical workflow, and that VA specify that the

[1] Healthcare providers is used to refer to community based physicians/specialist and hospitals.

solution present clinicians with relevant information where needed with a minimum number of "clicks to find."

## Topic Area: Leverage Current and Future Standards

The integrated EHR platform that DoD and VA are implementing provides the opportunity to significantly influence interoperability standards across the healthcare community, addressing gaps and competition among current standards. The Panel recognized that commercial health systems and technologies would realize only limited business value from making data portable between them, but this would lower the barrier to patient movement among healthcare providers.

### Engage Cerner as an advocate of the VA and DoD position in all relevant standards-making bodies

The Panel recommended increased VA presence and leadership in national health IT standards-making activities, in coordination with the DoD. Additionally, VA should encourage Cerner to serve as an active advocate of the VA-DoD position and to participate actively in the development and/or evaluation of new standards, policy directives, operating procedures, processes, etc. As an integrated voting bloc, VA, DoD, and Cerner will have the potential to act as a strong driver of national standards. Panelists understood that VA is not currently active in the FHIR community or in the Health Level Seven International (HL7) Argonaut Project.

In addition, Panelists identified a need for standards to exchange patient-reported outcome data for integration into the clinician's workflow. The current RFP language seemingly puts the burden on Cerner for the development of standards, and the Panel recommended that VA take a more active position. This will ensure that VA will participate and drive implementation when standards mature. Where standards are immature, VA must participate in efforts to accelerate standardization.

### Require Cerner to implement all standards as defined by VA, current and future

Because it is unclear where health IT is heading in five years, the Panel strongly suggested VA include contract language to address possible future advancements in the form of standards as defined by VA. At a minimum, VA should seek maximum interoperability with community care organizations, using open interoperability standards wherever possible. This flexibility would ensure that VA does not rely on external stakeholders to determine the standards that VA would be required to accept. The Panel recommended that VA pay particular attention to specific categories of standards: real-time data read/write by care providers and Veterans; interoperability tools; seamless DoD and VA vision records; and principles for data normalization and structure. The Panel also recognized Cerner's influence in ensuring that the CommonWell network interoperates at the highest possible levels with other networks including CareQuality—an influence that VA should continue to promote.

### VA must own its data; clear ownership and access are critical to success now and in the future

The Panel highlighted an important recommendation regarding data rights that was discussed in the prior VA EHRM Listening Forum on September 7, 2017. The Panel recommended that VA define who has what rights from the perspectives of data ownership, access, and sharing (e.g., VA owns the data and all data products vs. community care providers own the patient data vs. each Veteran owns all of his or her data). Determining the authoritative data source for the various elements of a Veteran's health record is an important Veteran-centric component of interoperability, the longitudinal record, and seamless access to data.

> "So, what you need is clear access and clear ownership of your information…you need to have absolutely, undisputed, clear ownership and ability to move the data to any place you want to use it and use it in any way you want to use it when you get there. And not have them [Cerner] be able to say no, that's our data or hinder you in any way or have an unreasonable charge to get it."

VA should define an enterprise-wide policy for all VA data. A suitable policy would include, but not be limited to, EHRM-specific data, and should be issued by the VA Central Office (VACO) or Veterans Health Administration (VHA). VA must have clear ownership of and access to all the information in the EHR and be able to move that information (into new systems or among systems) as needed, now and in the future. Owning the data ensures that it is available regardless of vendor or system. VA must include this in the Cerner contract. Technology innovations occur rapidly in the 21st century, and VA must have full ability to move its data to future systems.

Panelists also recommended that VA publish its data model, for instance to the National Library of Medicine, to further promote commercial interoperability investments. Lastly, Panelists encouraged VA to leverage its investment in the Open Source Electronic Health Record Alliance (OSEHRA) by providing seed money to develop open source connectors between Cerner and Epic, which would encourage other vendors to join in the effort.

## Topic Area: Commit to Open, Standards-Based APIs

A significant technology enabler of seamless interoperability among the community of Veteran healthcare providers is the use of Application Programming Interfaces (APIs). These software intermediaries allow disparate EHR applications to communicate with each other and exchange data using standard, defined forms. The Panel emphasized the need for VA to create an environment that would minimize additional costs to community providers in order to interoperate with VA. VA can accomplish this by requiring the new EHR system to expose APIs that support bi-directional data transactions. The Panel further recommended that VA make a commitment to open, standards-based APIs, including the SMART on FHIR/Argonaut APIs, to facilitate the ready and efficient exchange of data with partners providing care in the community and to support open clinical workflow.

## Establish clear publishing and access service requirements

The Panel recognized that data access requirements differ depending on who provides or accesses that data. Therefore, the Panel recommended that VA be more specific in defining each level of data publishing and access service that is specific to (1) Veteran access (e.g., use of vets.gov); (2) VA clinician access; (3) partner access; and (4) Health Information Exchange (HIE) access. The RFP should include a clear description of identity and access management requirements, including user population types and the association of specific application permissions with particular roles/positions.

> "The Contractor should provide all of the data that is currently being provided in the Contractor's patient portal to the consumer via an open standards-based API gateway. The Contractor should also provide all of the reporting data required by federal law to the Veteran via an open standards based API framework, accessible via any application or third-party data store of the Veteran's choice, that's number one."

Machine-to-machine access is also critical for efficient sharing of information. The Panel recommended that VA ensure that all significant data stored in the software be accessible through APIs with no requirement for creation of custom applications to specifically access VA data. From a forward-looking perspective, VA should require that the EHR system support the ability to access data elements using open standards-based interfaces, and include the ability to interface with legacy data, patient-generated data, and third-party data that resides outside the EHR system. In addition, Cerner should provide the required utility services to support intermediary or peer-to-peer services (e.g., support Veteran-directed or Veteran-mediated requests, data exchange, and ingestion of data from non-VA providers).

## Provide a VA application platform that supports APIs from third-party providers with no barrier to entry

Currently vets.gov serves as a portal to Veteran services. The Panel recommended that VA consider using such a portal to connect any third-party application to the EHR solution without requiring fees or vendor permissions. VA should have full authority to connect any third-party application through one of the standard open APIs conformant with the vendor's API without pre-registering the application with the vendor. This is a very important authority to have in terms of the ability to innovate rapidly, without constraints.

> "The API Gateway document is awesome … world class and future looking."

The Panelists also reviewed the proposed VA "API Gateway" language provided during the API discussion to anchor the dialogue and concurred that this requirement is fundamental to supporting interoperability. The Panel strongly endorsed the "API Gateway" language. Specifically, the Panelists recommended that VA include a requirement that VA have full authority to connect any third-party application to the Cerner system without requiring prior approval by Cerner. Furthermore, VA should ensure that developers of third-party applications connecting to the VA system via the open standard and VA-defined APIs continue to own their

intellectual property (IP). From a usability perspective, the Panel also recommended that VA be able to establish the connectivity business rules, such as the ability for applications to remain connected for a reasonable time frame (e.g., 1 year) and to receive automatic notification about patient information updates.

### Require implementation of Clinical Decision Service (CDS) Hooks to invoke decision support from within a clinician's EHR workflow

EHRs are essential to efficient delivery of high-quality care, as they provide the clinician with essential decision data at the time required. However, current EHR systems approach workflow from an IT system perspective rather than a clinician's perspective. The latter workflow should, of course, be paramount in the VA EHR implementation, and should also leverage a recent innovation called CDS Hooks. This technology provides the clinician with context-driven decision support and capability by enabling the EHR to trigger third-party services at key events that include ordering medication and opening a patient face sheet. For example, when the VA clinician begins to prescribe medication, a CDS Hook can call an external service that presents the clinician with the list of medications already prescribed to the patient by clinicians outside VA. The Panelists strongly recommended that VA require Cerner to implement and use CDS Hooks within the clinician workflow.

## Topic Area: Use Community Care Contracts to Foster Interoperability

The new EHR system must be able to communicate with other EHR systems (e.g., Epic, AllScripts, etc.) within the care community. It is critical that VA ensure the Cerner EHR system remain robust for future interoperability with new products. Cerner must commit itself to supporting other forms of interoperability, such as a presentation layer that is common to other systems (e.g., the App store model). The Panel recommended that prior to execution of the Community Care Act contract VA require third-party providers (and Cerner competitors) to commit to supporting the contract as early adopters.

> "Innovations going forward are going to come from multiple directions. And having those interfaces, and going with a general interoperability approach that doesn't fork off from what's happening in the rest of the healthcare system, will allow the Veterans to benefit from technology whether that's coming from Google, from a new company, from an innovative shop within VA -- you end up creating a market with good prices, high value."

### Veterans must be able to access and download a computable form of their health data

Panelists noted that access to data represents the biggest problem today. VA must clearly direct Cerner to expose data so it can be used by third parties. In the contract and in conversations with Cerner and third parties, VA must require specifics regarding how Veterans and providers will

access and share their data. In addition, VA must require that any agreements leave the door open for future standards and technologies.

Panelists believed that VA could achieve this by invoking the principle that the data belongs to the Veteran, rather than by citing specific technologies and standards (given how rapidly they are evolving). Veterans must be able to invoke their right of access to data to support data exchange across all providers (e.g., pull data through an API on their smartphone and push it to their community care provider), now and in the future. Keeping pace with this requirement will drive continual innovation by Cerner and all providers.

## VA must own the API layer

Cerner ownership of the API layer (across every customer) poses a real threat to achieving interoperability, speed of innovation, and cost efficiency throughout the network of community care providers. Panelists stated that it is of utmost importance that VA include specific language stipulating that VA and Veterans be able to use third-party applications without having to register them with Cerner. VA must control the API key, not Cerner.

Additionally, VA should require that Cerner provide access to MPages, a developer toolkit, and a programming interface that will enable innovators and third parties to develop APIs.

## Require that community care contracts include VA EHR standards to support bi-directional data sharing

Panelists agreed that requiring the support and collaboration of community care providers and participating actively in health IT standards bodies would give VA the opportunity to advance the "national" standard for data sharing—closing any gaps and inconsistencies among federal, industry, and inter-industry standards. VA must require every provider in the chain of a Veteran's care to support the same standards for data interoperability in order to ensure seamless, best possible care for Veterans. This includes the requirement that all providers and third-party applications, in exchange for using the VA-provided API gateway, provide bi-directional health information back to VA that can be used for context-driven clinical decisions and informatics.

## Change the data exchange consent model from "opt in" to "opt out"

To encourage seamless interoperability across all entities providing care to Veterans, the consent model for exchanging data between healthcare providers must be modified to follow an opt-out rather than an opt-in policy, which limits participant numbers. This would allow Veterans to invoke their individual right of access under the Health Information Portability and Accountability Act (HIPAA) to move their data as needed. Many states have already adopted an opt-out consent policy as part of their HIE.[2] VA can achieve this by aligning its policy to an opt-

[2] See https://www.healthit.gov/sites/default/files/State%20HIE%20Opt-In%20vs%20Opt-Out%20Policy%20Research_09-30-16_Final.pdf

out model, supported by the new VA proposed rule[3] to allow HIEs to collect a Veteran's consent and electronically attest to the consent to VA in order to obtain the required EHR.

## Topic Area: Additional Contract Changes

In addition to the recommendations in the prior sections, the Panelists encouraged VA to add further definitions and clarity in the following areas:

- Require Cerner to provide VA with full read and partial write access to all data elements within the EHR, at VA's sole discretion.
- Require Cerner to make the VA data model, standards, and other similar interoperability changes available in all other non-VA Cerner instances of its EHR platform.
- Clearly define "enabling security framework" so that users know if this means a specific security framework such as those provided by the National Institute of Standards and Technology (NIST), HITRUST, etc.
- Amend "national Common Trust Framework" to specifically refer to the intended source. The Panelists suggested that VA replace this wording with "Trusted Exchange Framework and Common Agreement (TEFCA)" as specified in the 21st Century Cures Act.
- Amend RFP Performance Work Statement (PWS) Section 5.10.4(i) to clarify if the "provider collaboration via secure e-mail using Direct standards" is limited to the Direct protocols and just the Cerner platform.
- Incorporate the model RFP language necessary for Cerner to support the API and SMART on FHIR platform and SMART-enabled applications, as described in Appendix B.

[3] See https://s3.amazonaws.com/public-inspection.federalregister.gov/2018-00758.pdf

# II. Recommendations for RFP Changes

MITRE engaged Morrison & Foerster, LLP, as the independent and unbiased legal expert to identify the specific changes to the RFP language necessary to implement the recommendations made by the Interoperability Review Panel. MITRE provided Morrison & Foerster, LLP, with the summary recommendations and a copy of the RFP.[4] In addition, MITRE collected specific ideas for contract language from the Panel. Appendix C presents all recommended RFP changes.

[4] *Performance Work Statement for the VA Electronic Health Record Modernization System*, Final Version 1.7, Amendment 03, December 4, 2017, Department of Veterans Affairs. File name: 001 - VA EHRM IDIQ PWS (Amended 12.04.2017) - Copy.docx

# III. Observations from University of Pennsylvania Medical Center Site Visit

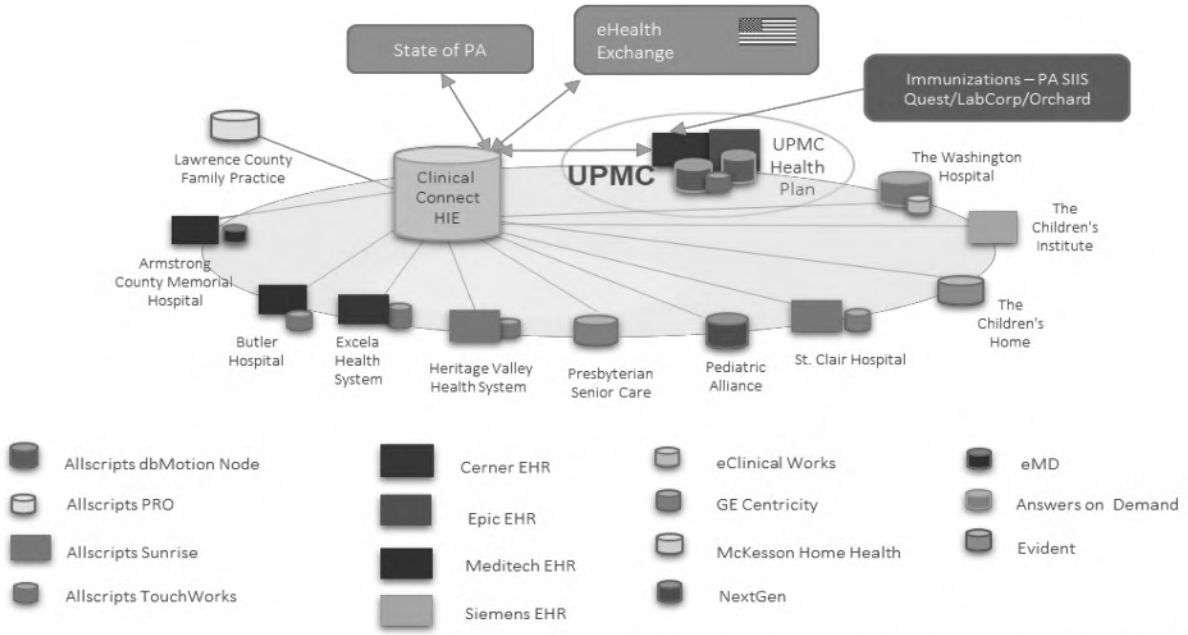
A delegation from VA and MITRE traveled to Pittsburgh, Pennsylvania, on January 19, 2018, for a meeting with representatives of UPMC Enterprises to discuss aspects of EHR interoperability that UPMC has successfully implemented over the past several years. The VA team, led by John Windom, included Dr. Ashwini Zenooz, (b)(6), John Short, and (b)(6). The MITRE group included Richard Byrne, Jay Schnitzer, (b)(6), (b)(6), and (b)(6). The hosts at UPMC included Dr. Rasu Shrestha, C. Talbot Heppenstall, Jr., Ed McAllister, Dr. Robert Bart, Adam Berger, Diane Michalec, Phyllis Szymanski, and Dr. Amy Urban, as well as additional staff.

The meeting was broken into four parts. Following introductions, Session 1 described the structure of UPMC. Session 2 covered UPMC's last decade of interoperability, and Session 3 centered on the road ahead for UPMC and industry.

Dr. Rasu Shrestha began the meeting by making the introductions and setting the agenda. He stated that UPMC's approach had followed a best-of-breed strategy, as opposed to a best-of-suite strategy, with the intention of failing fast and succeeding often. The overall UPMC structure has four parts: provider services, insurance services, international activities, and enterprises.

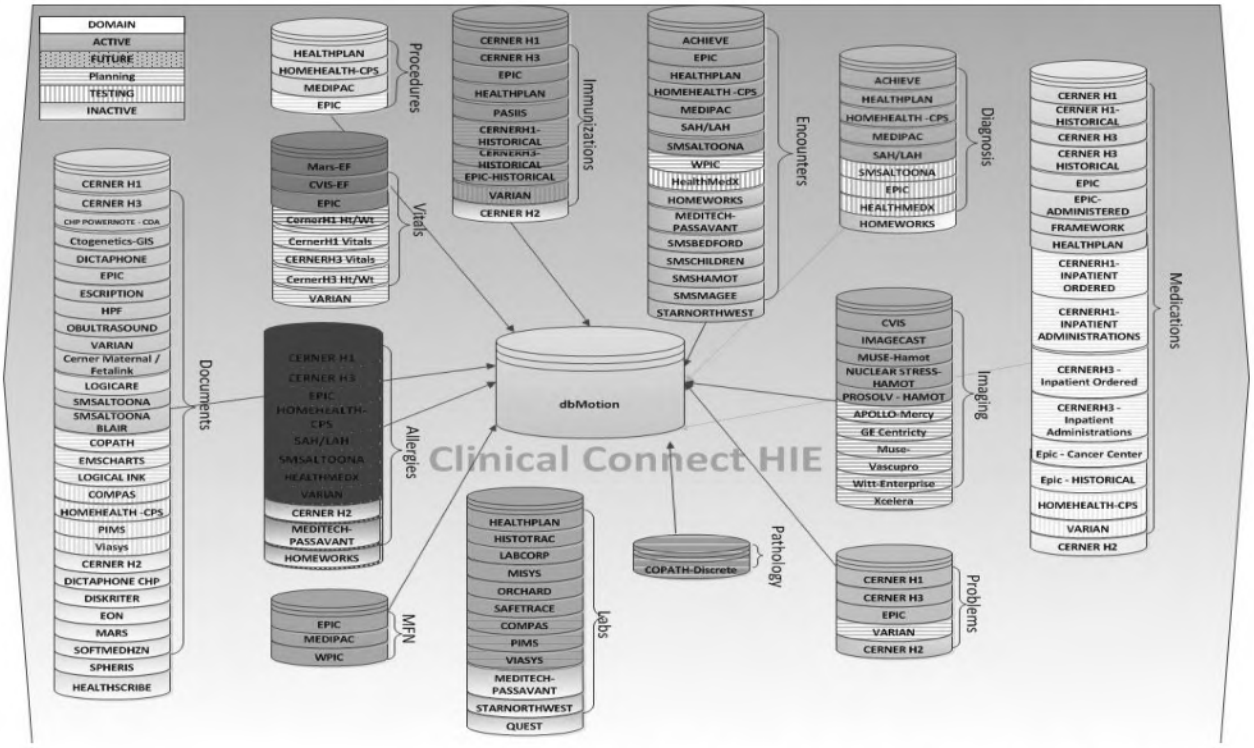
During the discussion of interoperability, the UPMC team described its approach to interoperability, called Connected Healthcare, which is based on the commercial product dbMotion of AllScripts. UPMC has created an entity titled ClinicalConnect HIE (CCHIE) that uses HL7. ClinicalConnect exists as a separate 501c(3) company, of which UPMC is a member. CCHIE contains 90 live interfaces. This HIE went live in June 2012; its members consist of 10 hospitals. It competes with three other HIEs in Pennsylvania. The repository contains data on 8.3 million patients, and, in terms of patient consent, CCHIE uses an opt-out model. It currently has connections to four EHRs: Cerner (two versions), Epic, and Varian. Data available within CCHIE spans allergies, clinical documents, diagnosis, encounters, immunizations, labs, medications, problems, and procedures. Much of this data is in the form of documents (Continuity of Care Document (HITSP C32 CCD format, including problems, allergies, and medications); unstructured clinical documents (HITSP C62 format); Consolidated Clinical Document Architecture (C-CDA CCD, including problems, allergies, medications, immunizations, procedures, and insurance); and HL7 Interface (ADT: encounters, documents, imaging documents, and labs only).

At the point of care dbMotion allows multiple views for the CCHIE: 1) a clinical view, 2) a newer view titled EHR agent, and 3) a Cerner MPage integration view. The next phase of the UPMC work in this regard will consist of integration with CommonWell. Figure 2 shows the architecture of the system. Figure 3 depicts the data feeds.




Source: From UPMC Enterprises, used with permission, for VA use only

**Figure 2. ClinicalConnect (Western Pennsylvania) Health Information Exchange**




Source: From UPMC Enterprises, used with permission, for VA use only

**Figure 3. Interoperability Data Integration**

**ACQUISITION SENSITIVE**

**Confidential and Proprietary**

**For Department of Veterans Affairs Use Only**

When asked whether UPMC, or anyone else in the country, has a point-to-point Cerner-to-Epic interoperability solution that does not use an HIE, UPMC representatives responded "No." Furthermore, UPMC representatives noted that about 10 percent of the total available individual patient data is currently transferred with UPMC's interoperability system. This is complicated by an ongoing data explosion that doubles the amount of data in UPMC's system about every 18 months.

Following the presentations and lunch, MITRE Chief Technology Officer Jay Schnitzer saw a live demonstration of CCHIE by Dr. Amy Urban and Dr. Rasu Shrestha. The live demonstration confirmed that all of the documents listed above are visible with equal fidelity and a very similar format from both the UPMC end and the community provider end and perspective. The system requires clinicians to know and understand where documents can be found, and sometimes requires multiple mouse clicks, but all documents can be accessed from the same EHR entry page with one single log in. Additionally, some data elements, including vital signs and labs, can be viewed in the form of graphs as a function of time, including data elements from multiple sources.

# IV. Closing Thoughts and Suggested Next Steps

The Panelists noted that VA cannot achieve true future EHR interoperability through the Cerner RFP alone, or through technology alone. The state of practice today shares only a small portion of available patient data. For VA to succeed in the future, multiple other components must be present and aligned: innovation, policy, standards, customer buy-in, and legislation, to name a few.

The following next steps are recommended for VA consideration:

1. Complete the RFP revisions, conduct appropriate negotiations with the Contractor expeditiously, and complete the Contract process as planned. Stand firm during negotiations to maximize ease of access to data and data models for building third-party APIs, applications, and services for future community innovations.
2. Work with other federal government agencies and departments with similar interoperability interests and concerns, including, but not limited to, the White House, DoD, Food and Drug Administration (FDA), Centers for Medicare and Medicaid Services (CMS), Office of the National Coordinator for Health Information Technology (ONC), and other parts of the Department of Health and Human Services, to align approaches to EHR interoperability and the development and support of standards government-wide.
3. Support future innovation approaches, including concepts such as an Interoperability Laboratory and outreach to the broader innovation ecosystem (major medical centers, academia, traditional and non-traditional healthcare providers, startups, individual entrepreneurs, others). It is critical to align the innovations planned in VA's Digital Veterans Platform to the VA EHR innovation efforts to ensure consistent, continuous improvements to clinician and Veteran health experiences.
4. Create an External Review Panel to provide continuous expert guidance, review, and feedback over the course of the implementation and help capture best practices from the expert community going forward. Conduct ongoing demonstrations of end-to-end Veteran use cases that require data sharing across organizational boundaries to validate improvements in Veteran healthcare and reduce burdens on healthcare providers. VA and Contractor will ensure that Federal Advisory Committee Act (FACA) guidelines are followed in leveraging any external review panels.

# Appendix A: Interoperability Review Forum Participants

| Panelists | Title | Organization |
|---|---|---|
| Aneesh Chopra | President | CareJourney, former United States Chief Technology Officer |
| Charles E. (Chuck) Christian | Vice President, Technology and Engagement | Indiana Health Information Exchange |
| Ryan Howells | Principal | Leavitt Partners, LLC |
| Andrew Karson, MD | Director, Clinical Decision Support | Massachusetts General Hospital |
| Chris Klomp | Chief Executive Officer | Collective Medical Technologies, Inc. |
| Kenneth Mandl, MD | Professor, Biomedical Informatics<br>Director, Computational Health Informatics | Harvard Medical School<br>Boston Children's Hospital |
| Frank Opelka, MD | Medical Director, Quality and Health Policy | American College of Surgeons |
| Peter Pronovost, MD, PhD | Director, Armstrong Institute for Patient Safety and Quality<br>Senior Vice President, Patient Safety and Quality | Johns Hopkins University |
| Christopher J. (Cris) Ross | Chief Information Officer | The Mayo Clinic |
| Carla Smith | Executive Vice President | The Healthcare Information and Management Systems Society |
| Paul R. Sutton, MD, PhD | Professor, Biomedical Informatics and Medical Education<br>Associate Medical Director, Inpatient IT Systems, UW Medicine IT Services | University of Washington |

| VA Participants | Title | Organization |
|---|---|---|
| David J. Shulkin, M.D. | Secretary | Department of Veterans Affairs |
| Carolyn Clancy | Executive in Charge, Veterans Health Administration | Department of Veterans Affairs |
| Bill James | Acting Assistant Secretary, Office of Information & Technology | Department of Veterans Affairs |
| John Windom | Program Executive for EHRM and Special Advisor to the Under Secretary for Health | Department of Veterans Affairs |
| Dr. Ashwini Zenooz | Chief Medical Officer, EHRM; Deputy, Office of Deputy Under Secretary for Health Policy & Services, VHA | Department of Veterans Affairs |
| John Short | Chief Technology Officer, EHRM; Executive Director of Information Technology System Modernization | Department of Veterans Affairs |
| (b)(6) | Portfolio Lead: Project Transition and VA Integration, VA Center for Innovation | Department of Veterans Affairs |
| Camilo Sandoval | Senior White House Advisor, VHA | Department of Veterans Affairs |
| (b)(6) | Senior Advisor to the Secretary on Strategic Partnerships | Department of Veterans Affairs |
| (b)(6) | Contracts | Department of Veterans Affairs |
| Kyle Sheetz | White House Fellow | Department of Veterans Affairs |

| Other Federal Government Participants | Title | Organization |
|---|---|---|
| (b)(6) | Senior Advisor, Office of Administration | The Centers for Medicare & Medicaid Services |
| Chris Liddell | Assistant to the President for Strategic Initiatives | The White House, Office of American Innovation |
| Bruce Moskowitz, M.D. | Internist | External Expert Participant |
| Shannon Sartan | Director, Digital Services | The Centers for Medicare & Medicaid Services |
| Dr. Lauren Thompson | Director | DoD/VA Interagency Program Office |
| Jon White | Deputy National Coordinator for Mental Health | The United States Department of Health and Human Services/The Office of the National Coordinator for Health Information Technology |

# Appendix B: RFP Language for Purchasing Extensible Health IT

From https://smarthealthit.org/2017/08/draft-model-rfp-language-for-purchasing-extensible-health-it/, as of January 15, 2018.

SMART Platform (www.smarthealthit.org) is a project that lays the groundwork for a more flexible approach to sourcing health information technology tools. Like Apple and Android's app stores, SMART provides the means for developers to create and for health systems and providers to easily deploy third-party applications in tandem with their existing electronic health record, data warehouse, or health information exchange platforms.

To deploy SMART-enabled applications, health systems must ensure that their existing health information technology infrastructure supports the SMART on FHIR API. The SMART on FHIR starter set detailed below lists the minimum requirements for supporting the API and SMART-enabled applications. You may wish to augment this list of minimum requirements with suggestions from the Add-On Functionality listed depending on the types of applications your organization wishes to deploy.

This document is intended as a resource for providers and health systems as they draft Request for Proposals (RFPs) and negotiate with their HIT vendors for added functionality. It has multiple authors from across the SMART team and its advisors. Feedback is welcome.

The vendor must support the SMART on FHIR platform, a vendor agnostic API that allows third-party developers to build external apps and services that integrate with the vended product.

At a minimum, the vendor product should include the following components in order to support SMART on FHIR and SMART-enabled applications:

## Data Access

- Provide automated, standards-based, read-only access through the FHIR API and FHIR data models (resources) to:
  - a well-defined set of real-time discrete data (including support for the API parameters and resources described in the Argonaut Implementation Guide)
  - free-text clinical notes

## Data Manipulation

- Write structured data from third-party apps back to the organization's EHR and, where relevant, a data warehouse, using the FHIR REST API to communicate data including:
  - free-text clinical notes

## Standards-Based App Authorization

- Protect data and identity endpoints with standards-based authorization mechanisms (including the OAuth2 profiles described in the Argonaut Implementation Guide).
- Provide access to data endpoints with an approach that does not require user intervention subsequent to the initial setup such as the method described in the draft SMART Backend Services Profile (http://docs.smarthealthit.org/authorization/backend-services/) Provide capability to restrict this access to a specified set of patients (roster).
- Enable Health System to connect any third-party app of their choice that is conformant with the API without pre-registering the app with HIT Vendor.
- Enable patients to connect any third-party app of their choice that is conformant with the API without pre-registering the app with HIT Vendor through the OAuth Dynamic Registration protocol.
- Provide OAuth refresh tokens with a duration of one year to patient and provider facing apps that support the SMART Client Secret profile.

## Identity Management

- Act as a standards-based Identity Provider using OpenID Connect. This ensures that users can authenticate to plug-in apps using single-sign-in via their existing EHR or patient portal credentials.
- Act as a standards-based relying party to a customer-selected Identity Provider using OpenID Connect. This ensures that users can sign into the EHR or patient portal using an external, hospital-supplied single-sign-on account.

## Workflow

- Support standards-based embedding of external application UI (HTML5). This ensures that app developers can build Web apps, and these apps can run directly inside of the EHR.
- Support the launch of external applications in the clinician's workflow (this is not limited to the EHR and should include non-EHR integrated tools such as smart phones and tablets). For example, a clinician that has opted to use a third-party-developed native iPad app to visualize a patient's BMI over time can seamlessly use the application alongside the EHR via single-sign-on.
- Support notifications to and from running applications. For example, an embedded app can notify the EHR when the user is "done" with it.

## Add-On Functionality

The provider organization may also want to consider the following additions to its RFP depending on the types of applications it wishes to develop and run in the future.

### Bulk Data Export

- Provide automated access to bulk export of data (complete representation of all data in the MU Common Clinical data set as well as free text notes) using a method like the SMART Flat FHIR draft proposal (http://docs.smarthealthit.org/flat-fhir)

### Data Manipulation

- Write structured data from third-party apps back to the organization's EHR and, where relevant, a data warehouse, using the FHIR REST API to communicate data including:
  - medication prescriptions
  - lab and diagnostic imaging orders
- Support the dependent transactions necessary to ensure that actions completed by third-party applications using the API are valid in the EHR and data warehouse.

### Context-Specific Service Hooks

- Support the ability to call an external standards-based service in specific workflow steps, through the CDS Hooks specification, including:
  - opening a patient record
  - new prescriptions
  - new lab orders
  - new imaging studies

### Intellectual Property

The IP of any app integrated through the SMART on FHIR API belongs to the author and not the vendor.

## Custom SMART on FHIR Extension to a Proprietary API

Should a vendor neglect to provide SMART on FHIR natively, the client has the right to provide a custom extension to the vendor's API. The ownership of the IP for the custom extension is negotiable between the client and the vendor, but the ownership of the app using the custom extension belongs to its author.

# Appendix C: Recommended RFP Interoperability Language Changes

The table below captures the recommended changes to the VA EHRM RFP.

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| **Commit to Full VA-DoD Interoperability** | | | | |
| 1 | Define specific capability performance requirement and mechanisms to hold Cerner accountable for reducing the administrative burden in clinician workflow with the objective of increasing efficiency. | The IDIQ RFP PWS Section 5.1.11 speaks to overall EHRM value and performance management monitoring, measurement and reporting. Performance metrics will be defined and enforced at the task order level, since, for example, hosting metrics will be significantly different from deployment metrics.<br><br>The RFP Section 8.6 refers to the use of Quality Assurance Surveillance Plans (QASP), which will include Functional and Non-Functional Key Performance Indicators (KPIs). The QASP will evolve as the EHRM solution and technology matures and is intended to establish Contractor accountability to what VA requires and values. | None. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 2 | Define specifically the *span* of providers who can properly interface with VA under a proposed solution (the number of community providers who would be able to interface with VA under a solution as a function of cost to the provider). | RFP Section 5.2.1(j) states that "The EHRM solution shall support access via tablet or mobile device as adjudicated by joint governance. Platform specifics will be identified by VA at a TO level."<br><br>Section 5.10.4 states that "The Contractor is required to collaborate with VA affiliates, community partners, EHR providers, healthcare providers, and vendors to advance seamless care throughout the healthcare market." | Suggest amending the language in RFP Section 5.2.1(j) to: "Support broad access via tablet or mobile devices and pursue technology to reduce the burden to the clinicians (e.g., providing third-party provide access to information using light-weight portals and support for future generation mobile devices). Platform specifics shall be adjudicated by joint governance and incorporated by VA at a TO level." | Concur. Will negotiate with Cerner for inclusion of language. |
| 3 | Define the *degree* of interoperability the solution provides (ranging from basic file sharing to fully interchangeable, integrated and functionally identical patient records). | RFP Section 5.10.4 speaks to interoperability and provides sufficient breadth to introduce any additional information exchange requirements in the future, at the sole discretion of VA.<br><br>Requirements Traceability Matrix (RTM) VA-FR-31 discusses specifics of data management, types of data to be exchanged, and methods of communication. | Suggest adding to RFP Section 5.10.5: "m) The Contractor shall conduct an annual Interoperability Self-Assessment against standards that shall be specified by VA, such as those promulgated by HIMSS or future standards to be identified by VA." | Concur. Will negotiate with Cerner for inclusion. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 4 | Pivot the RFP to be Veteran-centric and NOT system-centric. Be mindful that lessons learned are that many EHRs do not currently maximize efficient clinical workflow, so build that in (e.g., using CDS Hooks) and present information where needed with minimum "clicks to find" to reduce clinician burden. | RFP Section 5.2.1 speaks to the EHR application supporting workflows.<br><br>Section 5.5.1 Workflow development and normalization addresses configuration of workflows to meet VA requirements.<br><br>Section 5.5.7 Organizational Change Management discusses optimizing workflows for each clinical role.<br><br>Section 8.6 refers to the use of Quality Assurance Surveillance Plans (QASP) which provides active, continuous measurement against the extensive performance requirements captured in Appendices A-1 and A-2: EHRM Key Performance Indicators to ensure a Veteran-centric approach.<br><br>RTM section VA-FR-33 requires adoption, development and maintenance of metrics to assess timeliness and quality of healthcare delivery to the patient population.<br><br>The current RFP language can be clarified to specifically refer to the improvement on Veteran-centric delivery. | Suggest adding to RFP Section 5.5.1: "k) Provide an understanding of how all workflows will impact VA care coordination and management processes (e.g., incorporating community information) to improve Veteran-centric delivery."<br>Also add to Section 5.5.1: "l) Configure workflows to incorporate all community data at the discrete level in support of clinical decision support, care management, disease management. The clinical workflow within the EHR should not require users to visit additional screens to view externally sourced data."<br><br>See Item 29 for specific recommendations on CDS Hooks. | Concur. Will negotiate with Cerner for inclusion. |
| 5 | Require Cerner support end-to-end use cases with major external stakeholders involved. | RFP Section 5.2.1 speaks to the EHR application supporting workflows. The Contractor can only be held responsible for elements of the end-to-end use case that reside within their system. | Suggest adding to RFP Section 5.2.1: "Testing conducted under the Test and Evaluation Program Plan may include specific workflows to inform a demonstration of end-to-end clinical use cases involving external stakeholders." | Concur. Will negotiate with Cerner for inclusion. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
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| 6 | Develop detailed data flow requirements between Cerner and all other vendors, be specific using clinical workflow or Veteran/patient-centric use cases. | Detailed data flow requirements should not be part of the RFP as it will result in the limitation of functionality to the specific data flows specified. They will be part of the Test and Evaluation Plan (TEP), where data flows can be added or modified. However, RFP Section 5.5.1 does not indicate that the external community data and end-to-end workflows will be considered in the configuration of standard EHRM workflows. | Suggest adding to RFP Section 5.5.1: "j) The Contractor shall enable configuration of the application that supports external community data without requiring the clinician to go to special screens to see and use external data." | Concur. Will negotiate with Cerner for inclusion. |
| 7 | Specifically define the machine-data readability expectations to ensure interoperability between legacy, community care providers, and Cerner (e.g., notes fields). | RTM VA-FR-31 Requires the ability "to manage data structures that are standardized, accessible and editable." Specific requirements are to be incorporated into Task Orders, according to the structure of the contract. | See Item #34 for recommended changes to incorporate the SMART on FHIR and SMART-enabled applications.<br><br>See Item # 49 for recommended changes to incorporate sharing of the EHRM data model and to improve the amount of computable data shared with community care providers.<br><br>Suggest VA obtain a description from the Contractor that describes the current baseline of shareable data elements that are computable. | Concur. Will request information from Cerner. |
| 8 | Document the DoD-VA EHR Exchange Framework - it can serve as a starting point for the National model. | This is information that should be included as part of acquisition baseline developed by EHRM Program Management Office technical activities. | None. | Concur. |
| 9 | Require ability for bulk data export. | RFP Section 5.10.4(g) requires the Contractor to provide a software solution for multilateral standards-based ingestion, normalization, storage and exporting of Health Information Exchange acquired Veteran health information. | None. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 10 | Require "push" capability to send data back in to VA EHR / Cerner database. | RFP Section 5.10.4(g) requires the Contractor to provide a software solution for multilateral standards-based ingestion, normalization, storage and exporting of Health Information Exchange acquired Veteran health information. | None. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 11 | Require that VA drive and own the analytical algorithms and not rely on Cerner. Require that VA health organizations be involved in building the logic models with the community and the vendor. | RFP Section 5.1.5 requires the Contractor provide requirements development support but does not include who is responsible for coordinating the community input on the logic models.<br><br>RFP Section 5.1.7 requires the Contractor support data management but does not state that VA shall provide the analytical algorithms.<br><br>RFP Section 5.5.1(e) requires the Contractor support robust semantic modeling for the information associated with the workflows Further detail to achieve this recommendation is also detailed in the Functional Requirement documentation, specifically VA-FR-31. VA should lead and own the analytical algorithms as it is in the best interest of the health community. By owning the algorithms, VA will take the lead on coordinating the effort, but the Contractor will actually develop the algorithms. | Suggest adding to RFP Section 5.1.5: "While the Contractor shall provide such support, VA reserves the right to take the lead on coordinating input from the user and provider communities. VA may, at its discretion, incorporate analytics from other entities, and include them in its future Digital Veterans Platform, with which the EHR must be fully compatible and interoperable."<br><br>Suggest adding to RFP Section 5.1.7(b): "based on community and VA coordinated analytic algorithms."<br><br>Suggest adding to RFP Section 5.5.1(e): "VA and its agents shall have unlimited rights to all resulting models and algorithms."<br><br>Suggest adding to RFP Section 5.5.1(f): “which modeling shall be based on analytical algorithms and data models (1) developed by the Contractor, (2) co-developed by the Contractor in coordination with VA health organizations and the community, (3) developed by VA health organizations, or (4) provided by third-party developers. VA and its agents shall have unlimited rights to all algorithms and logic models incorporated in the EHRM solution, and intellectual property rights will be handled in accordance with § H.2 of the Contract “VA EHRM IP License Agreement” on a Task Order basis.” | Concur. Will negotiate with Cerner for inclusion. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
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| 12 | Enhance the data quality management requirements to ensure Cerner is responsible for maintaining and resolving data quality issues. | RFP Section 5.1.8 Requires the Contractor to be responsible for data migration, but RFP Section 5.1.7 does not include a requirement for the Contractor to manage data quality internal to its systems. | Suggest adding to RFP Section 5.1.7: "j) Maintain backward compatibility of the EHRM solution in such way as to maintain the quality of the data, to ensure that, once captured, the Government has access to and computational use of the data regardless of the evolution of the EHRM or age of the data k) Identify data quality issues found in data sourced from systems beyond its operational remit, applying the same validations and quality standards to incoming external data that it performs for data originated natively within the EHRM solution. Where the principle of seamless care requires that EHRM accept data that does not meet its internal data quality standards, Contractor shall implement the solution so that any incoming data that does not meet EHRM data quality standards be clearly flagged as such and provide both process and user interface to allow incorrect or missing data to be remedied if possible." | Concur. |
| 13 | Define the common identity and access management approach Cerner and others will adopt (e.g., using the Vets.gov identity as the coordinating identity). | RFP Section 5.5.2 describes the required approach to identity and access management across population types and roles. DoD/VA are aligning their efforts to address this going forward. | None. | Concur. |
| 14 | Adopt the DoD approach to data and system security. | RFP Section 5.4: Information System Authorization, Testing and Continuous Monitoring describes the security approach for the shared DoD/VA authorization boundary. Joint DoD/VA Strategy will be executed. | None. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
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| 15 | Share the VA's security approach to medical and endpoint security with DoD for opportunity to leverage and harmonize. | RFP Section 5.4: Information System Authorization, Testing and Continuous Monitoring describes the security approach for the shared DoD/VA authorization boundary. Joint DoD/VA Strategy will be executed. | None. | Concur. |
| 16 | Require Cerner to make the VA data model, standards, and other similar interoperability changes available in all other non-VA Cerner instances of its EHR platform. | RFP Section 5.10.4.1 requires opportunity for agreed upon Contractor proprietary information/data model extension points (e.g., ingestion and record APIs) to be provided to both international and national standards designating organizations, however, this does not include providing the capability to other Cerner users, which would extend Cerner interoperability across the community. | Suggest adding to RFP Section 5.10.4.1: "The Contractor shall provide VA access and usage rights into any underlying proprietary terminology/code systems for the purpose of enhancing national standards to address any gaps identified in the EHRM solution. The Contractor shall also make the interoperability capabilities and product enhancements developed under this contract available to non-VA Cerner clients." | Concur. Will negotiate with Cerner for inclusion of language. |
| 17 | Clearly define “enabling security framework.” Does this mean a specific security framework such as NIST, HITRUST, etc. | VA Requirements Traceability Matrix Non-Functional requirements provides the security requirements to include Access Management, Identity Management, and Information Assurance/Security. RFP Sections 5.4 Information System Authorization, Testing and Continuous Monitoring and 5.5.2 Identity and Access Management provide additional clarification on the security requirements. | None. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
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| | | **Leverage Current and Future Standards** | | |
| 18 | Specifically describe what and how you can read, write, and reconcile re: health data. | Requirement VA-FR-31 describes data management requirements: standardized data and coding terminology systems; use of government endorsed messaging and content standards for interoperability; management of data elements from various entry points etc. The current requirement does not provide understanding of which data elements are being exchanged and the degree of interoperability/ computability supported. | Suggest adding to RFP 5.10.4(m): "The annual assessment will report on the state of each data element (e.g., which are supported in what capacities and in which formats). This will help assure standards implementation consistency and assure standards compliance with evolving national standards." | Concur. Will negotiate with Cerner for inclusion of language. |
| 19 | Define who has what rights from a data sharing perspective, impacting APIs (e.g., VA owns the data + all data products vs. Community care provider owns their treatment info on patient vs. patient owns all their own data.) | Requirement VA-FR-31 and RFP Section 5.1.7 describe data management requirements (including syndication).<br><br>Section 5.5.4 requires "all, significant data stored in the software is accessible through API's" however clarification is needed to ensure access to all data originating from alternate VA-designated authoritative sources. | Suggest adding to RFP 5.5.4: "l) Provide standards-based API access (e.g., FHIR) to all patient data from the VA-designated authoritative data sources for the patient's record within the Contractor's product suite." | Concur. Will negotiate with Cerner for inclusion of language. |
| 20 | Identify the authoritative source for the various elements of a Veteran's health record. | RFP Section 5.1.4 requires the Contractor to provide support in the development and/or evaluation of new Standards, Policy Directives, Operating Procedures, Processes, etc.<br><br>Broader recommendation beyond the scope of the EHRM RFP is for VA to define the authoritative source policy for all VA data. This is not an EHRM specific policy and should be issued by VACO or VHA. | Suggest adding to RFP 5.5.4: "j) assist VA in defining and establishing the authoritative data sources associated with each data element in the EHR (e.g., where it is available and who has access to the information)." | Concur with the language for 5.5.4. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
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| 21 | Increase the VA presence and leadership role in standards-making bodies (e.g., Argonaut). | Increasing VA presence and leadership roles in standards-making bodies is an entirely separate recommendation that is not related to the IDIQ. | None. | Concur. |
| 22 | Include requirement for Cerner to support VA as an advocate to VA position on all relevant standards-making bodies. | RFP Section 5.1.4 requires Contractor support in the development and/or evaluation of new standards, policy directives, operating procedures, processes and/or assessments on their impacts when implemented. | None. | Concur. |
| 23 | Require Cerner to implement all standards as defined by VA. | Requirements Traceability Matrix VA-NJ-177 defines interoperability data standards and specifically cites support of the health data standards identified in the VA-DoD Health Information Technical Standards Profile and by the VA-DoD Interagency Clinical Informatics board. | None. | Concur. |
| 24 | Clarify the intended reference in the phrase “national Common Trust Framework.” Does this refer to the Trusted Exchange Framework and Common Agreement (TEFCA) specified in the 21st Century Cures Act? | RFP Section 5.10.4(h) refers imprecisely to the "national Common Trust Framework." | Suggest replacing the phrase in RFP Section 5.10.4 h) "national Common Trust Framework" with “Trusted Exchange Framework and Common Agreement (TEFCA).” | Concur. Will negotiate with Cerner for inclusion of language. |
| 25 | Clarify if the “provider collaboration via secure e-mail using Direct standards” is limited to the Direct protocols and just the Cerner platform. | RFP Section 5.10.4(i) requires the Contractor, by IOC, to "provide a capability for provider collaboration via secure e-mail using Direct standards within a Cerner Millennium EHR workflow context." | Suggest adding to RFP Section 5.10.4(i): "the ONC Direct protocol or future VA-designated standard." | Concur. Will negotiate with Cerner for inclusion of language. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| | | **Commit to Open, Standards-Based APIs** | | |
| 26 | Be specific about the VA publishing / access service requirements. | RFP Section 5.5.4 includes requirements that all significant data stored in the software is accessible through API's with no requirement for creation of custom applications to specifically access VA data. RTM VA-NF-7 requires the system to support the ability to access data elements using open standard-based interfaces including legacy data. Clarification is needed to ensure the intention to pursue standards-based APIs. | Suggest adding to RFP Section 5.5.4 – "standards-based" in front of APIs. | Concur. Will negotiate with Cerner for inclusion of language. |
| 27 | Define in the contract the VA publishing / access services specifically for (1) Veteran access services (e.g., vets.gov), (2) VA clinician access services, (3) Partner access services, and (4) HIE access service. | RFP Section 5.5.2 describes identity and access management requirements including user population types and the association of specific application permissions tied to roles/positions. RTM VA-NF-6 through 48 describe specific access services required. | None. | Concur. |
| 28 | Ensure external API developers can host their apps on an app platform that is NOT controlled by Cerner (and therefore does not require Cerner licensing and approval). | RFP Section 5.1.8(d) requires the contractor analyze and propose a way forward for the capability for external apps to use HealtheIntent as a data source.<br><br>Section 5.5.4 requires the contractor to support data exchanges via the API gateway.<br><br>Section 5.10.4.2 requires the contractor to work in good faith to integrate the EHRM with the Digital Veterans Platform API gateway. | Suggest replacing the second sentence in 5.10.4.2: "The Contractor shall integrate the EHRM to interoperate with DVP or future state VA platform." | Concur. Will negotiate with Cerner for inclusion of language. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
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| 29 | Include requirement for Cerner to provide CDS Hooks to support open clinician workflow. | RFP Section 5.8 requires the contractor provision robust data analysis toolsets that allow, among other things, analytics and Clinical Decision Support (CDS).<br><br>VA-NF-T26 requires "integration with Cerner via standards-based interfaces (including but not necessarily limited to support for FHIR APIs and/or OMG CDS API/ HL7 CDS APIs (e.g., CDS Hooks)". | None. | Concur. |
| 30 | Specify the required utility services to support intermediary or peer-to-peer services; e.g., support Veteran-directed or Veteran-mediated request, exchange, and ingestion from non-VA providers (via APIs where available). | RFP Section 5.10.4(c) requires "the Contractor shall provide a software solution enabling VA to release and consume, via on-demand access, a Veteran's complete longitudinal health record to and from DoD and connected community partners. The longitudinal record solution shall support Provider-to-Provider record sharing, as well as Provider-Veteran-Provider sharing (Veteran mediated record sharing), including appropriate consent management." | Suggest adding ", regardless of which EHR they use" after "connected community partners…to and from DoD and connected community partners, regardless of which EHR they use." | Concur. Will negotiate with Cerner for inclusion of language. |
| 31 | Require that VA has full authority to connect any VA-approved, secure third-party app with the Cerner system, without Cerner approval. | RFP Section 5.7.1 requires the contractor provide on-site integration for devices connecting to the Contractor system.<br>VA is fully responsible for the security of its systems and protection of its data. | Suggest adding to 5.7.1b: "including via the Digital Veterans Platform…support for VA-approved third-party apps connecting to the Contractor system, including via the Digital Veterans Platform."<br><br>Suggest adding to 5.7.1 – "g) Permit and approve connecting all VA approved secure apps without additional fees or licensing." | Concur. Will negotiate with Cerner for inclusion of language. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
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| 32 | Ensure the API developers retain their IP rights when their API is used to connect to the Cerner interface. | RFP Section 5.5.4 sets forth requirements with respect to APIs, including paragraph (e), which provides for the provision and maintenance of a Developer Portal.<br><br>Section 5.10 generally promotes innovation while 5.10.4.2 requires the Contractor to support the Digital Veterans Platform (DVP) API gateway which is intended to provide a neutral application platform for third party APIs.<br><br>Additional language is required to promote innovation in the creation of third party applications by removing derivative or cascading intellectual property restrictions/ constraints. | Suggest adding to RFP 5.5.4(e): " and provide policies and procedures for the use of the Developer Portal(s) and APIs that promote innovative third-party API development" and "Third party API developers shall retain their IP rights when their API is used to connect to the Cerner interface, and there will be no derivative IP ownership when third parties consume Cerner terminology through open APIs." | Concur. Will negotiate with Cerner for inclusion of language. |
| 33 | Require the ability for 3rd party apps to remain connected to the Cerner system and receive automatic notification on updates (e.g., vaccination). Allow the app to connect without being cut off in accordance with VA security requirements. | RFP Section 5.7.1 requires the contractor provide on-site integration for devices connecting to the Contractor system. | Suggest adding to RFP Section 5.7.1(b): "support for third-party apps connecting to the Contractor system."<br><br>Suggest adding the following new paragraphs (ii) and (iii) to RFP Section 5.7.1(b): "ii. Provide ability for third-party apps to remain connected to the Contractor system in accordance with VA security requirements and receive automatic notification on updates; and iii. Allow the app to remain connected without interruption lasting longer than a certain period of time to be approved by the Government." | Concur. Will negotiate with Cerner for inclusion of language. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 34 | Incorporate the model RFP language necessary for Cerner to support the API and SMART on FHIR platform and SMART-enabled applications. | RFP Section 5.10.4 and the Requirements Traceability Matrix refer to SMART and FHIR based applications but do not incorporate all elements of the suggested functionality such as the support for standards-based embedding of external application UI (HTML5). | Suggest adding to RFP Section 5.10.4: "In addition, the software and services shall support the VA designated standards, such as SMART on FHIR and SMART-enabled applications, or published standard at the time." | Concur. Will negotiate with Cerner for inclusion of language. |
| **Use Community Care Contracts to Foster Interoperability** | | | | |
| 35 | Before the contract is signed, get Care Act providers and Cerner competitors to commit to support the contract as early adopters. | Pre-contractual activity and pertains to future strategic discussions to drive interoperability in the marketplace. | None. | Concur. |
| 36 | Require publication of the EHRM /Cerner clinical data model in the National Library of Medicine (following the Kaiser example). | RFP Section 5.10.4.1 states: In support of the interoperability objectives under this Section, agreed upon Contractor proprietary information/data model extension points (e.g., ingestion and record APIs) may be provided to both international and national standards designating organizations as described and set forth in an applicable Task Order. | None. | Concur. |
| 37 | Require the Veteran to be able to invoke their right of access to data as the intermediary to support data exchange (e.g., pull through their API on phone and push to their community care provider). | RFP Section 5.7.1 requires support to Veterans ensuring they can effectively navigate the HealtheLife patient portal and Wellness programs to effectively manage their health. | Suggest adding to RFP Section 5.7.1(c): “using mobile apps, thin-client and thick-client solutions" and “Veterans shall be able to enable sharing of their health data with their community care providers in accordance with all VA-designated national standards." | Concur. Will negotiate with Cerner for inclusion of language. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 38 | Require Cerner and the Community Care provider applications provide bi-directional health information in exchange for using the VA-provided API gateway. | RFP Sections 5.10.1, .2, and .3 require support for innovation and other development activities.<br><br>Section 5.10.4(c) requires "a software solution enabling VA to release and consume, via on-demand access, a Veteran's complete longitudinal health record to and from DoD and connected community partners."<br><br>VA-NF-61, -63, and -65 requires bi-directional interface in support of Pharmacy. This requirement can be fulfilled by a flat file and does not require the data to be computable. | Suggest adding to RFP Section 5.10.4(c): "The bi-directional health information exchange shall maximize use of discrete data that supports context-driven clinical decisions and informatics." | Concur. Will negotiate with Cerner for inclusion of language. |
| 39 | Shift VA policy enabled by the Choice Care Act from "Opt-In" to "Opt-Out" such that the starting assumption is that data can be shared unless the Veteran "opts out." | Review and revise VA policy. | None. | Concur. |
| | | **Other** | | |
| 40 | Analyze and understand the operational cost to VA to implement and operate under the proposed solution. | Analysis of cost information is not part of a IDIQ contract. It will be done as part of the standard PMO processes. | None. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 41 | Incorporate requirement that subsequent updates and improvements to the Cerner solution is part of the baseline contract (and cost). | RFP Section 5.2.3 Software Maintenance requires: The Contractor shall provide its commercial support and maintenance services described in its End User License Agreement. Leveraging Contractor's best practices and agreed upon upgrade schedule between DoD and VA, software maintenance includes all releases of the software such as major releases, minor releases, maintenance releases. | None. | Concur. |
| 42 | Address the differences between federal and state privacy laws - policy that Federal laws take precedence over state laws. | Federal and state privacy laws can only be addressed through legislation. | None. | Concur. |
| 43 | Ensure VA has no gag order: Require Cerner to allow open, public sharing/reporting (e.g., screen shots) on issues or errors with the EHR solution (e.g., if there is a known anomaly, that anomaly and its work-around is shared with the Cerner user community). | RFP Section 5.3.3 - System Quality and Performance Measures and Monitoring is appropriate to capture this requirement.<br><br>There is no explicit contractual language requiring the contractor to disclose issues or efforts, nor is there language explicitly preserving the right of VA to share such information. | Suggest adding to RFP Section 5.3.3: "Contractor is responsible for reporting all issues or errors associated with the EHR solution and acknowledges and agrees that errors shall not be considered confidential, proprietary or trade secrets, and accordingly, shall be releasable to VA or its agents. VA retains the right to share any issue, error or resolution approach." | Concur. Will negotiate with Cerner for inclusion of language. |
| 44 | Define the way ahead for 3rd party apps (sunset, rebuild and transition) during the Cerner transition. | This should be evaluated in congruence with the legacy transition plans (pivot plans) of existing systems to Cerner. | None. | Concur. |
| 45 | Emphasize the need and resource commitment to achieve clinician consensus, change management, and culture. | RFP Section 5.5.7 Organizational Change Management includes a detailed approach to clinician consensus, change management and culture change. | None. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 46 | Develop a roadmap for all EHR vendors that specifies how Veterans and providers access and share their data and get that data from A to B. This is not limited to the Cerner solution, but includes legacy and community care systems. | These tasks are not part of the IDIQ and will be addressed via Data Migration Plan and Data Management Strategy across VA. | None. | Concur. |
| 47 | Require ability for VA to innovate using the Cerner solution, including support to a Veteran Interoperability Partnership Lab. | RFP Section 5.10: Innovation and Enhancements includes an innovation process, categories and development activities to enable VA innovation activities using the Cerner solution. The language is sufficiently broad to support issuance of a Task Order requiring the Contractor to support interoperability activities including a Veteran Interoperability Partnership Lab.<br><br>MITRE recommends this lab be independently managed and used to support 3rd party innovators, demonstrate interoperability solutions, validate the effectiveness of interoperability solutions in an end-to-end clinical use case context, and serve as a reference architecture to allow 3rd party stakeholders to exercise innovations. | None. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 48 | Understand how Cerner will manage data quality, including provenance, error bounds, data looping, security, etc. | The RFP Section 8.6 refers to the use of Quality Assurance Surveillance Plans (QASP), which is intended to establish Contractor accountability to what VA requires and values.<br><br>VA-NF-T46 requires "The system shall support provenance (chain of custody or ownership) and pedigree (processing history how the data was produced or incorporated) and enable identification, collection, and production of data according to source, custody and ownership and display of data in business, logical, legal or physical models." | None. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 49 | Understand how Cerner will provide VA with access to the data model, share data for analytics freely to 3rd parties, increase the amount of computable data exchanged with 3rd parties.<br><br>Panelists acknowledged this recommendation is a stretch goal. | RFP Section 5.8 address the support to business intelligence and data analytics. Section 5.10.4.1 supports the sharing of Contractor proprietary information/data model extension points (e.g., ingestion and record APIs) with both international and national standards designating organizations. However, current language does not require access to the EHRM data model, supporting understanding of and therefore increase the exchange of computable data with community care providers. | Suggest adding to RFP Section 5.8: "h) Provide VA EHRM data model, underpinning terminology model, tables, definitions, and examples of fully populated Veteran data files. Provide documentation or software that is used for quality checks and that illustrate what data elements are computable."<br><br>Suggest adding to Section 5.10.4.1: "n) The Contractor shall support Knowledge Interoperability by supporting the extension of clinical content assets such as terminologies, clinical decision support rules, order sets, etc. This includes the ability to curate, extend, and share that knowledge with clinical partners. This fosters rapid adoption from industry best practices, e.g., clinical professional societies."<br><br>Suggest VA obtain a price from the Contractor to provide a report explain the steps involved in accessing the data model, including producing an example data file, and demonstrating how much of the data is computable; provide cost estimates for outside parties to access the data via this mechanism. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 50 | Understand how the Cerner EHRM solution will improve Veteran and clinician experiences. | RFP Section 5.2.1 describes the EHR application, however does not specifically focus priorities on the Veteran and clinician experience as captured in end-to-end use cases.<br><br>Section 8.6 refers to the Quality Assurance Surveillance Plans, which include Functional and Non-Functional Key Performance Indicators (KPIs). These KPIs will reflect VA priorities which include improvement of both Veteran and clinician experiences. | Suggest adding to RFP Section 5.2.1.1: "k) Provide for the ability to measure the EHRM performance that contributes to any end-to-end use case, thereby capturing its impact on improving a Veteran and clinician experience." | Concur. |

# Appendix D: Acronyms

| | |
|---|---|
| API | Application Programming Interface |
| CCHIE | ClinicalConnect Health Information Exchange |
| CDS | Clinical Decision Service |
| DoD | Department of Defense |
| EHR | Electronic Health Record |
| EHRM | Electronic Health Record Modernization |
| FHIR | Fast Healthcare Interoperability Resources |
| HIE | Health Information Exchange |
| HL7 | Health Level Seven International |
| IP | Intellectual Property |
| IT | Information Technology |
| PWS | Performance Work Statement |
| RFP | Request for Proposal |
| UPMC | University of Pittsburgh Medical Center |
| VA | Department of Veterans Affairs |
| VACO | VA Central Office |
| VHA | Veterans Health Administration |

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From: Mingo, Fred J., Jr. </o=va/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=vacomingof>
To: Cussatt, Dominic (SES) </o=va/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=vacocussad>; Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=vacosandoc>
Cc:
Bcc:
Subject: FOIA request & planned release of the Mitre Report
Date: Thu Sep 06 2018 07:50:38 EDT
Attachments: VA EHRM Interoperability Review Report Jan 2018 FINAL.PDF

Camilo, Dom,

Good morning. I am also the acting FOIA officer for OEHRM. We have received three separate FOIA requests for the attached Mitre report and now that our contract is awarded and upon review by John Windom we are preparing to release the entire document without any redactions. We am sharing this document with you in advance for your awareness, no action is required. VHA leadership has also received a similar email.

Please let me know if you have any questions.

Warm regards,

Fred Mingo

VA Office of Electronic Health Record Modernization (OEHRM)

Director, Program Control

Acting FOIA Officer

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ACQUISITION SENSITIVE

# Department of Veterans Affairs Electronic Health Modernization

# Request for Proposal Interoperability Review Report

Authors: Jay J. Schnitzer, M.D., Ph.D.

(b)(6)

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**McLean, VA**
**January 2018**

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# VA EHRM RFP Interoperability Review Report

January 31, 2018

MITRE

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# Executive Summary

This Review Report presents responses to three requests from the Department of Veterans Affairs (VA) to MITRE related to the topic of interoperability within the VA Electronic Health Record Modernization Request for Proposal:

I. Conduct an external Interoperability Review Panel to review the interoperability language in the existing Request for Proposal (RFP),

II. Engage an independent and unbiased legal expert to identify the specific changes to the RFP language necessary to implement the recommendations from the Interoperability Review Panel, and

III. Visit the University of Pittsburgh Medical Center to understand the existing operational multi-vendor solution and interoperability solutions for applicability and scalability to the VA.

## I. Interoperability Review Panel

In support of the Secretary of Veterans Affairs, David J. Shulkin, M.D., The MITRE Corporation convened and hosted a VA Electronic Health Record Modernization (EHRM) Request for Proposal (RFP) Interoperability Review Panel on January 5, 2018, at MITRE's McLean headquarters. The invited external senior electronic health record (EHR) interoperability subject matter experts (the Panel) reviewed the interoperability language in the existing RFP and developed joint suggestions and recommendations for VA to consider for incorporation to support the successful execution of a new commercial EHR contract with industry. The Panel affirmed that the primary goal should be seamless Veteran-centric healthcare achieved through true EHR interoperability. Achieving this goal rests on three overarching principles that should be supported by interoperability language in the RFP: 1) free and open access to data, 2) an ecosystem that provides fair access to third parties by creating a level playing field, and 3) a seamless Veteran and health provider (clinician) experience. Four categories of recommendations from the Panel (the first three to the interoperability language in the RFP, and the fourth for future VA contracts) will enable VA to realize this goal on the basis of the underlying principles: 1) commit to full VA-Department of Defense (DoD) interoperability, 2) leverage current and future standards, 3) commit to open, standards-based application programming interfaces (APIs), and 4) use Care in the Community contracts to foster interoperability.

For the first category (commit to full VA-DoD interoperability), the Panel agreed that the Determination and Findings signed by Secretary Shulkin on June 1, 2017, represented the correct approach to interoperability within VA and between VA and DoD. The Panel strongly endorsed the proposed VA "API Gateway" language. The most important specific recommendations included:

- Define the degree of interoperability the solution will provide, ranging from basic file sharing to fully interchangeable, integrated and functionally identical patient records.

Suggest that the Contractor conduct an annual Interoperability Self-Assessment against current and future standards that shall be specified by the VA; and

- The contract language should include the following elements:
  - performance measures to hold Cerner accountable for reducing the administrative burden in clinician workflow with the objective of increasing efficiency,
  - ability for bulk data export based on standards, with no proprietary formats (e.g., Flat FHIR [Fast Healthcare Interoperability Resources]), and
  - "push" capability to insert patient data back into the VA EHR / Cerner database.

For the second category (leverage current and future standards), the following specific recommendations were among the most important:

- Require that Cerner implement all standards as defined by VA, current and future,
- Engage Cerner as an advocate of the VA and DoD position in all relevant standards-making bodies, and
- Ensure that VA and Veterans have complete access to data.

For the third category (commit to open, standards-based APIs), the Panel voiced the following recommendations:

- Establish clear publishing and access service requirements,
- Provide a VA application platform that supports APIs from third party providers with no barrier to entry, and
- Require implementation of clinical decision support (CDS) Hooks to invoke decision support from within a clinician's EHR workflow.

The body of this report contains multiple additional specific recommendations.

## II. Recommendations for RFP Changes

MITRE engaged Morrison & Foerster, LLP as the independent and unbiased legal expert to identify the specific changes to the RFP language necessary to implement the recommendations from the Interoperability Review Panel. Appendix C presents all recommended changes to the RFP.

## III. Observations from University of Pittsburgh Medical Center Site Visit

A delegation from VA and MITRE traveled to Pittsburgh, Pennsylvania, on January 19, 2018, for a meeting with representatives from University of Pittsburgh Medical Center (UPMC) Enterprises to discuss aspects of EHR interoperability that UPMC has successfully implemented over the past several years. The report includes an overview of those practices.

## IV. Closing Thoughts and Suggested Next Steps

The Panelists noted that VA cannot achieve true future EHR interoperability through the Cerner RFP alone, or through technology alone. The state of practice today shares only a small portion of available patient data. For VA to succeed in the future, multiple other components must be present and aligned: innovation, policy, standards, customer buy-in, and legislation, to name a few.

The following next steps are recommended for VA consideration:

1. Complete the RFP revisions, conduct appropriate negotiations with the Contractor expeditiously, and complete the contract process as planned. Stand firm during negotiations to maximize ease of access to data and data models for building third party APIs, applications, and services for future community innovations.
2. Continue to work with other federal government agencies and departments with similar interoperability interests and concerns, including, but not limited to, the White House, DoD, Food and Drug Administration (FDA), Centers for Medicare and Medicaid Services (CMS), Office of the National Coordinator for Health Information Technology (ONC), and other parts of the Department of Health and Human Services, to align approaches to EHR interoperability and the development and support of standards government-wide.
3. Support future innovation approaches, including concepts such as an Interoperability Laboratory and outreach to the broader innovation ecosystem (major medical centers, academia, traditional and non-traditional healthcare providers, startups, individual entrepreneurs, others). It is critical to align the innovations planned in VA's Digital Veterans Platform to the VA EHR innovation efforts to ensure consistent continuous improvements to clinician and Veteran health experiences.
4. Create an External Review Panel to provide expert continuous guidance, review, and feedback over the course of the implementation, to help capture best practices from the expert community going forward. Conduct ongoing demonstrations of end-to-end Veteran use cases requiring data sharing across organizational boundaries to validate improvements in Veteran healthcare and reduction of burden for healthcare providers. VA and Contractor will ensure that Federal Advisory Committee Act (FACA) guidelines are followed in leveraging any external review panels.

# Table of Contents

Background....1
I. Interoperability Review Panel....2
Introduction....2
Goal....2
Methodology/Approach....2
Topic Area: VA Definition of Interoperability....3
Topic Area: Commit to Full VA-DoD Interoperability....4
Topic Area: Leverage Current and Future Standards....6
Topic Area: Commit to Open, Standards-Based APIs....7
Topic Area: Use Community Care Contracts to Foster Interoperability....9
Topic Area: Additional Contract Changes....11
II. Recommendations for RFP Changes....12
III. Observations from University of Pennsylvania Medical Center Site Visit....13
IV. Closing Thoughts and Suggested Next Steps....16
Appendix A: Interoperability Review Forum Participants....17
Appendix B: RFP Language for Purchasing Extensible Health IT....19
Appendix C: Recommended RFP Interoperability Language Changes....22
Appendix D: Acronyms....42

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## Background

The Department of Veterans Affairs (VA) plans to establish seamless care for Veterans throughout the health care provider market. Seamless care requires interoperability between the Department of Defense (DoD), VA, VA affiliates, community partners, electronic health record (EHR) providers, healthcare providers, and vendors. VA directed The MITRE Corporation to independently review the capability of Cerner's proposed EHR solution to seamlessly transmit health records between EHR systems supporting healthcare providers who both use and contribute patient data to a Veteran's health record, to include Veterans Choice Program (VCP) community-care service providers and VA affiliates. This Review Report presents responses to three requests:

I. Conduct an external Interoperability Review Panel to review the interoperability language in the existing Request for Proposal (RFP),

II. Engage an independent and unbiased legal expert to identify the specific changes to the RFP language necessary to implement the recommendations from the Interoperability Review Panel, and

III. Visit the University of Pittsburgh Medical Center to understand the existing operational multi-vendor solution and interoperability solutions for applicability and scalability to VA.

# I. Interoperability Review Panel

## Introduction

In support of the Secretary of Veterans Affairs, David J. Shulkin, M.D., MITRE convened and hosted a VA Electronic Health Record Modernization (EHRM) Request for Proposal (RFP) Interoperability Review Panel on January 5, 2018, at MITRE's McLean, VA headquarters. MITRE invited external senior EHR interoperability subject matter experts (hereafter referred to as Panelists) to review the interoperability language in the existing RFP and to develop joint suggestions and recommendations for VA to consider incorporating into the RFP to support the successful execution of a new commercial EHR contract with industry. Eleven Panelists took part in person, and several senior government executives observed the process (see Appendix A for the full list of participants).

## Goal

The Interoperability Review Panel sought to provide Secretary Shulkin and his senior leadership team with insights into key best practices and guidance from national experts regarding EHR interoperability. The Panel evaluated the corresponding language in the draft RFP based on successful business transformations and implementations of a new commercial EHR system across a distributed hospital and provider network. This section of the report summarizes the outcome of the Panel: expert recommendations that will inform VA's interoperability contract language. The document also provides actionable and specific best practice recommendations and rationales to enable successful acquisition and implementation of EHR interoperability.

## Methodology/Approach

The first part of the session, which lasted for five hours, was conducted as a fish-bowl exercise and was guided by Chatham House Rule. The Panelists sat at a center table, with VA and other government observers sitting at surrounding tables. The second part, which lasted two hours, consisted of a summary debrief to the Secretary and senior VA leadership. The Secretary could ask questions and engage with the Panel throughout the second session. MITRE moderated the session to elicit inputs from all Panelists and to drive alignment toward consensus in the recommendations.

The agenda for the first portion of the session was structured to elicit inputs from all Panelists, with notes captured on-screen as redlines to the RFP interoperability language to ensure recommendations accurately reflected the Panelists' contributions. Subsequently, in a facilitated discussion, the Panelists grouped their recommendations into specific categories in real time. The second portion, as noted, provided opportunities for the Secretary to discuss the recommendations in additional detail.

This section of the report summarizes the discussion that took place. It highlights actionable changes to the interoperability language contained in the RFP and additional recommendations and lessons learned that can enable interoperability of the VA EHRM solution. Text boxes

throughout the report present direct quotations from Panelists. To ensure participant confidentiality, MITRE has destroyed the transcript and event recording used to develop this report.

## Topic Area: VA Definition of Interoperability

> *The key to modernization is creating greater interoperability with Governmental partners, including DoD, in a way that focuses efforts in support of the Veteran's journey, beginning with their military service. We will partner with others to ensure Veterans can get their benefits, care, and services consistently, easily, and with excellent customer service, no matter where they are throughout their lives. VA will work with local communities, and with other Federal, State, Tribal, and Local Government entities to ensure Veterans get what they need. VA will also continue to leverage the private sector where appropriate and needed to deliver the very best outcomes for Veterans.*
>
> – draft VA 2018–2024 Strategic Plan

### Enable data sharing, interoperability, and agility through data standardization

VA needs to allow data sharing among various business applications, such as appointment scheduling and business intelligence, as well as ensure transportability of information between sites. Panelists advised VA to leverage and support the best-in-class innovation currently in use within the VA culture. VA must also enable interoperability as the Department integrates the EHR into other supporting systems, both within the VA network and with external health service providers. Agility is necessary for adoption of future innovative technologies and/or if VA wants to upgrade or change the EHR approach. The Panelists cautioned that the current EHR technology is already 20 years old and, as with all industries and information technology (IT) solutions, many possibly disruptive technologies exist on the horizon.

> "It really optimizes transportability of best practices, because if you are trying to transfer best practices from one site to another and you have the same system where the best practice is going to land, then it is much easier."

The session began with a discussion on interoperability as currently defined by VA (Figure 1). Prior to establishing a roadmap to inform a nationwide plan to advance health data interoperability, VA must first ensure system-wide interoperability across the Department. Throughout the Review Panel session, the Panelists described and referred to this concept as "Level 1 Interoperability" throughout the Review Panel session; it includes migration of Veteran data from ~130 instances of the Veterans Health Information Systems and Technology Architecture (VistA) to one VA platform.

**Figure 1. VA Definition of EHR Interoperability**

"Level 2 Interoperability," as described in the Panel discussion, addresses the ability for VA to leverage the same Cerner platform used by DoD to ensure seamless care from active service to Veteran status. Once this capability is implemented, the clinical data transformation will allow a true longitudinal view of a Veteran's record as he or she transitions from DoD to VA for care and other critical services such as benefit adjudication.

"Level 3 Interoperability" will allow both VA and DoD to take an important step toward transforming electronic patient data exchange on a national scale. With the utilization of community healthcare providers via the VA Community of Care initiative and DoD's Tricare network providers, VA has the opportunity to drive interoperability between DoD and VA as well as with the extensive network of healthcare providers that serve our Nation's Veterans, active duty service members, and their beneficiaries.

True nationwide EHR interoperability for the entire United States is the ultimate goal, and the Panelists agreed that VA and DoD could reach this goal if the three aforementioned levels of interoperability are achieved. Here, VA has the opportunity to drive clinical transformation and instantiation of a complete EHR for all patients at the national level.

## Topic Area: Commit to Full VA-DoD Interoperability

The Panel focused primarily on reviewing the interoperability language within the RFP for the Cerner contract. However as described in Interoperability Levels 1 and 2, the commitment to the seamless integration of VA and DoD health data represents the foundation required to realize interoperability with private sector

> "You really have to get the basics done first. Let's just make absolutely sure that the interoperability between DoD and VA [is achieved]."

healthcare providers.[1] It is important to note that the interoperability levels can be addressed simultaneously and should not be separated, as they must be integrated to efficiently achieve the larger future data sharing ecosystem.

## Specify the expectations for interoperability between DoD and VA

During discussions about the expectation that Cerner will provide a single EHR solution to be shared by both DoD and VA, the Panel raised concerns about the lack of specificity in the contract language. Current interoperability data standards address a subset of the Veteran's clinical record and VA has the opportunity to ensure Cerner provides interoperability of all discrete data, at a minimum, between VA and DoD. Adopting the same platform would increase seamless sharing, but the Panel stated that VA should take additional action to ensure that such sharing is realized. The DoD and VA systems should use proprietary database-to-database interoperability if necessary, to maximize interoperability between those two systems. These systems should be configured to meet the distinct needs of each while being connected to each other in a native database-to-database method as necessary, leveraging open interoperability standards wherever possible. As a result, clinicians should experience no differences when they move from a VA system to a DoD system. These data should also be computable, or be made computable according to a specific schedule. VA should consider adding language to the RFP that specifically defines the degree of interoperability the solution will provide, ranging from basic file sharing to fully interchangeable, integrated and functionally identical patient records.

The Panelists also stated that, for VA and DoD collectively, the contractual language should include the following requirements:

- Performance measures to hold Cerner accountable for reducing the administrative burden in clinician workflow with the objective of increasing efficiency
- Capability for bulk data export based on standards, with no proprietary formats (e.g., Flat FHIR [Fast Healthcare Interoperability Resources])
- "Push" capability to insert new patient data back into the VA EHR / Cerner database.

## Pivot the RFP to be Veteran-centric and not system-centric

The Panelists discussed the impact of EHR implementations on clinician workflow, describing the issue as one of approaching the implementation as an IT system implementation rather than the preferred Veteran- or clinician-centric implementation. The current RFP appears to be written in a system-centric way rather than leveraging use-cases to describe the Veteran or clinician experience or workflow to characterize the requirement. The Panelists recommended that VA incorporate use-cases to characterize requirements and amend the RFP language to emphasize the Veteran-centric objectives. In addition, Panelists noted that VA should recognize that EHRs do not currently maximize efficient clinical workflow, and that VA specify that the

[1] Healthcare providers is used to refer to community based physicians/specialist and hospitals.

solution present clinicians with relevant information where needed with a minimum number of "clicks to find."

## Topic Area: Leverage Current and Future Standards

The integrated EHR platform that DoD and VA are implementing provides the opportunity to significantly influence interoperability standards across the healthcare community, addressing gaps and competition among current standards. The Panel recognized that commercial health systems and technologies would realize only limited business value from making data portable between them, but this would lower the barrier to patient movement among healthcare providers.

### Engage Cerner as an advocate of the VA and DoD position in all relevant standards-making bodies

The Panel recommended increased VA presence and leadership in national health IT standards-making activities, in coordination with the DoD. Additionally, VA should encourage Cerner to serve as an active advocate of the VA-DoD position and to participate actively in the development and/or evaluation of new standards, policy directives, operating procedures, processes, etc. As an integrated voting bloc, VA, DoD, and Cerner will have the potential to act as a strong driver of national standards. Panelists understood that VA is not currently active in the FHIR community or in the Health Level Seven International (HL7) Argonaut Project.

In addition, Panelists identified a need for standards to exchange patient-reported outcome data for integration into the clinician's workflow. The current RFP language seemingly puts the burden on Cerner for the development of standards, and the Panel recommended that VA take a more active position. This will ensure that VA will participate and drive implementation when standards mature. Where standards are immature, VA must participate in efforts to accelerate standardization.

### Require Cerner to implement all standards as defined by VA, current and future

Because it is unclear where health IT is heading in five years, the Panel strongly suggested VA include contract language to address possible future advancements in the form of standards as defined by VA. At a minimum, VA should seek maximum interoperability with community care organizations, using open interoperability standards wherever possible. This flexibility would ensure that VA does not rely on external stakeholders to determine the standards that VA would be required to accept. The Panel recommended that VA pay particular attention to specific categories of standards: real-time data read/write by care providers and Veterans; interoperability tools; seamless DoD and VA vision records; and principles for data normalization and structure. The Panel also recognized Cerner's influence in ensuring that the CommonWell network interoperates at the highest possible levels with other networks including CareQuality—an influence that VA should continue to promote.

### VA must own its data; clear ownership and access are critical to success now and in the future

The Panel highlighted an important recommendation regarding data rights that was discussed in the prior VA EHRM Listening Forum on September 7, 2017. The Panel recommended that VA define who has what rights from the perspectives of data ownership, access, and sharing (e.g., VA owns the data and all data products vs. community care providers own the patient data vs. each Veteran owns all of his or her data). Determining the authoritative data source for the various elements of a Veteran's health record is an important Veteran-centric component of interoperability, the longitudinal record, and seamless access to data.

> "So, what you need is clear access and clear ownership of your information…you need to have absolutely, undisputed, clear ownership and ability to move the data to any place you want to use it and use it in any way you want to use it when you get there. And not have them [Cerner] be able to say no, that's our data or hinder you in any way or have an unreasonable charge to get it."

VA should define an enterprise-wide policy for all VA data. A suitable policy would include, but not be limited to, EHRM-specific data, and should be issued by the VA Central Office (VACO) or Veterans Health Administration (VHA). VA must have clear ownership of and access to all the information in the EHR and be able to move that information (into new systems or among systems) as needed, now and in the future. Owning the data ensures that it is available regardless of vendor or system. VA must include this in the Cerner contract. Technology innovations occur rapidly in the 21st century, and VA must have full ability to move its data to future systems.

Panelists also recommended that VA publish its data model, for instance to the National Library of Medicine, to further promote commercial interoperability investments. Lastly, Panelists encouraged VA to leverage its investment in the Open Source Electronic Health Record Alliance (OSEHRA) by providing seed money to develop open source connectors between Cerner and Epic, which would encourage other vendors to join in the effort.

## Topic Area: Commit to Open, Standards-Based APIs

A significant technology enabler of seamless interoperability among the community of Veteran healthcare providers is the use of Application Programming Interfaces (APIs). These software intermediaries allow disparate EHR applications to communicate with each other and exchange data using standard, defined forms. The Panel emphasized the need for VA to create an environment that would minimize additional costs to community providers in order to interoperate with VA. VA can accomplish this by requiring the new EHR system to expose APIs that support bi-directional data transactions. The Panel further recommended that VA make a commitment to open, standards-based APIs, including the SMART on FHIR/Argonaut APIs, to facilitate the ready and efficient exchange of data with partners providing care in the community and to support open clinical workflow.

## Establish clear publishing and access service requirements

The Panel recognized that data access requirements differ depending on who provides or accesses that data. Therefore, the Panel recommended that VA be more specific in defining each level of data publishing and access service that is specific to (1) Veteran access (e.g., use of vets.gov); (2) VA clinician access; (3) partner access; and (4) Health Information Exchange (HIE) access. The RFP should include a clear description of identity and access management requirements, including user population types and the association of specific application permissions with particular roles/positions.

> "The Contractor should provide all of the data that is currently being provided in the Contractor's patient portal to the consumer via an open standards-based API gateway. The Contractor should also provide all of the reporting data required by federal law to the Veteran via an open standards based API framework, accessible via any application or third-party data store of the Veteran's choice, that's number one."

Machine-to-machine access is also critical for efficient sharing of information. The Panel recommended that VA ensure that all significant data stored in the software be accessible through APIs with no requirement for creation of custom applications to specifically access VA data. From a forward-looking perspective, VA should require that the EHR system support the ability to access data elements using open standards-based interfaces, and include the ability to interface with legacy data, patient-generated data, and third-party data that resides outside the EHR system. In addition, Cerner should provide the required utility services to support intermediary or peer-to-peer services (e.g., support Veteran-directed or Veteran-mediated requests, data exchange, and ingestion of data from non-VA providers).

## Provide a VA application platform that supports APIs from third-party providers with no barrier to entry

Currently vets.gov serves as a portal to Veteran services. The Panel recommended that VA consider using such a portal to connect any third-party application to the EHR solution without requiring fees or vendor permissions. VA should have full authority to connect any third-party application through one of the standard open APIs conformant with the vendor's API without pre-registering the application with the vendor. This is a very important authority to have in terms of the ability to innovate rapidly, without constraints.

> "The API Gateway document is awesome … world class and future looking."

The Panelists also reviewed the proposed VA "API Gateway" language provided during the API discussion to anchor the dialogue and concurred that this requirement is fundamental to supporting interoperability. The Panel strongly endorsed the "API Gateway" language. Specifically, the Panelists recommended that VA include a requirement that VA have full authority to connect any third-party application to the Cerner system without requiring prior approval by Cerner. Furthermore, VA should ensure that developers of third-party applications connecting to the VA system via the open standard and VA-defined APIs continue to own their

intellectual property (IP). From a usability perspective, the Panel also recommended that VA be able to establish the connectivity business rules, such as the ability for applications to remain connected for a reasonable time frame (e.g., 1 year) and to receive automatic notification about patient information updates.

### Require implementation of Clinical Decision Service (CDS) Hooks to invoke decision support from within a clinician's EHR workflow

EHRs are essential to efficient delivery of high-quality care, as they provide the clinician with essential decision data at the time required. However, current EHR systems approach workflow from an IT system perspective rather than a clinician's perspective. The latter workflow should, of course, be paramount in the VA EHR implementation, and should also leverage a recent innovation called CDS Hooks. This technology provides the clinician with context-driven decision support and capability by enabling the EHR to trigger third-party services at key events that include ordering medication and opening a patient face sheet. For example, when the VA clinician begins to prescribe medication, a CDS Hook can call an external service that presents the clinician with the list of medications already prescribed to the patient by clinicians outside VA. The Panelists strongly recommended that VA require Cerner to implement and use CDS Hooks within the clinician workflow.

## Topic Area: Use Community Care Contracts to Foster Interoperability

The new EHR system must be able to communicate with other EHR systems (e.g., Epic, AllScripts, etc.) within the care community. It is critical that VA ensure the Cerner EHR system remain robust for future interoperability with new products. Cerner must commit itself to supporting other forms of interoperability, such as a presentation layer that is common to other systems (e.g., the App store model). The Panel recommended that prior to execution of the Community Care Act contract VA require third-party providers (and Cerner competitors) to commit to supporting the contract as early adopters.

> "Innovations going forward are going to come from multiple directions. And having those interfaces, and going with a general interoperability approach that doesn't fork off from what's happening in the rest of the healthcare system, will allow the Veterans to benefit from technology whether that's coming from Google, from a new company, from an innovative shop within VA -- you end up creating a market with good prices, high value."

### Veterans must be able to access and download a computable form of their health data

Panelists noted that access to data represents the biggest problem today. VA must clearly direct Cerner to expose data so it can be used by third parties. In the contract and in conversations with Cerner and third parties, VA must require specifics regarding how Veterans and providers will

access and share their data. In addition, VA must require that any agreements leave the door open for future standards and technologies.

Panelists believed that VA could achieve this by invoking the principle that the data belongs to the Veteran, rather than by citing specific technologies and standards (given how rapidly they are evolving). Veterans must be able to invoke their right of access to data to support data exchange across all providers (e.g., pull data through an API on their smartphone and push it to their community care provider), now and in the future. Keeping pace with this requirement will drive continual innovation by Cerner and all providers.

## VA must own the API layer

Cerner ownership of the API layer (across every customer) poses a real threat to achieving interoperability, speed of innovation, and cost efficiency throughout the network of community care providers. Panelists stated that it is of utmost importance that VA include specific language stipulating that VA and Veterans be able to use third-party applications without having to register them with Cerner. VA must control the API key, not Cerner.

Additionally, VA should require that Cerner provide access to MPages, a developer toolkit, and a programming interface that will enable innovators and third parties to develop APIs.

## Require that community care contracts include VA EHR standards to support bi-directional data sharing

Panelists agreed that requiring the support and collaboration of community care providers and participating actively in health IT standards bodies would give VA the opportunity to advance the "national" standard for data sharing—closing any gaps and inconsistencies among federal, industry, and inter-industry standards. VA must require every provider in the chain of a Veteran's care to support the same standards for data interoperability in order to ensure seamless, best possible care for Veterans. This includes the requirement that all providers and third-party applications, in exchange for using the VA-provided API gateway, provide bi-directional health information back to VA that can be used for context-driven clinical decisions and informatics.

## Change the data exchange consent model from "opt in" to "opt out"

To encourage seamless interoperability across all entities providing care to Veterans, the consent model for exchanging data between healthcare providers must be modified to follow an opt-out rather than an opt-in policy, which limits participant numbers. This would allow Veterans to invoke their individual right of access under the Health Information Portability and Accountability Act (HIPAA) to move their data as needed. Many states have already adopted an opt-out consent policy as part of their HIE.[2] VA can achieve this by aligning its policy to an opt-

[2] See https://www.healthit.gov/sites/default/files/State%20HIE%20Opt-In%20vs%20Opt-Out%20Policy%20Research_09-30-16_Final.pdf

out model, supported by the new VA proposed rule[3] to allow HIEs to collect a Veteran's consent and electronically attest to the consent to VA in order to obtain the required EHR.

## Topic Area: Additional Contract Changes

In addition to the recommendations in the prior sections, the Panelists encouraged VA to add further definitions and clarity in the following areas:

- Require Cerner to provide VA with full read and partial write access to all data elements within the EHR, at VA's sole discretion.
- Require Cerner to make the VA data model, standards, and other similar interoperability changes available in all other non-VA Cerner instances of its EHR platform.
- Clearly define "enabling security framework" so that users know if this means a specific security framework such as those provided by the National Institute of Standards and Technology (NIST), HITRUST, etc.
- Amend "national Common Trust Framework" to specifically refer to the intended source. The Panelists suggested that VA replace this wording with "Trusted Exchange Framework and Common Agreement (TEFCA)" as specified in the 21st Century Cures Act.
- Amend RFP Performance Work Statement (PWS) Section 5.10.4(i) to clarify if the "provider collaboration via secure e-mail using Direct standards" is limited to the Direct protocols and just the Cerner platform.
- Incorporate the model RFP language necessary for Cerner to support the API and SMART on FHIR platform and SMART-enabled applications, as described in Appendix B.

[3] See https://s3.amazonaws.com/public-inspection.federalregister.gov/2018-00758.pdf

# II. Recommendations for RFP Changes

MITRE engaged Morrison & Foerster, LLP, as the independent and unbiased legal expert to identify the specific changes to the RFP language necessary to implement the recommendations made by the Interoperability Review Panel. MITRE provided Morrison & Foerster, LLP, with the summary recommendations and a copy of the RFP.[4] In addition, MITRE collected specific ideas for contract language from the Panel. Appendix C presents all recommended RFP changes.

[4] *Performance Work Statement for the VA Electronic Health Record Modernization System*, Final Version 1.7, Amendment 03, December 4, 2017, Department of Veterans Affairs. File name: 001 - VA EHRM IDIQ PWS (Amended 12.04.2017) - Copy.docx

# III. Observations from University of Pennsylvania Medical Center Site Visit

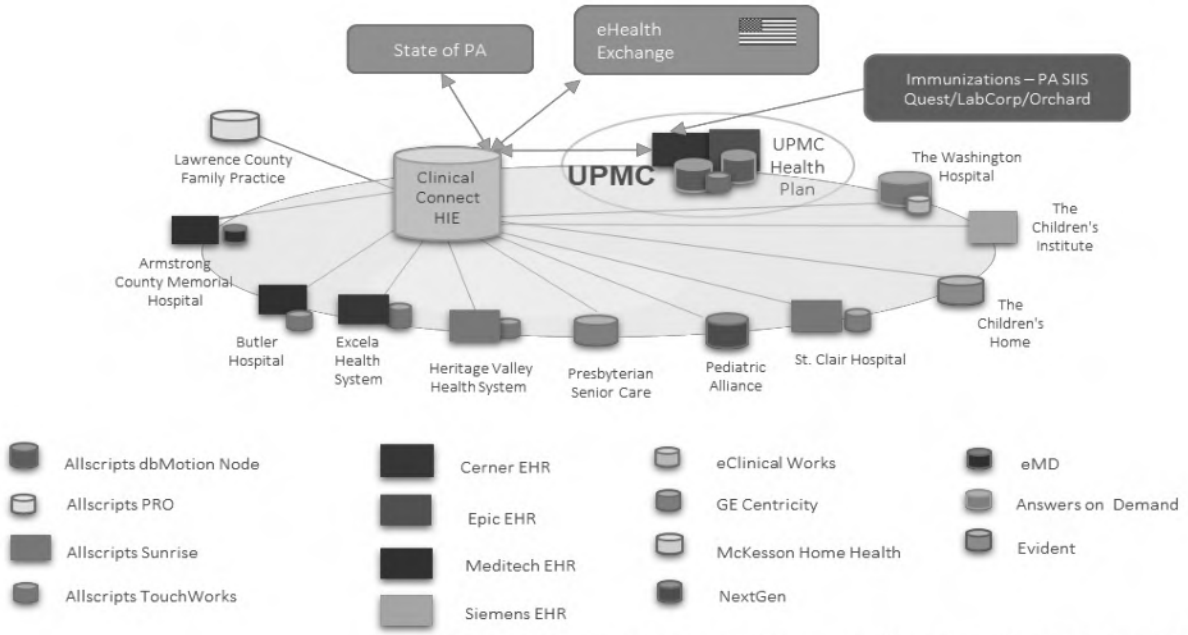
A delegation from VA and MITRE traveled to Pittsburgh, Pennsylvania, on January 19, 2018, for a meeting with representatives of UPMC Enterprises to discuss aspects of EHR interoperability that UPMC has successfully implemented over the past several years. The VA team, led by John Windom, included Dr. Ashwini Zenooz, (b)(6) John Short, and (b)(6) The MITRE group included Richard Byrne, Jay Schnitzer, (b)(6) (b)(6) and (b)(6) The hosts at UPMC included Dr. Rasu Shrestha, C. Talbot Heppenstall, Jr., Ed McAllister, Dr. Robert Bart, Adam Berger, Diane Michalec, Phyllis Szymanski, and Dr. Amy Urban, as well as additional staff.

The meeting was broken into four parts. Following introductions, Session 1 described the structure of UPMC. Session 2 covered UPMC's last decade of interoperability, and Session 3 centered on the road ahead for UPMC and industry.

Dr. Rasu Shrestha began the meeting by making the introductions and setting the agenda. He stated that UPMC's approach had followed a best-of-breed strategy, as opposed to a best-of-suite strategy, with the intention of failing fast and succeeding often. The overall UPMC structure has four parts: provider services, insurance services, international activities, and enterprises.

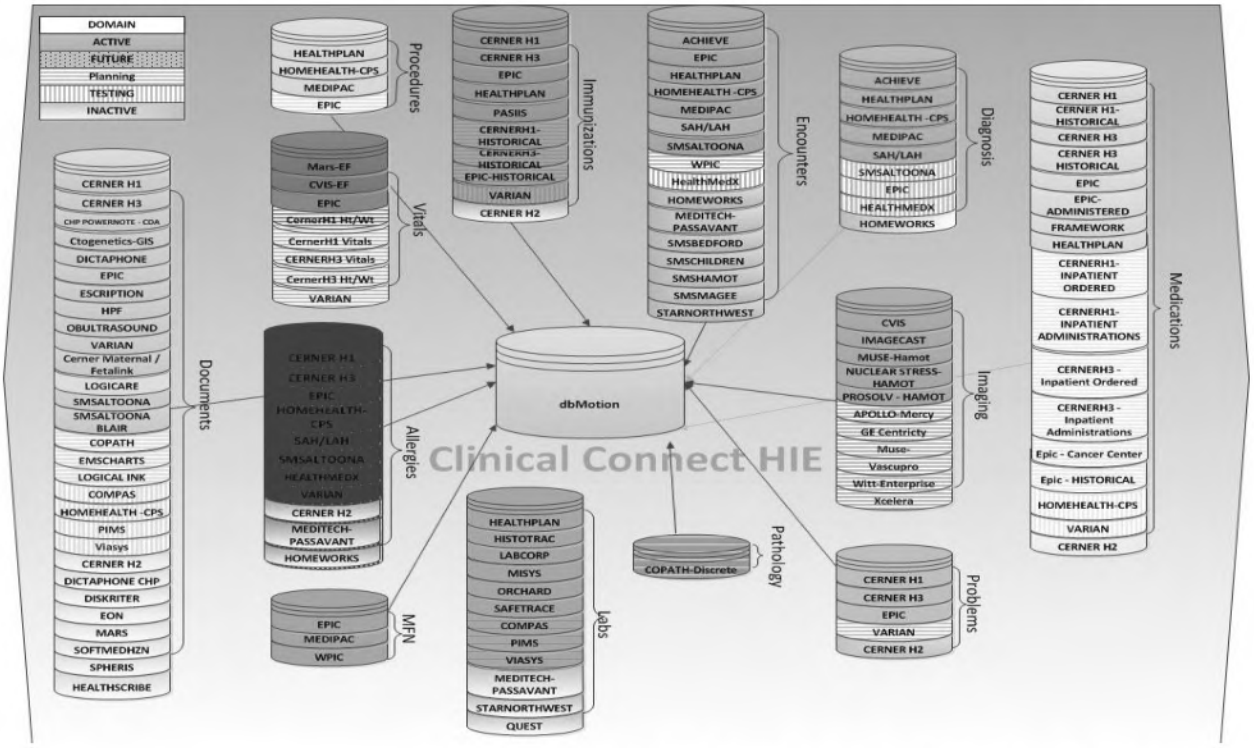
During the discussion of interoperability, the UPMC team described its approach to interoperability, called Connected Healthcare, which is based on the commercial product dbMotion of AllScripts. UPMC has created an entity titled ClinicalConnect HIE (CCHIE) that uses HL7. ClinicalConnect exists as a separate 501c(3) company, of which UPMC is a member. CCHIE contains 90 live interfaces. This HIE went live in June 2012; its members consist of 10 hospitals. It competes with three other HIEs in Pennsylvania. The repository contains data on 8.3 million patients, and, in terms of patient consent, CCHIE uses an opt-out model. It currently has connections to four EHRs: Cerner (two versions), Epic, and Varian. Data available within CCHIE spans allergies, clinical documents, diagnosis, encounters, immunizations, labs, medications, problems, and procedures. Much of this data is in the form of documents (Continuity of Care Document (HITSP C32 CCD format, including problems, allergies, and medications); unstructured clinical documents (HITSP C62 format); Consolidated Clinical Document Architecture (C-CDA CCD, including problems, allergies, medications, immunizations, procedures, and insurance); and HL7 Interface (ADT: encounters, documents, imaging documents, and labs only).

At the point of care dbMotion allows multiple views for the CCHIE: 1) a clinical view, 2) a newer view titled EHR agent, and 3) a Cerner MPage integration view. The next phase of the UPMC work in this regard will consist of integration with CommonWell. Figure 2 shows the architecture of the system. Figure 3 depicts the data feeds.




Source: From UPMC Enterprises, used with permission, for VA use only

**Figure 2. ClinicalConnect (Western Pennsylvania) Health Information Exchange**




Source: From UPMC Enterprises, used with permission, for VA use only

**Figure 3. Interoperability Data Integration**

**ACQUISITION SENSITIVE**

**Confidential and Proprietary**

**For Department of Veterans Affairs Use Only**

When asked whether UPMC, or anyone else in the country, has a point-to-point Cerner-to-Epic interoperability solution that does not use an HIE, UPMC representatives responded "No." Furthermore, UPMC representatives noted that about 10 percent of the total available individual patient data is currently transferred with UPMC's interoperability system. This is complicated by an ongoing data explosion that doubles the amount of data in UPMC's system about every 18 months.

Following the presentations and lunch, MITRE Chief Technology Officer Jay Schnitzer saw a live demonstration of CCHIE by Dr. Amy Urban and Dr. Rasu Shrestha. The live demonstration confirmed that all of the documents listed above are visible with equal fidelity and a very similar format from both the UPMC end and the community provider end and perspective. The system requires clinicians to know and understand where documents can be found, and sometimes requires multiple mouse clicks, but all documents can be accessed from the same EHR entry page with one single log in. Additionally, some data elements, including vital signs and labs, can be viewed in the form of graphs as a function of time, including data elements from multiple sources.

# IV. Closing Thoughts and Suggested Next Steps

The Panelists noted that VA cannot achieve true future EHR interoperability through the Cerner RFP alone, or through technology alone. The state of practice today shares only a small portion of available patient data. For VA to succeed in the future, multiple other components must be present and aligned: innovation, policy, standards, customer buy-in, and legislation, to name a few.

The following next steps are recommended for VA consideration:

1. Complete the RFP revisions, conduct appropriate negotiations with the Contractor expeditiously, and complete the Contract process as planned. Stand firm during negotiations to maximize ease of access to data and data models for building third-party APIs, applications, and services for future community innovations.
2. Work with other federal government agencies and departments with similar interoperability interests and concerns, including, but not limited to, the White House, DoD, Food and Drug Administration (FDA), Centers for Medicare and Medicaid Services (CMS), Office of the National Coordinator for Health Information Technology (ONC), and other parts of the Department of Health and Human Services, to align approaches to EHR interoperability and the development and support of standards government-wide.
3. Support future innovation approaches, including concepts such as an Interoperability Laboratory and outreach to the broader innovation ecosystem (major medical centers, academia, traditional and non-traditional healthcare providers, startups, individual entrepreneurs, others). It is critical to align the innovations planned in VA's Digital Veterans Platform to the VA EHR innovation efforts to ensure consistent, continuous improvements to clinician and Veteran health experiences.
4. Create an External Review Panel to provide continuous expert guidance, review, and feedback over the course of the implementation and help capture best practices from the expert community going forward. Conduct ongoing demonstrations of end-to-end Veteran use cases that require data sharing across organizational boundaries to validate improvements in Veteran healthcare and reduce burdens on healthcare providers. VA and Contractor will ensure that Federal Advisory Committee Act (FACA) guidelines are followed in leveraging any external review panels.

# Appendix A: Interoperability Review Forum Participants

| Panelists | Title | Organization |
|---|---|---|
| Aneesh Chopra | President | CareJourney, former United States Chief Technology Officer |
| Charles E. (Chuck) Christian | Vice President, Technology and Engagement | Indiana Health Information Exchange |
| Ryan Howells | Principal | Leavitt Partners, LLC |
| Andrew Karson, MD | Director, Clinical Decision Support | Massachusetts General Hospital |
| Chris Klomp | Chief Executive Officer | Collective Medical Technologies, Inc. |
| Kenneth Mandl, MD | Professor, Biomedical Informatics<br>Director, Computational Health Informatics | Harvard Medical School<br>Boston Children's Hospital |
| Frank Opelka, MD | Medical Director, Quality and Health Policy | American College of Surgeons |
| Peter Pronovost, MD, PhD | Director, Armstrong Institute for Patient Safety and Quality<br>Senior Vice President, Patient Safety and Quality | Johns Hopkins University |
| Christopher J. (Cris) Ross | Chief Information Officer | The Mayo Clinic |
| Carla Smith | Executive Vice President | The Healthcare Information and Management Systems Society |
| Paul R. Sutton, MD, PhD | Professor, Biomedical Informatics and Medical Education<br>Associate Medical Director, Inpatient IT Systems, UW Medicine IT Services | University of Washington |

| VA Participants | Title | Organization |
|---|---|---|
| David J. Shulkin, M.D. | Secretary | Department of Veterans Affairs |
| Carolyn Clancy | Executive in Charge, Veterans Health Administration | Department of Veterans Affairs |
| Bill James | Acting Assistant Secretary, Office of Information & Technology | Department of Veterans Affairs |
| John Windom | Program Executive for EHRM and Special Advisor to the Under Secretary for Health | Department of Veterans Affairs |
| Dr. Ashwini Zenooz | Chief Medical Officer, EHRM; Deputy, Office of Deputy Under Secretary for Health Policy & Services, VHA | Department of Veterans Affairs |
| John Short | Chief Technology Officer, EHRM; Executive Director of Information Technology System Modernization | Department of Veterans Affairs |
| (b)(6) | Portfolio Lead: Project Transition and VA Integration, VA Center for Innovation | Department of Veterans Affairs |
| Camilo Sandoval | Senior White House Advisor, VHA | Department of Veterans Affairs |
| (b)(6) | Senior Advisor to the Secretary on Strategic Partnerships | Department of Veterans Affairs |
| (b)(6) | Contracts | Department of Veterans Affairs |
| Kyle Sheetz | White House Fellow | Department of Veterans Affairs |

| Other Federal Government Participants | Title | Organization |
|---|---|---|
| (b)(6) | Senior Advisor, Office of Administration | The Centers for Medicare & Medicaid Services |
| Chris Liddell | Assistant to the President for Strategic Initiatives | The White House, Office of American Innovation |
| Bruce Moskowitz, M.D. | Internist | External Expert Participant |
| Shannon Sartan | Director, Digital Services | The Centers for Medicare & Medicaid Services |
| Dr. Lauren Thompson | Director | DoD/VA Interagency Program Office |
| Jon White | Deputy National Coordinator for Mental Health | The United States Department of Health and Human Services/The Office of the National Coordinator for Health Information Technology |

# Appendix B: RFP Language for Purchasing Extensible Health IT

From https://smarthealthit.org/2017/08/draft-model-rfp-language-for-purchasing-extensible-health-it/, as of January 15, 2018.

SMART Platform (www.smarthealthit.org) is a project that lays the groundwork for a more flexible approach to sourcing health information technology tools. Like Apple and Android's app stores, SMART provides the means for developers to create and for health systems and providers to easily deploy third-party applications in tandem with their existing electronic health record, data warehouse, or health information exchange platforms.

To deploy SMART-enabled applications, health systems must ensure that their existing health information technology infrastructure supports the SMART on FHIR API. The SMART on FHIR starter set detailed below lists the minimum requirements for supporting the API and SMART-enabled applications. You may wish to augment this list of minimum requirements with suggestions from the Add-On Functionality listed depending on the types of applications your organization wishes to deploy.

This document is intended as a resource for providers and health systems as they draft Request for Proposals (RFPs) and negotiate with their HIT vendors for added functionality. It has multiple authors from across the SMART team and its advisors. Feedback is welcome.

The vendor must support the SMART on FHIR platform, a vendor agnostic API that allows third-party developers to build external apps and services that integrate with the vended product.

At a minimum, the vendor product should include the following components in order to support SMART on FHIR and SMART-enabled applications:

## Data Access

- Provide automated, standards-based, read-only access through the FHIR API and FHIR data models (resources) to:
  - a well-defined set of real-time discrete data (including support for the API parameters and resources described in the Argonaut Implementation Guide)
  - free-text clinical notes

## Data Manipulation

- Write structured data from third-party apps back to the organization's EHR and, where relevant, a data warehouse, using the FHIR REST API to communicate data including:
  - free-text clinical notes

## Standards-Based App Authorization

- Protect data and identity endpoints with standards-based authorization mechanisms (including the OAuth2 profiles described in the Argonaut Implementation Guide).
- Provide access to data endpoints with an approach that does not require user intervention subsequent to the initial setup such as the method described in the draft SMART Backend Services Profile (http://docs.smarthealthit.org/authorization/backend-services/) Provide capability to restrict this access to a specified set of patients (roster).
- Enable Health System to connect any third-party app of their choice that is conformant with the API without pre-registering the app with HIT Vendor.
- Enable patients to connect any third-party app of their choice that is conformant with the API without pre-registering the app with HIT Vendor through the OAuth Dynamic Registration protocol.
- Provide OAuth refresh tokens with a duration of one year to patient and provider facing apps that support the SMART Client Secret profile.

## Identity Management

- Act as a standards-based Identity Provider using OpenID Connect. This ensures that users can authenticate to plug-in apps using single-sign-in via their existing EHR or patient portal credentials.
- Act as a standards-based relying party to a customer-selected Identity Provider using OpenID Connect. This ensures that users can sign into the EHR or patient portal using an external, hospital-supplied single-sign-on account.

## Workflow

- Support standards-based embedding of external application UI (HTML5). This ensures that app developers can build Web apps, and these apps can run directly inside of the EHR.
- Support the launch of external applications in the clinician's workflow (this is not limited to the EHR and should include non-EHR integrated tools such as smart phones and tablets). For example, a clinician that has opted to use a third-party-developed native iPad app to visualize a patient's BMI over time can seamlessly use the application alongside the EHR via single-sign-on.
- Support notifications to and from running applications. For example, an embedded app can notify the EHR when the user is "done" with it.

## Add-On Functionality

The provider organization may also want to consider the following additions to its RFP depending on the types of applications it wishes to develop and run in the future.

### Bulk Data Export

- Provide automated access to bulk export of data (complete representation of all data in the MU Common Clinical data set as well as free text notes) using a method like the SMART Flat FHIR draft proposal (http://docs.smarthealthit.org/flat-fhir)

### Data Manipulation

- Write structured data from third-party apps back to the organization's EHR and, where relevant, a data warehouse, using the FHIR REST API to communicate data including:
  - medication prescriptions
  - lab and diagnostic imaging orders
- Support the dependent transactions necessary to ensure that actions completed by third-party applications using the API are valid in the EHR and data warehouse.

### Context-Specific Service Hooks

- Support the ability to call an external standards-based service in specific workflow steps, through the CDS Hooks specification, including:
  - opening a patient record
  - new prescriptions
  - new lab orders
  - new imaging studies

### Intellectual Property

The IP of any app integrated through the SMART on FHIR API belongs to the author and not the vendor.

## Custom SMART on FHIR Extension to a Proprietary API

Should a vendor neglect to provide SMART on FHIR natively, the client has the right to provide a custom extension to the vendor's API. The ownership of the IP for the custom extension is negotiable between the client and the vendor, but the ownership of the app using the custom extension belongs to its author.

# Appendix C: Recommended RFP Interoperability Language Changes

The table below captures the recommended changes to the VA EHRM RFP.

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| **Commit to Full VA-DoD Interoperability** | | | | |
| 1 | Define specific capability performance requirement and mechanisms to hold Cerner accountable for reducing the administrative burden in clinician workflow with the objective of increasing efficiency. | The IDIQ RFP PWS Section 5.1.11 speaks to overall EHRM value and performance management monitoring, measurement and reporting. Performance metrics will be defined and enforced at the task order level, since, for example, hosting metrics will be significantly different from deployment metrics.<br><br>The RFP Section 8.6 refers to the use of Quality Assurance Surveillance Plans (QASP), which will include Functional and Non-Functional Key Performance Indicators (KPIs). The QASP will evolve as the EHRM solution and technology matures and is intended to establish Contractor accountability to what VA requires and values. | None. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 2 | Define specifically the *span* of providers who can properly interface with VA under a proposed solution (the number of community providers who would be able to interface with VA under a solution as a function of cost to the provider). | RFP Section 5.2.1(j) states that "The EHRM solution shall support access via tablet or mobile device as adjudicated by joint governance. Platform specifics will be identified by VA at a TO level."<br><br>Section 5.10.4 states that "The Contractor is required to collaborate with VA affiliates, community partners, EHR providers, healthcare providers, and vendors to advance seamless care throughout the healthcare market." | Suggest amending the language in RFP Section 5.2.1(j) to: "Support broad access via tablet or mobile devices and pursue technology to reduce the burden to the clinicians (e.g., providing third-party provide access to information using light-weight portals and support for future generation mobile devices). Platform specifics shall be adjudicated by joint governance and incorporated by VA at a TO level." | Concur. Will negotiate with Cerner for inclusion of language. |
| 3 | Define the *degree* of interoperability the solution provides (ranging from basic file sharing to fully interchangeable, integrated and functionally identical patient records). | RFP Section 5.10.4 speaks to interoperability and provides sufficient breadth to introduce any additional information exchange requirements in the future, at the sole discretion of VA.<br><br>Requirements Traceability Matrix (RTM) VA-FR-31 discusses specifics of data management, types of data to be exchanged, and methods of communication. | Suggest adding to RFP Section 5.10.5: "m) The Contractor shall conduct an annual Interoperability Self-Assessment against standards that shall be specified by VA, such as those promulgated by HIMSS or future standards to be identified by VA." | Concur. Will negotiate with Cerner for inclusion. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 4 | Pivot the RFP to be Veteran-centric and NOT system-centric. Be mindful that lessons learned are that many EHRs do not currently maximize efficient clinical workflow, so build that in (e.g., using CDS Hooks) and present information where needed with minimum "clicks to find" to reduce clinician burden. | RFP Section 5.2.1 speaks to the EHR application supporting workflows.<br><br>Section 5.5.1 Workflow development and normalization addresses configuration of workflows to meet VA requirements.<br><br>Section 5.5.7 Organizational Change Management discusses optimizing workflows for each clinical role.<br><br>Section 8.6 refers to the use of Quality Assurance Surveillance Plans (QASP) which provides active, continuous measurement against the extensive performance requirements captured in Appendices A-1 and A-2: EHRM Key Performance Indicators to ensure a Veteran-centric approach.<br><br>RTM section VA-FR-33 requires adoption, development and maintenance of metrics to assess timeliness and quality of healthcare delivery to the patient population.<br><br>The current RFP language can be clarified to specifically refer to the improvement on Veteran-centric delivery. | Suggest adding to RFP Section 5.5.1: "k) Provide an understanding of how all workflows will impact VA care coordination and management processes (e.g., incorporating community information) to improve Veteran-centric delivery."<br>Also add to Section 5.5.1: "l) Configure workflows to incorporate all community data at the discrete level in support of clinical decision support, care management, disease management. The clinical workflow within the EHR should not require users to visit additional screens to view externally sourced data."<br><br>See Item 29 for specific recommendations on CDS Hooks. | Concur. Will negotiate with Cerner for inclusion. |
| 5 | Require Cerner support end-to-end use cases with major external stakeholders involved. | RFP Section 5.2.1 speaks to the EHR application supporting workflows. The Contractor can only be held responsible for elements of the end-to-end use case that reside within their system. | Suggest adding to RFP Section 5.2.1: "Testing conducted under the Test and Evaluation Program Plan may include specific workflows to inform a demonstration of end-to-end clinical use cases involving external stakeholders." | Concur. Will negotiate with Cerner for inclusion. |

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|---|---|---|---|---|
| 6 | Develop detailed data flow requirements between Cerner and all other vendors, be specific using clinical workflow or Veteran/patient-centric use cases. | Detailed data flow requirements should not be part of the RFP as it will result in the limitation of functionality to the specific data flows specified. They will be part of the Test and Evaluation Plan (TEP), where data flows can be added or modified. However, RFP Section 5.5.1 does not indicate that the external community data and end-to-end workflows will be considered in the configuration of standard EHRM workflows. | Suggest adding to RFP Section 5.5.1: "j) The Contractor shall enable configuration of the application that supports external community data without requiring the clinician to go to special screens to see and use external data." | Concur. Will negotiate with Cerner for inclusion. |
| 7 | Specifically define the machine-data readability expectations to ensure interoperability between legacy, community care providers, and Cerner (e.g., notes fields). | RTM VA-FR-31 Requires the ability "to manage data structures that are standardized, accessible and editable." Specific requirements are to be incorporated into Task Orders, according to the structure of the contract. | See Item #34 for recommended changes to incorporate the SMART on FHIR and SMART-enabled applications.<br><br>See Item # 49 for recommended changes to incorporate sharing of the EHRM data model and to improve the amount of computable data shared with community care providers.<br><br>Suggest VA obtain a description from the Contractor that describes the current baseline of shareable data elements that are computable. | Concur. Will request information from Cerner. |
| 8 | Document the DoD-VA EHR Exchange Framework - it can serve as a starting point for the National model. | This is information that should be included as part of acquisition baseline developed by EHRM Program Management Office technical activities. | None. | Concur. |
| 9 | Require ability for bulk data export. | RFP Section 5.10.4(g) requires the Contractor to provide a software solution for multilateral standards-based ingestion, normalization, storage and exporting of Health Information Exchange acquired Veteran health information. | None. | Concur. |

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|---|---|---|---|---|
| 10 | Require "push" capability to send data back in to VA EHR / Cerner database. | RFP Section 5.10.4(g) requires the Contractor to provide a software solution for multilateral standards-based ingestion, normalization, storage and exporting of Health Information Exchange acquired Veteran health information. | None. | Concur. |

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|---|---|---|---|---|
| 11 | Require that VA drive and own the analytical algorithms and not rely on Cerner. Require that VA health organizations be involved in building the logic models with the community and the vendor. | RFP Section 5.1.5 requires the Contractor provide requirements development support but does not include who is responsible for coordinating the community input on the logic models.<br><br>RFP Section 5.1.7 requires the Contractor support data management but does not state that VA shall provide the analytical algorithms.<br><br>RFP Section 5.5.1(e) requires the Contractor support robust semantic modeling for the information associated with the workflows Further detail to achieve this recommendation is also detailed in the Functional Requirement documentation, specifically VA-FR-31. VA should lead and own the analytical algorithms as it is in the best interest of the health community. By owning the algorithms, VA will take the lead on coordinating the effort, but the Contractor will actually develop the algorithms. | Suggest adding to RFP Section 5.1.5: "While the Contractor shall provide such support, VA reserves the right to take the lead on coordinating input from the user and provider communities. VA may, at its discretion, incorporate analytics from other entities, and include them in its future Digital Veterans Platform, with which the EHR must be fully compatible and interoperable."<br><br>Suggest adding to RFP Section 5.1.7(b): "based on community and VA coordinated analytic algorithms."<br><br>Suggest adding to RFP Section 5.5.1(e): "VA and its agents shall have unlimited rights to all resulting models and algorithms."<br><br>Suggest adding to RFP Section 5.5.1(f): “which modeling shall be based on analytical algorithms and data models (1) developed by the Contractor, (2) co-developed by the Contractor in coordination with VA health organizations and the community, (3) developed by VA health organizations, or (4) provided by third-party developers. VA and its agents shall have unlimited rights to all algorithms and logic models incorporated in the EHRM solution, and intellectual property rights will be handled in accordance with § H.2 of the Contract “VA EHRM IP License Agreement” on a Task Order basis.” | Concur. Will negotiate with Cerner for inclusion. |

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|---|---|---|---|---|
| 12 | Enhance the data quality management requirements to ensure Cerner is responsible for maintaining and resolving data quality issues. | RFP Section 5.1.8 Requires the Contractor to be responsible for data migration, but RFP Section 5.1.7 does not include a requirement for the Contractor to manage data quality internal to its systems. | Suggest adding to RFP Section 5.1.7: "j) Maintain backward compatibility of the EHRM solution in such way as to maintain the quality of the data, to ensure that, once captured, the Government has access to and computational use of the data regardless of the evolution of the EHRM or age of the data k) Identify data quality issues found in data sourced from systems beyond its operational remit, applying the same validations and quality standards to incoming external data that it performs for data originated natively within the EHRM solution. Where the principle of seamless care requires that EHRM accept data that does not meet its internal data quality standards, Contractor shall implement the solution so that any incoming data that does not meet EHRM data quality standards be clearly flagged as such and provide both process and user interface to allow incorrect or missing data to be remedied if possible." | Concur. |
| 13 | Define the common identity and access management approach Cerner and others will adopt (e.g., using the Vets.gov identity as the coordinating identity). | RFP Section 5.5.2 describes the required approach to identity and access management across population types and roles. DoD/VA are aligning their efforts to address this going forward. | None. | Concur. |
| 14 | Adopt the DoD approach to data and system security. | RFP Section 5.4: Information System Authorization, Testing and Continuous Monitoring describes the security approach for the shared DoD/VA authorization boundary. Joint DoD/VA Strategy will be executed. | None. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 15 | Share the VA's security approach to medical and endpoint security with DoD for opportunity to leverage and harmonize. | RFP Section 5.4: Information System Authorization, Testing and Continuous Monitoring describes the security approach for the shared DoD/VA authorization boundary. Joint DoD/VA Strategy will be executed. | None. | Concur. |
| 16 | Require Cerner to make the VA data model, standards, and other similar interoperability changes available in all other non-VA Cerner instances of its EHR platform. | RFP Section 5.10.4.1 requires opportunity for agreed upon Contractor proprietary information/data model extension points (e.g., ingestion and record APIs) to be provided to both international and national standards designating organizations, however, this does not include providing the capability to other Cerner users, which would extend Cerner interoperability across the community. | Suggest adding to RFP Section 5.10.4.1: "The Contractor shall provide VA access and usage rights into any underlying proprietary terminology/code systems for the purpose of enhancing national standards to address any gaps identified in the EHRM solution. The Contractor shall also make the interoperability capabilities and product enhancements developed under this contract available to non-VA Cerner clients." | Concur. Will negotiate with Cerner for inclusion of language. |
| 17 | Clearly define “enabling security framework.” Does this mean a specific security framework such as NIST, HITRUST, etc. | VA Requirements Traceability Matrix Non-Functional requirements provides the security requirements to include Access Management, Identity Management, and Information Assurance/Security. RFP Sections 5.4 Information System Authorization, Testing and Continuous Monitoring and 5.5.2 Identity and Access Management provide additional clarification on the security requirements. | None. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| | | **Leverage Current and Future Standards** | | |
| 18 | Specifically describe what and how you can read, write, and reconcile re: health data. | Requirement VA-FR-31 describes data management requirements: standardized data and coding terminology systems; use of government endorsed messaging and content standards for interoperability; management of data elements from various entry points etc. The current requirement does not provide understanding of which data elements are being exchanged and the degree of interoperability/ computability supported. | Suggest adding to RFP 5.10.4(m): "The annual assessment will report on the state of each data element (e.g., which are supported in what capacities and in which formats). This will help assure standards implementation consistency and assure standards compliance with evolving national standards." | Concur. Will negotiate with Cerner for inclusion of language. |
| 19 | Define who has what rights from a data sharing perspective, impacting APIs (e.g., VA owns the data + all data products vs. Community care provider owns their treatment info on patient vs. patient owns all their own data.) | Requirement VA-FR-31 and RFP Section 5.1.7 describe data management requirements (including syndication).<br><br>Section 5.5.4 requires "all, significant data stored in the software is accessible through API's" however clarification is needed to ensure access to all data originating from alternate VA-designated authoritative sources. | Suggest adding to RFP 5.5.4: "l) Provide standards-based API access (e.g., FHIR) to all patient data from the VA-designated authoritative data sources for the patient's record within the Contractor's product suite." | Concur. Will negotiate with Cerner for inclusion of language. |
| 20 | Identify the authoritative source for the various elements of a Veteran's health record. | RFP Section 5.1.4 requires the Contractor to provide support in the development and/or evaluation of new Standards, Policy Directives, Operating Procedures, Processes, etc.<br><br>Broader recommendation beyond the scope of the EHRM RFP is for VA to define the authoritative source policy for all VA data. This is not an EHRM specific policy and should be issued by VACO or VHA. | Suggest adding to RFP 5.5.4: "j) assist VA in defining and establishing the authoritative data sources associated with each data element in the EHR (e.g., where it is available and who has access to the information)." | Concur with the language for 5.5.4. |

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|---|---|---|---|---|
| 21 | Increase the VA presence and leadership role in standards-making bodies (e.g., Argonaut). | Increasing VA presence and leadership roles in standards-making bodies is an entirely separate recommendation that is not related to the IDIQ. | None. | Concur. |
| 22 | Include requirement for Cerner to support VA as an advocate to VA position on all relevant standards-making bodies. | RFP Section 5.1.4 requires Contractor support in the development and/or evaluation of new standards, policy directives, operating procedures, processes and/or assessments on their impacts when implemented. | None. | Concur. |
| 23 | Require Cerner to implement all standards as defined by VA. | Requirements Traceability Matrix VA-NJ-177 defines interoperability data standards and specifically cites support of the health data standards identified in the VA-DoD Health Information Technical Standards Profile and by the VA-DoD Interagency Clinical Informatics board. | None. | Concur. |
| 24 | Clarify the intended reference in the phrase “national Common Trust Framework.” Does this refer to the Trusted Exchange Framework and Common Agreement (TEFCA) specified in the 21st Century Cures Act? | RFP Section 5.10.4(h) refers imprecisely to the "national Common Trust Framework." | Suggest replacing the phrase in RFP Section 5.10.4 h) "national Common Trust Framework" with “Trusted Exchange Framework and Common Agreement (TEFCA).” | Concur. Will negotiate with Cerner for inclusion of language. |
| 25 | Clarify if the “provider collaboration via secure e-mail using Direct standards” is limited to the Direct protocols and just the Cerner platform. | RFP Section 5.10.4(i) requires the Contractor, by IOC, to "provide a capability for provider collaboration via secure e-mail using Direct standards within a Cerner Millennium EHR workflow context." | Suggest adding to RFP Section 5.10.4(i): "the ONC Direct protocol or future VA-designated standard." | Concur. Will negotiate with Cerner for inclusion of language. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| | | **Commit to Open, Standards-Based APIs** | | |
| 26 | Be specific about the VA publishing / access service requirements. | RFP Section 5.5.4 includes requirements that all significant data stored in the software is accessible through API's with no requirement for creation of custom applications to specifically access VA data. RTM VA-NF-7 requires the system to support the ability to access data elements using open standard-based interfaces including legacy data. Clarification is needed to ensure the intention to pursue standards-based APIs. | Suggest adding to RFP Section 5.5.4 – "standards-based" in front of APIs. | Concur. Will negotiate with Cerner for inclusion of language. |
| 27 | Define in the contract the VA publishing / access services specifically for (1) Veteran access services (e.g., vets.gov), (2) VA clinician access services, (3) Partner access services, and (4) HIE access service. | RFP Section 5.5.2 describes identity and access management requirements including user population types and the association of specific application permissions tied to roles/positions. RTM VA-NF-6 through 48 describe specific access services required. | None. | Concur. |
| 28 | Ensure external API developers can host their apps on an app platform that is NOT controlled by Cerner (and therefore does not require Cerner licensing and approval). | RFP Section 5.1.8(d) requires the contractor analyze and propose a way forward for the capability for external apps to use HealtheIntent as a data source.<br><br>Section 5.5.4 requires the contractor to support data exchanges via the API gateway.<br><br>Section 5.10.4.2 requires the contractor to work in good faith to integrate the EHRM with the Digital Veterans Platform API gateway. | Suggest replacing the second sentence in 5.10.4.2: "The Contractor shall integrate the EHRM to interoperate with DVP or future state VA platform." | Concur. Will negotiate with Cerner for inclusion of language. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 29 | Include requirement for Cerner to provide CDS Hooks to support open clinician workflow. | RFP Section 5.8 requires the contractor provision robust data analysis toolsets that allow, among other things, analytics and Clinical Decision Support (CDS).<br><br>VA-NF-T26 requires "integration with Cerner via standards-based interfaces (including but not necessarily limited to support for FHIR APIs and/or OMG CDS API/ HL7 CDS APIs (e.g., CDS Hooks)". | None. | Concur. |
| 30 | Specify the required utility services to support intermediary or peer-to-peer services; e.g., support Veteran-directed or Veteran-mediated request, exchange, and ingestion from non-VA providers (via APIs where available). | RFP Section 5.10.4(c) requires "the Contractor shall provide a software solution enabling VA to release and consume, via on-demand access, a Veteran's complete longitudinal health record to and from DoD and connected community partners. The longitudinal record solution shall support Provider-to-Provider record sharing, as well as Provider-Veteran-Provider sharing (Veteran mediated record sharing), including appropriate consent management." | Suggest adding ", regardless of which EHR they use" after "connected community partners…to and from DoD and connected community partners, regardless of which EHR they use." | Concur. Will negotiate with Cerner for inclusion of language. |
| 31 | Require that VA has full authority to connect any VA-approved, secure third-party app with the Cerner system, without Cerner approval. | RFP Section 5.7.1 requires the contractor provide on-site integration for devices connecting to the Contractor system.<br>VA is fully responsible for the security of its systems and protection of its data. | Suggest adding to 5.7.1b: "including via the Digital Veterans Platform…support for VA-approved third-party apps connecting to the Contractor system, including via the Digital Veterans Platform."<br><br>Suggest adding to 5.7.1 – "g) Permit and approve connecting all VA approved secure apps without additional fees or licensing." | Concur. Will negotiate with Cerner for inclusion of language. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 32 | Ensure the API developers retain their IP rights when their API is used to connect to the Cerner interface. | RFP Section 5.5.4 sets forth requirements with respect to APIs, including paragraph (e), which provides for the provision and maintenance of a Developer Portal.<br><br>Section 5.10 generally promotes innovation while 5.10.4.2 requires the Contractor to support the Digital Veterans Platform (DVP) API gateway which is intended to provide a neutral application platform for third party APIs.<br><br>Additional language is required to promote innovation in the creation of third party applications by removing derivative or cascading intellectual property restrictions/ constraints. | Suggest adding to RFP 5.5.4(e): " and provide policies and procedures for the use of the Developer Portal(s) and APIs that promote innovative third-party API development" and "Third party API developers shall retain their IP rights when their API is used to connect to the Cerner interface, and there will be no derivative IP ownership when third parties consume Cerner terminology through open APIs." | Concur. Will negotiate with Cerner for inclusion of language. |
| 33 | Require the ability for 3rd party apps to remain connected to the Cerner system and receive automatic notification on updates (e.g., vaccination). Allow the app to connect without being cut off in accordance with VA security requirements. | RFP Section 5.7.1 requires the contractor provide on-site integration for devices connecting to the Contractor system. | Suggest adding to RFP Section 5.7.1(b): "support for third-party apps connecting to the Contractor system."<br><br>Suggest adding the following new paragraphs (ii) and (iii) to RFP Section 5.7.1(b): "ii. Provide ability for third-party apps to remain connected to the Contractor system in accordance with VA security requirements and receive automatic notification on updates; and iii. Allow the app to remain connected without interruption lasting longer than a certain period of time to be approved by the Government." | Concur. Will negotiate with Cerner for inclusion of language. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 34 | Incorporate the model RFP language necessary for Cerner to support the API and SMART on FHIR platform and SMART-enabled applications. | RFP Section 5.10.4 and the Requirements Traceability Matrix refer to SMART and FHIR based applications but do not incorporate all elements of the suggested functionality such as the support for standards-based embedding of external application UI (HTML5). | Suggest adding to RFP Section 5.10.4: "In addition, the software and services shall support the VA designated standards, such as SMART on FHIR and SMART-enabled applications, or published standard at the time." | Concur. Will negotiate with Cerner for inclusion of language. |
| **Use Community Care Contracts to Foster Interoperability** | | | | |
| 35 | Before the contract is signed, get Care Act providers and Cerner competitors to commit to support the contract as early adopters. | Pre-contractual activity and pertains to future strategic discussions to drive interoperability in the marketplace. | None. | Concur. |
| 36 | Require publication of the EHRM /Cerner clinical data model in the National Library of Medicine (following the Kaiser example). | RFP Section 5.10.4.1 states: In support of the interoperability objectives under this Section, agreed upon Contractor proprietary information/data model extension points (e.g., ingestion and record APIs) may be provided to both international and national standards designating organizations as described and set forth in an applicable Task Order. | None. | Concur. |
| 37 | Require the Veteran to be able to invoke their right of access to data as the intermediary to support data exchange (e.g., pull through their API on phone and push to their community care provider). | RFP Section 5.7.1 requires support to Veterans ensuring they can effectively navigate the HealtheLife patient portal and Wellness programs to effectively manage their health. | Suggest adding to RFP Section 5.7.1(c): “using mobile apps, thin-client and thick-client solutions" and “Veterans shall be able to enable sharing of their health data with their community care providers in accordance with all VA-designated national standards." | Concur. Will negotiate with Cerner for inclusion of language. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 38 | Require Cerner and the Community Care provider applications provide bi-directional health information in exchange for using the VA-provided API gateway. | RFP Sections 5.10.1, .2, and .3 require support for innovation and other development activities.<br><br>Section 5.10.4(c) requires "a software solution enabling VA to release and consume, via on-demand access, a Veteran's complete longitudinal health record to and from DoD and connected community partners."<br><br>VA-NF-61, -63, and -65 requires bi-directional interface in support of Pharmacy. This requirement can be fulfilled by a flat file and does not require the data to be computable. | Suggest adding to RFP Section 5.10.4(c): "The bi-directional health information exchange shall maximize use of discrete data that supports context-driven clinical decisions and informatics." | Concur. Will negotiate with Cerner for inclusion of language. |
| 39 | Shift VA policy enabled by the Choice Care Act from "Opt-In" to "Opt-Out" such that the starting assumption is that data can be shared unless the Veteran "opts out." | Review and revise VA policy. | None. | Concur. |
| | | **Other** | | |
| 40 | Analyze and understand the operational cost to VA to implement and operate under the proposed solution. | Analysis of cost information is not part of a IDIQ contract. It will be done as part of the standard PMO processes. | None. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 41 | Incorporate requirement that subsequent updates and improvements to the Cerner solution is part of the baseline contract (and cost). | RFP Section 5.2.3 Software Maintenance requires: The Contractor shall provide its commercial support and maintenance services described in its End User License Agreement. Leveraging Contractor's best practices and agreed upon upgrade schedule between DoD and VA, software maintenance includes all releases of the software such as major releases, minor releases, maintenance releases. | None. | Concur. |
| 42 | Address the differences between federal and state privacy laws - policy that Federal laws take precedence over state laws. | Federal and state privacy laws can only be addressed through legislation. | None. | Concur. |
| 43 | Ensure VA has no gag order: Require Cerner to allow open, public sharing/reporting (e.g., screen shots) on issues or errors with the EHR solution (e.g., if there is a known anomaly, that anomaly and its work-around is shared with the Cerner user community). | RFP Section 5.3.3 - System Quality and Performance Measures and Monitoring is appropriate to capture this requirement.<br><br>There is no explicit contractual language requiring the contractor to disclose issues or efforts, nor is there language explicitly preserving the right of VA to share such information. | Suggest adding to RFP Section 5.3.3: "Contractor is responsible for reporting all issues or errors associated with the EHR solution and acknowledges and agrees that errors shall not be considered confidential, proprietary or trade secrets, and accordingly, shall be releasable to VA or its agents. VA retains the right to share any issue, error or resolution approach." | Concur. Will negotiate with Cerner for inclusion of language. |
| 44 | Define the way ahead for 3rd party apps (sunset, rebuild and transition) during the Cerner transition. | This should be evaluated in congruence with the legacy transition plans (pivot plans) of existing systems to Cerner. | None. | Concur. |
| 45 | Emphasize the need and resource commitment to achieve clinician consensus, change management, and culture. | RFP Section 5.5.7 Organizational Change Management includes a detailed approach to clinician consensus, change management and culture change. | None. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 46 | Develop a roadmap for all EHR vendors that specifies how Veterans and providers access and share their data and get that data from A to B. This is not limited to the Cerner solution, but includes legacy and community care systems. | These tasks are not part of the IDIQ and will be addressed via Data Migration Plan and Data Management Strategy across VA. | None. | Concur. |
| 47 | Require ability for VA to innovate using the Cerner solution, including support to a Veteran Interoperability Partnership Lab. | RFP Section 5.10: Innovation and Enhancements includes an innovation process, categories and development activities to enable VA innovation activities using the Cerner solution. The language is sufficiently broad to support issuance of a Task Order requiring the Contractor to support interoperability activities including a Veteran Interoperability Partnership Lab.<br><br>MITRE recommends this lab be independently managed and used to support 3rd party innovators, demonstrate interoperability solutions, validate the effectiveness of interoperability solutions in an end-to-end clinical use case context, and serve as a reference architecture to allow 3rd party stakeholders to exercise innovations. | None. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 48 | Understand how Cerner will manage data quality, including provenance, error bounds, data looping, security, etc. | The RFP Section 8.6 refers to the use of Quality Assurance Surveillance Plans (QASP), which is intended to establish Contractor accountability to what VA requires and values.<br><br>VA-NF-T46 requires "The system shall support provenance (chain of custody or ownership) and pedigree (processing history how the data was produced or incorporated) and enable identification, collection, and production of data according to source, custody and ownership and display of data in business, logical, legal or physical models." | None. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 49 | Understand how Cerner will provide VA with access to the data model, share data for analytics freely to 3rd parties, increase the amount of computable data exchanged with 3rd parties.<br><br>Panelists acknowledged this recommendation is a stretch goal. | RFP Section 5.8 address the support to business intelligence and data analytics. Section 5.10.4.1 supports the sharing of Contractor proprietary information/data model extension points (e.g., ingestion and record APIs) with both international and national standards designating organizations. However, current language does not require access to the EHRM data model, supporting understanding of and therefore increase the exchange of computable data with community care providers. | Suggest adding to RFP Section 5.8: "h) Provide VA EHRM data model, underpinning terminology model, tables, definitions, and examples of fully populated Veteran data files. Provide documentation or software that is used for quality checks and that illustrate what data elements are computable."<br><br>Suggest adding to Section 5.10.4.1: "n) The Contractor shall support Knowledge Interoperability by supporting the extension of clinical content assets such as terminologies, clinical decision support rules, order sets, etc. This includes the ability to curate, extend, and share that knowledge with clinical partners. This fosters rapid adoption from industry best practices, e.g., clinical professional societies."<br><br>Suggest VA obtain a price from the Contractor to provide a report explain the steps involved in accessing the data model, including producing an example data file, and demonstrating how much of the data is computable; provide cost estimates for outside parties to access the data via this mechanism. | Concur. |

| Item No. | Independent External Review Recommendations | EHRM RFP Section(s) Affected and Additional Comments | MITRE Recommended Change(s) to the EHRM RFP | VA Adjudication |
|---|---|---|---|---|
| 50 | Understand how the Cerner EHRM solution will improve Veteran and clinician experiences. | RFP Section 5.2.1 describes the EHR application, however does not specifically focus priorities on the Veteran and clinician experience as captured in end-to-end use cases.<br><br>Section 8.6 refers to the Quality Assurance Surveillance Plans, which include Functional and Non-Functional Key Performance Indicators (KPIs). These KPIs will reflect VA priorities which include improvement of both Veteran and clinician experiences. | Suggest adding to RFP Section 5.2.1.1: "k) Provide for the ability to measure the EHRM performance that contributes to any end-to-end use case, thereby capturing its impact on improving a Veteran and clinician experience." | Concur. |

# Appendix D: Acronyms

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| API | Application Programming Interface |
| CCHIE | ClinicalConnect Health Information Exchange |
| CDS | Clinical Decision Service |
| DoD | Department of Defense |
| EHR | Electronic Health Record |
| EHRM | Electronic Health Record Modernization |
| FHIR | Fast Healthcare Interoperability Resources |
| HIE | Health Information Exchange |
| HL7 | Health Level Seven International |
| IP | Intellectual Property |
| IT | Information Technology |
| PWS | Performance Work Statement |
| RFP | Request for Proposal |
| UPMC | University of Pittsburgh Medical Center |
| VA | Department of Veterans Affairs |
| VACO | VA Central Office |
| VHA | Veterans Health Administration |

Document ID: 0.7.1705.630946

From: Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=vacosandoc>
To: Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=vacosandoc>
Cc:
Bcc: (b)(6)@gmail.com (b)(6)@gmail.com>
Subject: FW: Please Review Tonight
Date: Mon Aug 13 2018 11:46:17 EDT
Attachments: [EXTERNAL] NDA.pdf (1).msg
NDA.pdf
[EXTERNAL] RE: VA EHR NDA (2).msg
Perlmutter.EHR NDA v2 mbs.pdf
[EXTERNAL] Re: VA EHR NDA (3).msg
EHR NDA v2 mbs.pdf
EHR NDA v2 RL.pdf
EHR NDA v2.pdf

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Camilo Sandoval

202-461-6910

From: Sandoval, Camilo J.
Sent: Friday, May 04, 2018 2:16 AM
To: Spero, Casin D. <Casin.Spero@va.gov>; Hayes-Byrd, Jacquelyn <Jacquelyn.Hayes-Byrd@va.gov>; O'Rourke, Peter M. <Peter.ORourke@va.gov>
Subject: RE: Please Review Tonight

And in case anyone ask, here are the signed NDA's of Ike, Bruce, and Marc.

From: Sandoval, Camilo J.
Sent: Friday, May 04, 2018 2:12 AM
To: Spero, Casin D.; Hayes-Byrd, Jacquelyn; O'Rourke, Peter M.
Subject: RE: Please Review Tonight

Pete—

This request from members of congress is based on inaccurate reporting by Arthur Allen from Politico, which was fueled by David Shulkin and Scott Blackburn. In fact, the real outside interference and conflict of interest came from Peter Levin, who was attempting to shape the direction of ongoing contract negotiations between the VA and Cerner. According to John Windom and Ash Zenooz, on several occasions Secretary Shulkin suggested to the EHRM team that Peter Levin be hired as a direct contractor. When those efforts failed, Peter Levin then acquired VA contracts through MITRE with Secretary Shulkin's influence. Please note that Peter Levin, Scott Gould, Stephen Ondra and Michele Flournoy (married to Scott Gould) all work for or are associated with AMIDA and MITRE. Ironically, they were all senior VA or DOD employees under the Obama administration with access to insider information.

A key question Arthur Allen and interested members of congress should investigate and write about is, why did Shulkin and Blackburn continue to communicate with Peter Levin, and put undue pressure on John Windom to hire Peter Levin's firm—AMIDA—as a contractor. Also, why was Shulkin in such a rush to sign the Cerner contract last year(Oct/Nov) when there was over 51 major findings and recommendations added to the contract over the past several months? And for the record, it was a team of top medical CIOs and practitioners—put together by Ike Perlmutter and Bruce Moskowitz—who identified the flaws in the contract and made the recommendations, not MITRE. MITRE had advised against a strategic pause, and then took credit for the work done after.

Please read attachments.

From: Spero, Casin D.
Sent: Thursday, May 03, 2018 7:31 PM
To: Sandoval, Camilo J.; Hayes-Byrd, Jacquelyn; O'Rourke, Peter M.
Subject: RE: Please Review Tonight

Good info Cam, we may want to remind the interested parties of that.

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From: Sandoval, Camilo J.
Sent: Thursday, May 03, 2018 4:13:22 PM
To: Hayes-Byrd, Jacquelyn; O'Rourke, Peter M.; Spero, Casin D.
Subject: RE: Please Review Tonight

Thank you Jacquie. If we go back to Shulkin's EHRM hearing testimony, he mentions under oath that he and Scott Blackburn requested outside, non-governmental help from the top 5 Medical CIO's. These experts are who alerted him to the many interoperability issues previously unknown to Cerner or VA staff.

From: Hayes-Byrd, Jacquelyn

Sent: Thursday, May 03, 2018 5:42 PM
To: O'Rourke, Peter M.; Sandoval, Camilo J.; Spero, Casin D.
Subject: Please Review Tonight

Please see these two documents tonight as the Dep Sec provided this to Colonel Gainey late this afternoon

And Andy will be giving it to the Secretary first in the a.m. don't want you to be blindsided and I would like for you to be prepared to discuss.

Jacquie

From: Washington, Conrad
Sent: Thursday, May 03, 2018 5:32 PM
To: Hayes-Byrd, Jacquelyn
Subject: REQUESTED SCAN

Conrad Washington

Special Assistant

Office of the Secretary

810 Vermont Ave, NW

Washington, DC 20420

202-461-7865 (O)

Conrad.washington@va.gov

VA Core Values: Integrity, Commitment, Advocacy, Respect, and Excellence—I CARE

| | |
|---|---|
| Document ID: 0.7.1705.630946-000001 | |
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | [EXTERNAL] NDA.pdf (1).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:17 CDT 2018 |

**Cc:** DJS[vacodjs1@va.gov]; IF[(b)]@frenchangel59.com] [(b)(6)] @gmail.com [(b)(6)] @gmail.com]
**To:** Blackburn, Scott R. (DISABLED ACCT)[Scott.Blackburn@va.gov]; [(b)(6)] Windom, John H.[John.Windom@va.gov]
**From:** Bruce Moskowitz
**Sent:** Tue 3/13/2018 6:59:21 PM
**Subject:** [EXTERNAL] NDA.pdf
NDA.pdf

Sent from my iPad
Bruce Moskowitz M.D.

| | |
|---|---|
| Document ID: 0.7.1705.630946-000002 | |
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | NDA.pdf <extracted> |
| Last Modified: | Mon Aug 13 10:46:17 CDT 2018 |

**NON-DISCLOSURE AGREEMENT (Dated March 13, 2018)**

1. I acknowledge that I have been selected to participate in the planning for an electronic health record acquisition. In the course of participating in this acquisition, I may be or have been given access to or entrusted with Source Selection Information (as defined in Federal Acquisition Regulation (FAR) 2.101 and 3.104), and/or other sensitive Government data marked as "proprietary" (e.g., restrictive legend per FAR 52.215-1) that I cannot release to others nor can I use for the financial benefit of others or myself.

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2. I understand that 41 U.S.C. § 423, commonly referred to as the Procurement Integrity Act, and now codified at U.S.C.A. § § 2101-2107, and provisions FAR 3.104 govern the release of proprietary and source selection information . As it relates to the information that has been made available to me pursuant to this Non-Disclosure Agreement, I certify that I will not disclose any contractor bid, solicitation, proprietary, or Source Selection Information directly or indirectly to any person other than the President of the United States or a member of his administration to whom the President authorizes, another person subject to an equally restrictive Non-Disclosure Agreement related to the subject matter of this Agreement, the Secretary of the Department of Veterans Affairs or a person authorized by the head of agency or the contracting officer to receive such information. I understand that unauthorized disclosure of such information may subject me to substantial administrative, civil and criminal penalties, including fines, imprisonment, and loss of employment under the Procurement Integrity Act or other applicable laws and regulations.

3. I certify that I will not discuss evaluation of source selection matters with any unauthorized individuals (including Government personnel other than those set out in Paragraph 2 above), even after contract award, without specific prior approval from proper authority.

4. These provisions are consistent with, and do not supersede, conflict with, or otherwise alter the employee obligations, rights, or liabilities created by existing statute or Executive order relating to (1) classified information, (2) communications to Congress, (3) the reporting to an Inspector General of a violation of any law, rule, or regulation, or mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety, or (4) any other whistleblower protection. The definitions, requirements, obligations, rights, sanctions, and liabilities created by controlling Executive orders and statutory provisions are incorporated into this agreement and are controlling. These statutes and Executive orders include the following:

**NON-DISCLOSURE AGREEMENT**
Planning for an electronic health record acquisition
Dated Tuesday March 13, 2018
Page | 2

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☐Executive Order No. 12958;
☐The Privacy Act (5 U.S.C. § 552a);
☐The Trade Secrets Act (18 U.S.C. § 1905);
☐Section 7211 of title 5, United States Code (governing disclosures to Congress);
☐Section 1034 of title 10, United States Code, as amended by the Military Whistleblower Protection Act (governing disclosure to Congress by members of the military);
☐Section 2302(b)(8) of title 5, United States Code, as amended by the Whistleblower Protection Action (governing disclosures of illegality, waste, fraud, abuse or public health or safety threats);
☐The Intelligence Identities Protection Act of 1982 (50 U.S.C. § 421 *et seq.*) (governing disclosures that could expose confidential Government agents); and
☐The statutes which protect against disclosure that may compromise the national security, including sections 641, 793, 794, 798, and 952 of title 18, United States Code, and section 4(b) of the Subversive Activities Act of 1950 (50 U.S.C. § 783(b)).

Additionally, pursuant to 38 Code of Federal Regulations 1.201, all VA employees with knowledge or information about actual or possible violations of criminal law related to VA programs, operations, facilities, contracts, or information technology systems shall immediately report such knowledge or information to their supervisor, any management official, or directly to the Office of Inspector General.

Signature:

BRUCE MOSKOWITZ, M.D.
1411 N. FLAGER DR., #7100
WEST PALM BEACH, FL 33401

Name Printed: Bruce Moskowitz, MD

Organizational Conflict(s) of Interest (OCIs):

| Document ID: 0.7.1705.630946-000003 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | [EXTERNAL] RE: VA EHR NDA (2).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:17 CDT 2018 |

**To:** Marc Sherman[mbsherman@gmail.com]; Blackburn, Scott R. (DISABLED ACCT)[Scott.Blackburn@va.gov]
**Cc:** (b)(6) @gmail.com (b)(6) @gmail.com]; Bruce Moskowitz (b)(6) @mac.com] (b)(6) (b)(6) ; Windom, John H.[John.Windom@va.gov]; DJS[vacodjs1@va.gov]
**From:** IP
**Sent:** Tue 3/13/2018 6:07:06 PM
**Subject:** [EXTERNAL] RE: VA EHR NDA
Perlmutter.EHR NDA v2 mbs.pdf

Attached is my signed NDA. Thank you.

**From:** Marc Sherman [(b)(6) @gmail.com]
**Sent:** Tuesday, March 13, 2018 1:40 PM
**To:** Blackburn, Scott R.
**Cc:** IP; (b)(6) @gmail.com; Bruce Moskowitz; (b)(6) Windom, John H.; DJS
**Subject:** Re: VA EHR NDA

Scott, Matt and John

Thank you for the NDA draft that you sent along and the organized approach. I have attached the following to close the loop:

1. a marked up version of the NDA with a few necessary adjustments in red-line so you can see the changes that were made,
2. a blank copy of the amended NDA for Bruce and Ike to sign, and
3. a signed version by me of the amended NDA.

Thanks and happy to help as requested.

Marc

On Tue, Mar 13, 2018 at 10:31 AM, Blackburn, Scott R. <Scott.Blackburn@va.gov> wrote:
Ike, Bruce, Marc:

Thank each of you for agreeing to lend an extra set of outside eyes on the EHR contract. We appreciate your support and want to make sure we get to the best place possible for Veterans, the country and taxpayers. As we are incredibly grateful to you for volunteering your time, we want to make this as easy as possible for you. Here are 3 next steps.

1) We will need you to sign the attached NDA. Please return to (b)(6)

2) Matt will then send you the latest package under separate cover.

3) Given government contracts are different than what you are used to reading, we would propose a quick phone call so that we can orient you to the contract and help focus you on the parts where your expertise will be most valuable. (b)(6) (b)(6) (who is the government contracting officer) and John Windom (who is our EHR leader) will lead this from our side. I will ask (b)(6) (cc'd) here to help set up a time. We can either do this all together, if calendars match up, or separately if need be.

We have also connected with Stephanie Reel, Stan Huff, Dr. Karson, Dr. Ko, Dr. Shretha, and Jon Manis who all have all received the NDA and we are working with them. I am hoping to connect with Dr. Cooper today.

Thanks again!
Scott

**Scott Blackburn**
Acting CIO & Executive-in-Charge, Office of Information & Technology
Department of Veterans Affairs

| Document ID: 0.7.1705.630946-000004 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | Perlmutter.EHR NDA v2 mbs.pdf <extracted> |
| Last Modified: | Mon Aug 13 10:46:17 CDT 2018 |

**NON-DISCLOSURE AGREEMENT (Dated March 13, 2018)**

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2. I understand that 41 U.S.C. § 423, commonly referred to as the Procurement Integrity Act, and now codified at U.S.C.A. § § 2101-2107, and provisions FAR 3.104 govern the release of proprietary and source selection information . As it relates to the information that has been made available to me pursuant to this Non-Disclosure Agreement, I certify that I will not disclose any contractor bid, solicitation, proprietary, or Source Selection Information directly or indirectly to any person other than the President of the United States or a member of his administration to whom the President authorizes, another person subject to an equally restrictive Non-Disclosure Agreement related to the subject matter of this Agreement, the Secretary of the Department of Veterans Affairs or a person authorized by the head of agency or the contracting officer to receive such information. I understand that unauthorized disclosure of such information may subject me to substantial administrative, civil and criminal penalties, including fines, imprisonment, and loss of employment under the Procurement Integrity Act or other applicable laws and regulations.

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☐Executive Order No. 12958;
☐The Privacy Act (5 U.S.C. § 552a);
☐The Trade Secrets Act (18 U.S.C. § 1905);
☐Section 7211 of title 5, United States Code (governing disclosures to Congress);
☐Section 1034 of title 10, United States Code, as amended by the Military Whistleblower Protection Act (governing disclosure to Congress by members of the military);
☐Section 2302(b)(8) of title 5, United States Code, as amended by the Whistleblower Protection Action (governing disclosures of illegality, waste, fraud, abuse or public health or safety threats);
☐The Intelligence Identities Protection Act of 1982 (50 U.S.C. § 421 *et seq.*) (governing disclosures that could expose confidential Government agents); and
☐The statutes which protect against disclosure that may compromise the national security, including sections 641, 793, 794, 798, and 952 of title 18, United States Code, and section 4(b) of the Subversive Activities Act of 1950 (50 U.S.C. § 783(b)).

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Signature: (b)(6)

Name Printed: Isaac Perlmutter

Organizational Conflict(s) of Interest (OCIs):

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|---|---|
| Document ID: 0.7.1705.630946-000005 | |
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | [EXTERNAL] Re: VA EHR NDA (3).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:17 CDT 2018 |

**To:** Blackburn, Scott R. (DISABLED ACCT)[Scott.Blackburn@va.gov]
**Cc:** IF(b)(6)@frenchangel59.com](b)(6) @gmail.com(b)(6) @gmail.com]; Bruce Moskowitz(b)(6) @mac.com]; (b)(6); Windom, John H.[John.Windom@va.gov]; DJS[vacodjs1@va.gov]
**From:** Marc Sherman
**Sent:** Tue 3/13/2018 5:39:36 PM
**Subject:** [EXTERNAL] Re: VA EHR NDA
EHR NDA v2.pdf
EHR NDA v2 mbs.pdf
EHR NDA v2 RL.pdf

Scott, Matt and John

Thank you for the NDA draft that you sent along and the organized approach. I have attached the following to close the loop:

1. a marked up version of the NDA with a few necessary adjustments in red-line so you can see the changes that were made,
2. a blank copy of the amended NDA for Bruce and Ike to sign, and
3. a signed version by me of the amended NDA.

Thanks and happy to help as requested.

Marc

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Ike, Bruce, Marc:

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We have also connected with Stephanie Reel, Stan Huff, Dr. Karson, Dr. Ko, Dr. Shretha, and Jon Manis who all have all received the NDA and we are working with them. I am hoping to connect with Dr. Cooper today.

Thanks again!

Scott

**Scott Blackburn**

Acting CIO & Executive-in-Charge, Office of Information & Technology

Department of Veterans Affairs

| Document ID: 0.7.1705.630946-000006 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | EHR NDA v2 mbs.pdf <extracted> |
| Last Modified: | Mon Aug 13 10:46:17 CDT 2018 |

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Signature:

(b)(6)

Name Printed: Marc Sherman

Organizational Conflict(s) of Interest (OCIs):

| Document ID: 0.7.1705.630946-000007 | |
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| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | EHR NDA v2 RL.pdf <extracted> |
| Last Modified: | Mon Aug 13 10:46:17 CDT 2018 |

(b)(6)

(b)(6)

| Document ID: 0.7.1705.630946-000008 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | EHR NDA v2.pdf <extracted> |
| Last Modified: | Mon Aug 13 10:46:17 CDT 2018 |

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- Section 7211 of title 5, United States Code (governing disclosures to Congress);
- Section 1034 of title 10, United States Code, as amended by the Military Whistleblower Protection Act (governing disclosure to Congress by members of the military);
- Section 2302(b)(8) of title 5, United States Code, as amended by the Whistleblower Protection Action (governing disclosures of illegality, waste, fraud, abuse or public health or safety threats);
- The Intelligence Identities Protection Act of 1982 (50 U.S.C. § 421 *et seq.*) (governing disclosures that could expose confidential Government agents); and
- The statutes which protect against disclosure that may compromise the national security, including sections 641, 793, 794, 798, and 952 of title 18, United States Code, and section 4(b) of the Subversive Activities Act of 1950 (50 U.S.C. § 783(b)).

Additionally, pursuant to 38 Code of Federal Regulations 1.201, all VA employees with knowledge or information about actual or possible violations of criminal law related to VA programs, operations, facilities, contracts, or information technology systems shall immediately report such knowledge or information to their supervisor, any management official, or directly to the Office of Inspector General.

Signature:

Name Printed:

Organizational Conflict(s) of Interest (OCIs):

Document ID: 0.7.1705.630888

From: Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=vacosandoc>
To: Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=vacosandoc>
Cc:
Bcc:
Subject: FW: Please Review Tonight
Date: Mon Aug 13 2018 11:46:17 EDT
Attachments: [EXTERNAL] NDA.pdf (1).msg
NDA.pdf
[EXTERNAL] RE: VA EHR NDA (2).msg
Perlmutter.EHR NDA v2 mbs.pdf
[EXTERNAL] Re: VA EHR NDA (3).msg
EHR NDA v2 mbs.pdf
EHR NDA v2 RL.pdf
EHR NDA v2.pdf

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Camilo Sandoval

202-461-6910

From: Sandoval, Camilo J.
Sent: Friday, May 04, 2018 2:16 AM
To: Spero, Casin D. <Casin.Spero@va.gov>; Hayes-Byrd, Jacquelyn <Jacquelyn.Hayes-Byrd@va.gov>; O'Rourke, Peter M. <Peter.ORourke@va.gov>
Subject: RE: Please Review Tonight

And in case anyone ask, here are the signed NDA's of Ike, Bruce, and Marc.

From: Sandoval, Camilo J.
Sent: Friday, May 04, 2018 2:12 AM
To: Spero, Casin D.; Hayes-Byrd, Jacquelyn; O'Rourke, Peter M.
Subject: RE: Please Review Tonight

Pete—

This request from members of congress is based on inaccurate reporting by Arthur Allen from Politico, which was fueled by David Shulkin and Scott Blackburn. In fact, the real outside interference and conflict of interest came from Peter Levin, who was attempting to shape the direction of ongoing contract negotiations between the VA and Cerner. According to John Windom and Ash Zenooz, on several occasions Secretary Shulkin suggested to the EHRM team that Peter Levin be hired as a direct contractor. When those efforts failed, Peter Levin then acquired VA contracts through MITRE with Secretary Shulkin's influence. Please note that Peter Levin, Scott Gould, Stephen Ondra and Michele Flournoy (married to Scott Gould) all work for or are associated with AMIDA and MITRE. Ironically, they were all senior VA or DOD employees under the Obama administration with access to insider information.

A key question Arthur Allen and interested members of congress should investigate and write about is, why did Shulkin and Blackburn continue to communicate with Peter Levin, and put undue pressure on John Windom to hire Peter Levin's firm—AMIDA—as a contractor. Also, why was Shulkin in such a rush to sign the Cerner contract last year(Oct/Nov) when there was over 51 major findings and recommendations added to the contract over the past several months? And for the record, it was a team of top medical CIOs and practitioners—put together by Ike Perlmutter and Bruce Moskowitz—who identified the flaws in the contract and made the recommendations, not MITRE. MITRE had advised against a strategic pause, and then took credit for the work done after.

Please read attachments.

From: Spero, Casin D.
Sent: Thursday, May 03, 2018 7:31 PM
To: Sandoval, Camilo J.; Hayes-Byrd, Jacquelyn; O'Rourke, Peter M.
Subject: RE: Please Review Tonight

Good info Cam, we may want to remind the interested parties of that.

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From: Sandoval, Camilo J.
Sent: Thursday, May 03, 2018 4:13:22 PM
To: Hayes-Byrd, Jacquelyn; O'Rourke, Peter M.; Spero, Casin D.
Subject: RE: Please Review Tonight

Thank you Jacquie. If we go back to Shulkin's EHRM hearing testimony, he mentions under oath that he and Scott Blackburn requested outside, non-governmental help from the top 5 Medical CIO's. These experts are who alerted him to the many interoperability issues previously unknown to Cerner or VA staff.

From: Hayes-Byrd, Jacquelyn

Sent: Thursday, May 03, 2018 5:42 PM
To: O'Rourke, Peter M.; Sandoval, Camilo J.; Spero, Casin D.
Subject: Please Review Tonight

Please see these two documents tonight as the Dep Sec provided this to Colonel Gainey late this afternoon

And Andy will be giving it to the Secretary first in the a.m. don't want you to be blindsided and I would like for you to be prepared to discuss.

Jacquie

From: Washington, Conrad
Sent: Thursday, May 03, 2018 5:32 PM
To: Hayes-Byrd, Jacquelyn
Subject: REQUESTED SCAN

Conrad Washington

Special Assistant

Office of the Secretary

810 Vermont Ave, NW

Washington, DC 20420

202-461-7865 (O)

Conrad.washington@va.gov

VA Core Values: Integrity, Commitment, Advocacy, Respect, and Excellence—I CARE

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|---|---|
| Document ID: 0.7.1705.630888-000001 | |
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | [EXTERNAL] NDA.pdf (1).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:17 CDT 2018 |

**Cc:** DJS[vacodjs1@va.gov]; IP[(b)(6)@frenchangel59.com]; (b)(6) @gmail.com (b)(6) @gmail.com]
**To:** Blackburn, Scott R. (DISABLED ACCT)[Scott.Blackburn@va.gov]; (b)(6) ; Windom, John H.[John.Windom@va.gov]
**From:** Bruce Moskowitz
**Sent:** Tue 3/13/2018 6:59:21 PM
**Subject:** [EXTERNAL] NDA.pdf
NDA.pdf

Sent from my iPad
Bruce Moskowitz M.D.

| | |
|---|---|
| Document ID: 0.7.1705.630888-000002 | |
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | NDA.pdf <extracted> |
| Last Modified: | Mon Aug 13 10:46:17 CDT 2018 |

**NON-DISCLOSURE AGREEMENT (Dated March 13, 2018)**

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2. I understand that 41 U.S.C. § 423, commonly referred to as the Procurement Integrity Act, and now codified at U.S.C.A. § § 2101-2107, and provisions FAR 3.104 govern the release of proprietary and source selection information . As it relates to the information that has been made available to me pursuant to this Non-Disclosure Agreement, I certify that I will not disclose any contractor bid, solicitation, proprietary, or Source Selection Information directly or indirectly to any person other than the President of the United States or a member of his administration to whom the President authorizes, another person subject to an equally restrictive Non-Disclosure Agreement related to the subject matter of this Agreement, the Secretary of the Department of Veterans Affairs or a person authorized by the head of agency or the contracting officer to receive such information. I understand that unauthorized disclosure of such information may subject me to substantial administrative, civil and criminal penalties, including fines, imprisonment, and loss of employment under the Procurement Integrity Act or other applicable laws and regulations.

3. I certify that I will not discuss evaluation of source selection matters with any unauthorized individuals (including Government personnel other than those set out in Paragraph 2 above), even after contract award, without specific prior approval from proper authority.

4. These provisions are consistent with, and do not supersede, conflict with, or otherwise alter the employee obligations, rights, or liabilities created by existing statute or Executive order relating to (1) classified information, (2) communications to Congress, (3) the reporting to an Inspector General of a violation of any law, rule, or regulation, or mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety, or (4) any other whistleblower protection. The definitions, requirements, obligations, rights, sanctions, and liabilities created by controlling Executive orders and statutory provisions are incorporated into this agreement and are controlling. These statutes and Executive orders include the following:

**NON-DISCLOSURE AGREEMENT**
Planning for an electronic health record acquisition
Dated Tuesday March 13, 2018
Page | 2

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☐ Executive Order No. 12958;
☐ The Privacy Act (5 U.S.C. § 552a);
☐ The Trade Secrets Act (18 U.S.C. § 1905);
☐ Section 7211 of title 5, United States Code (governing disclosures to Congress);
☐ Section 1034 of title 10, United States Code, as amended by the Military Whistleblower Protection Act (governing disclosure to Congress by members of the military);
☐ Section 2302(b)(8) of title 5, United States Code, as amended by the Whistleblower Protection Action (governing disclosures of illegality, waste, fraud, abuse or public health or safety threats);
☐ The Intelligence Identities Protection Act of 1982 (50 U.S.C. § 421 *et seq.*) (governing disclosures that could expose confidential Government agents); and
☐ The statutes which protect against disclosure that may compromise the national security, including sections 641, 793, 794, 798, and 952 of title 18, United States Code, and section 4(b) of the Subversive Activities Act of 1950 (50 U.S.C. § 783(b)).

Additionally, pursuant to 38 Code of Federal Regulations 1.201, all VA employees with knowledge or information about actual or possible violations of criminal law related to VA programs, operations, facilities, contracts, or information technology systems shall immediately report such knowledge or information to their supervisor, any management official, or directly to the Offi

(b)(6)

Signatu

Name Printed: Bruce Moskowitz, MD

Organizational Conflict(s) of Interest (OCIs):

| Document ID: 0.7.1705.630888-000003 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | [EXTERNAL] RE: VA EHR NDA (2).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:17 CDT 2018 |

**To:** Marc Sherman [(b)(6)] @gmail.com]; Blackburn, Scott R. (DISABLED ACCT)[Scott.Blackburn@va.gov]
**Cc:** [perl2528@gmail.com][perl2528@gmail.com]; Bruce Moskowitz [(b)(6)] @mac.com]; [(b)(6)] [(b)(6)]; Windom, John H.[John.Windom@va.gov]; DJS[vacodjs1@va.gov]
**From:** IP
**Sent:** Tue 3/13/2018 6:07:06 PM
**Subject:** [EXTERNAL] RE: VA EHR NDA
Perlmutter.EHR NDA v2 mbs.pdf

Attached is my signed NDA. Thank you.

**From:** Marc Sherman [(b)(6)] @gmail.com]
**Sent:** Tuesday, March 13, 2018 1:40 PM
**To:** Blackburn, Scott R.
**Cc:** IP; [(b)(6)] @gmail.com; Bruce Moskowitz; [(b)(6)]; Windom, John H.; DJS
**Subject:** Re: VA EHR NDA

Scott, Matt and John

Thank you for the NDA draft that you sent along and the organized approach. I have attached the following to close the loop:

1. a marked up version of the NDA with a few necessary adjustments in red-line so you can see the changes that were made,
2. a blank copy of the amended NDA for Bruce and Ike to sign, and
3. a signed version by me of the amended NDA.

Thanks and happy to help as requested.

Marc

On Tue, Mar 13, 2018 at 10:31 AM, Blackburn, Scott R. <Scott.Blackburn@va.gov> wrote:
Ike, Bruce, Marc:

Thank each of you for agreeing to lend an extra set of outside eyes on the EHR contract. We appreciate your support and want to make sure we get to the best place possible for Veterans, the country and taxpayers. As we are incredibly grateful to you for volunteering your time, we want to make this as easy as possible for you. Here are 3 next steps.

1) We will need you to sign the attached NDA. Please return to [(b)(6)].

2) Matt will then send you the latest package under separate cover.

3) Given government contracts are different than what you are used to reading, we would propose a quick phone call so that we can orient you to the contract and help focus you on the parts where your expertise will be most valuable. [(b)(6)] [(b)(6)] who is the government contracting officer) and John Windom (who is our EHR leader) will lead this from our side. I will ask [(b)(6)] (cc'd) here to help set up a time. We can either do this all together, if calendars match up, or separately if need be.

We have also connected with Stephanie Reel, Stan Huff, Dr. Karson, Dr. Ko, Dr. Shretha, and Jon Manis who all have all received the NDA and we are working with them. I am hoping to connect with Dr. Cooper today.

Thanks again!
Scott

**Scott Blackburn**
Acting CIO & Executive-in-Charge, Office of Information & Technology
Department of Veterans Affairs

| Document ID: 0.7.1705.630888-000004 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | Perlmutter.EHR NDA v2 mbs.pdf <extracted> |
| Last Modified: | Mon Aug 13 10:46:17 CDT 2018 |

**NON-DISCLOSURE AGREEMENT (Dated March 13, 2018)**

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2. I understand that 41 U.S.C. § 423, commonly referred to as the Procurement Integrity Act, and now codified at U.S.C.A. § § 2101-2107, and provisions FAR 3.104 govern the release of proprietary and source selection information . As it relates to the information that has been made available to me pursuant to this Non-Disclosure Agreement, I certify that I will not disclose any contractor bid, solicitation, proprietary, or Source Selection Information directly or indirectly to any person other than the President of the United States or a member of his administration to whom the President authorizes, another person subject to an equally restrictive Non-Disclosure Agreement related to the subject matter of this Agreement, the Secretary of the Department of Veterans Affairs or a person authorized by the head of agency or the contracting officer to receive such information. I understand that unauthorized disclosure of such information may subject me to substantial administrative, civil and criminal penalties, including fines, imprisonment, and loss of employment under the Procurement Integrity Act or other applicable laws and regulations.

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☐The Privacy Act (5 U.S.C. § 552a);
☐The Trade Secrets Act (18 U.S.C. § 1905);
☐Section 7211 of title 5, United States Code (governing disclosures to Congress);
☐Section 1034 of title 10, United States Code, as amended by the Military Whistleblower Protection Act (governing disclosure to Congress by members of the military);
☐Section 2302(b)(8) of title 5, United States Code, as amended by the Whistleblower Protection Action (governing disclosures of illegality, waste, fraud, abuse or public health or safety threats);
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Signatu (b)(6)

Name Printed: Isaac Perlmutter

Organizational Conflict(s) of Interest (OCIs):

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| Document ID: 0.7.1705.630888-000005 | |
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | [EXTERNAL] Re: VA EHR NDA (3).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:17 CDT 2018 |

**To:** Blackburn, Scott R. (DISABLED ACCT)[Scott.Blackburn@va.gov]
**Cc:** IR(b)@frenchangel59.com]; (b)(6) @gmail.com (b)(6) @gmail.com]; Bruce Moskowitz (b)(6) @mac.com]; (b)(6) Windom, John H.[John.Windom@va.gov]; DJS[vacodjs1@va.gov]
**From:** Marc Sherman
**Sent:** Tue 3/13/2018 5:39:36 PM
**Subject:** [EXTERNAL] Re: VA EHR NDA
EHR NDA v2.pdf
EHR NDA v2 mbs.pdf
EHR NDA v2 RL.pdf

Scott, Matt and John

Thank you for the NDA draft that you sent along and the organized approach. I have attached the following to close the loop:

1. a marked up version of the NDA with a few necessary adjustments in red-line so you can see the changes that were made,
2. a blank copy of the amended NDA for Bruce and Ike to sign, and
3. a signed version by me of the amended NDA.

Thanks and happy to help as requested.

Marc

On Tue, Mar 13, 2018 at 10:31 AM, Blackburn, Scott R. <Scott.Blackburn@va.gov> wrote:

Ike, Bruce, Marc:

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We have also connected with Stephanie Reel, Stan Huff, Dr. Karson, Dr. Ko, Dr. Shretha, and Jon Manis who all have all received the NDA and we are working with them. I am hoping to connect with Dr. Cooper today.

Thanks again!

Scott

**Scott Blackburn**

Acting CIO & Executive-in-Charge, Office of Information & Technology

Department of Veterans Affairs

| Document ID: 0.7.1705.630888-000006 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | EHR NDA v2 mbs.pdf <extracted> |
| Last Modified: | Mon Aug 13 10:46:17 CDT 2018 |

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Signature:

(b)(6)

Name Printed: Marc Sherman

Organizational Conflict(s) of Interest (OCIs):

| Document ID: 0.7.1705.630888-000007 | |
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| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | EHR NDA v2 RL.pdf <extracted> |
| Last Modified: | Mon Aug 13 10:46:17 CDT 2018 |

(b)(6)

(b)(6)

| Document ID: 0.7.1705.630888-000008 | |
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| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | EHR NDA v2.pdf <extracted> |
| Last Modified: | Mon Aug 13 10:46:17 CDT 2018 |

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2. I understand that 41 U.S.C. § 423, commonly referred to as the Procurement Integrity Act, and now codified at U.S.C.A. § § 2101-2107, and provisions FAR 3.104 govern the release of proprietary and source selection information . As it relates to the information that has been made available to me pursuant to this Non-Disclosure Agreement, I certify that I will not disclose any contractor bid, solicitation, proprietary, or Source Selection Information directly or indirectly to any person other than the President of the United States or a member of his administration to whom the President authorizes, another person subject to an equally restrictive Non-Disclosure Agreement related to the subject matter of this Agreement, the Secretary of the Department of Veterans Affairs or a person authorized by the head of agency or the contracting officer to receive such information. I understand that unauthorized disclosure of such information may subject me to substantial administrative, civil and criminal penalties, including fines, imprisonment, and loss of employment under the Procurement Integrity Act or other applicable laws and regulations.

3. I certify that I will not discuss evaluation of source selection matters with any unauthorized individuals (including Government personnel other than those set out in Paragraph 2 above), even after contract award, without specific prior approval from proper authority.

4. These provisions are consistent with, and do not supersede, conflict with, or otherwise alter the employee obligations, rights, or liabilities created by existing statute or Executive order relating to (1) classified information, (2) communications to Congress, (3) the reporting to an Inspector General of a violation of any law, rule, or regulation, or mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety, or (4) any other whistleblower protection. The definitions, requirements, obligations, rights, sanctions, and liabilities created by controlling Executive orders and statutory provisions are incorporated into this agreement and are controlling. These statutes and Executive orders include the following:

---

- Executive Order No. 12958;
- The Privacy Act (5 U.S.C. § 552a);
- The Trade Secrets Act (18 U.S.C. § 1905);
- Section 7211 of title 5, United States Code (governing disclosures to Congress);
- Section 1034 of title 10, United States Code, as amended by the Military Whistleblower Protection Act (governing disclosure to Congress by members of the military);
- Section 2302(b)(8) of title 5, United States Code, as amended by the Whistleblower Protection Action (governing disclosures of illegality, waste, fraud, abuse or public health or safety threats);
- The Intelligence Identities Protection Act of 1982 (50 U.S.C. § 421 *et seq.*) (governing disclosures that could expose confidential Government agents); and
- The statutes which protect against disclosure that may compromise the national security, including sections 641, 793, 794, 798, and 952 of title 18, United States Code, and section 4(b) of the Subversive Activities Act of 1950 (50 U.S.C. § 783(b)).

Additionally, pursuant to 38 Code of Federal Regulations 1.201, all VA employees with knowledge or information about actual or possible violations of criminal law related to VA programs, operations, facilities, contracts, or information technology systems shall immediately report such knowledge or information to their supervisor, any management official, or directly to the Office of Inspector General.

Signature:

Name Printed:

Organizational Conflict(s) of Interest (OCIs):

Document ID: 0.7.1705.630777

From: Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=vacosandoc>
To: Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=vacosandoc>
Cc:
Bcc: (b)(6) @gmail.com (b)(6) @gmail.com>
Subject: FW: Please Review Tonight
Date: Mon Aug 13 2018 11:46:03 EDT
Attachments: [EXTERNAL] call today? (1).msg
[EXTERNAL] dod data sharing (2).msg
Levin slide on DoD data sharing -october 2017.pptx
[EXTERNAL] extremely confidential - eyes only - please do not forward or share - secva message this morning (3).msg
[EXTERNAL] Fwd: amida weekly ehrm data migration update (4).msg
Amida VA EHRM Weekly Report -sept 14 -final.docx
[EXTERNAL] Re: call today? (5).msg
EsaEmbeddedMsg (6).msg
EsaEmbeddedMsg (7).msg
FW: [External] connecting scott to charlie (8).msg
FW: [EXTERNAL] dod data sharing (9).msg
ATT00001.htm
Levin slide on DoD data sharing -october 2017.pptx
FW: [EXTERNAL] roger baker (10).msg
RE: [EXTERNAL] check in (11).msg
RE: [EXTERNAL] check in (12).msg
RE: [External] connecting scott to charlie (13).msg
RE: [EXTERNAL] extremely confidential - eyes only - please do not forward or share - secva message this morning (14).msg
RE: [EXTERNAL] follow-up from our last meeting (15).msg
RE: [EXTERNAL] Fwd: meeting with rob on wednesday (16).msg
RE: [EXTERNAL] stakeholder enterprise portal (sep) and ebenefits (17).msg
RE: [EXTERNAL] susan perez (18).msg
RE: RE: [EXTERNAL] thursday check in (19).msg
RE: Schedule important: Jack Bates' Availability - Peter needs to re-schedule (20).msg
RE: Schedule important: Jack Bates' Availability - Peter needs to re-schedule (21).msg
Windom (22).msg

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Camilo Sandoval

202-461-6910

From: Sandoval, Camilo J.

Sent: Friday, May 04, 2018 2:12 AM
To: Spero, Casin D. <Casin.Spero@va.gov>; Hayes-Byrd, Jacquelyn <Jacquelyn.Hayes-Byrd@va.gov>; O'Rourke, Peter M. <Peter.ORourke@va.gov>
Subject: RE: Please Review Tonight

Pete—

This request from members of congress is based on inaccurate reporting by Arthur Allen from Politico, which was fueled by David Shulkin and Scott Blackburn. In fact, the real outside interference and conflict of interest came from Peter Levin, who was attempting to shape the direction of ongoing contract negotiations between the VA and Cerner. According to John Windom and Ash Zenooz, on several occasions Secretary Shulkin suggested to the EHRM team that Peter Levin be hired as a direct contractor. When those efforts failed, Peter Levin then acquired VA contracts through MITRE with Secretary Shulkin's influence. Please note that Peter Levin, Scott Gould, Stephen Ondra and Michele Flournoy (married to Scott Gould) all work for or are associated with AMIDA and MITRE. Ironically, they were all senior VA or DOD employees under the Obama administration with access to insider information.

A key question Arthur Allen and interested members of congress should investigate and write about is, why did Shulkin and Blackburn continue to communicate with Peter Levin, and put undue pressure on John Windom to hire Peter Levin's firm—AMIDA—as a contractor. Also, why was Shulkin in such a rush to sign the Cerner contract last year(Oct/Nov) when there was over 51 major findings and recommendations added to the contract over the past several months? And for the record, it was a team of top medical CIOs and practitioners—put together by Ike Perlmutter and Bruce Moskowitz—who identified the flaws in the contract and made the recommendations, not MITRE. MITRE had advised against a strategic pause, and then took credit for the work done after.

Please read attachments.

From: Spero, Casin D.
Sent: Thursday, May 03, 2018 7:31 PM
To: Sandoval, Camilo J.; Hayes-Byrd, Jacquelyn; O'Rourke, Peter M.
Subject: RE: Please Review Tonight

Good info Cam, we may want to remind the interested parties of that.

---

From: Sandoval, Camilo J.
Sent: Thursday, May 03, 2018 4:13:22 PM
To: Hayes-Byrd, Jacquelyn; O'Rourke, Peter M.; Spero, Casin D.
Subject: RE: Please Review Tonight

Thank you Jacquie. If we go back to Shulkin's EHRM hearing testimony, he mentions under oath that he and Scott Blackburn requested outside, non-governmental help from the top 5 Medical CIO's. These experts are who alerted him to the many interoperability issues previously unknown to Cerner or VA staff.

From: Hayes-Byrd, Jacquelyn
Sent: Thursday, May 03, 2018 5:42 PM
To: O'Rourke, Peter M.; Sandoval, Camilo J.; Spero, Casin D.
Subject: Please Review Tonight

Please see these two documents tonight as the Dep Sec provided this to Colonel Gainey late this afternoon

And Andy will be giving it to the Secretary first in the a.m. don't want you to be blindsided and I would like for you to be prepared to discuss.

Jacquie

From: Washington, Conrad
Sent: Thursday, May 03, 2018 5:32 PM
To: Hayes-Byrd, Jacquelyn
Subject: REQUESTED SCAN

Conrad Washington

Special Assistant

Office of the Secretary

810 Vermont Ave, NW

Washington, DC 20420

202-461-7865 (O)

Conrad.washington@va.gov

| Document ID: 0.7.1705.630777-000001 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | [EXTERNAL] call today? (1).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:03 CDT 2018 |

**To:** Blackburn, Scott R. (DISABLED ACCT)[Scott.Blackburn@va.gov]
**From:** Peter Levin
**Sent:** Mon 9/4/2017 5:20:22 PM
**Subject:** [EXTERNAL] call today?

Hi Scott,
I hope this finds you well and enjoying your last weekend, for now ;), as a federal employee. I am sorry to disturb you. I hope you'll agree it was the right thing to do.

Good news and bad news:

The good news is that Marcy and Rob apparently had a good discussion this week. You may or may not know this, and you may or may not understand this, but it is a direct result of your "intervention". I can explain as useful. But it was useful.

The bad news is that things with EHRM are going off the rails a bit. My advice from folks you know and trust is to raise this to David. I can see this going both ways. On the one hand, he needs to know. On the other hand, it will hurt Windom (which I absolutely don't want).

The root cause of the trouble is that he (David, and John W) are being told that everything is "all set" on data migration. It is simply not true. The people doing the telling are eager to see MITRE/Amida bounced from the team. I got that call on Friday afternoon.

As usual, the contractors are just telling leadership what they want to hear. And the government employees have an agenda all their own. I personally admire Windom a lot, but he does not have the technical judgment to make a decision, and he is relying on Short a lot. Sweeping stuff under the rug (for the next guy) is a pretty typical VA approach.

Indeed, the reason so many programs have failed at VA is because people don't accept and deal with the truth. Eventually that blows up and kills the program. This is what happened to HealtheVet, CoreFLS, Strategic Asset Management, Scheduling, and many other big VA IT programs. The only way we made VBMS successful was by forcing VBA and OIT to deal with all the hard truths of the program. That's exactly not what's happening here.

My draft to the secretary is below, and I think I should send it later this evening or very first thing (6am) tomorrow. Your advice and perspective would be invaluable.

Thanks and best,

Peter

==========

Mr. Secretary:

This email is to alert you that I have been told my contract with VA to analyze the data migration plan for Cerner is at risk and may be cancelled as soon as tomorrow.

Senior members of the program office are not happy that I continue to tell you that I do not believe their data migration plan is adequate, and will put the program at long-term risk.

For as long as you care to hear it, I will continue to tell you the facts as I see them.

And yes, this also means I am willing to forgo my sub-contract to do so. You should expect nothing less from any of us.

| Document ID: 0.7.1705.630777-000002 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | [EXTERNAL] dod data sharing (2).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:03 CDT 2018 |

**To:** Shulkin, David J., MD[David.Shulkin@va.gov]
**Cc:** Windom, John H.[John.Windom@va.gov]; Blackburn, Scott R. (DISABLED ACCT)[Scott.Blackburn@va.gov]
**From:** Peter Levin
**Sent:** Fri 10/20/2017 10:49:17 AM
**Subject:** [EXTERNAL] dod data sharing
Levin slide on DoD data sharing -october 2017.pptx

Dear Mr Secretary,

further to our discussion on Monday about DoD data sharing, please find attached a two-slide power point that captures the current situation, with a proposed solution that is achievable and affordable.

The current approach to a single shared VA-DoD EHR system has two critical limitations:

1) The data set shared by DoD excludes key data elements needed for complete point-of-care clinical decision support (including but not limited to lab results, radiology reports, and Tricare claims data)

2) DoD data is made available in Cerner's Millennium EHR for *only* servicemembers who have been seen at an MHS Genesis-converted site. This means that fewer than 10 percent of servicemembers actually have data accessible through the Cerner platform.

To the topic of "return data from Cerner", we strongly recommend that Cerner-provided Medicines and Allergies be provided back to VA (HDR) and DoD (CDR) to leverage built-in critical safety checks that otherwise will not have complete data and which JLV - just a viewer - will not catch.

The following sentence is proposed language that captures our suggestion to you, and that you could use to convey secretarial intent, perhaps also to colleagues and partners at DoD:

I believe there would be tremendous benefit if DoD expanded the available data set to include a complete longitudinal medical record (excluding fields indicating force readiness) now. This can be accomplished by conducting a bulk data load of historical data from the legacy DoD EHR to HealtheIntent, similar to the VA approach. Only then can we legitimately claim our records are consolidated and the platforms unified.

Most respectfully,

Peter

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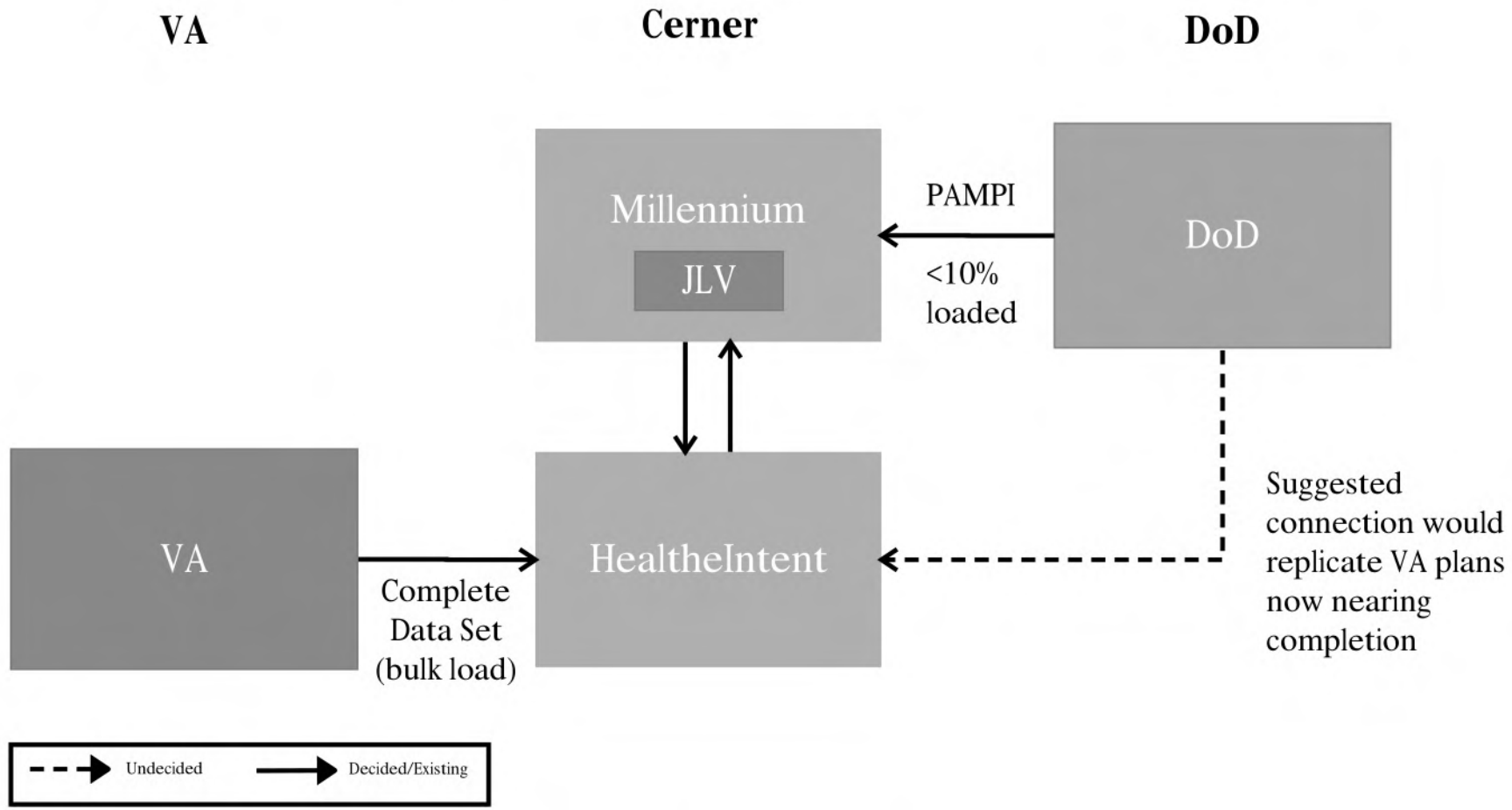
|---|---|
| Document ID: 0.7.1705.630777-000003 | |
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | Levin slide on DoD data sharing -october 2017.pptx <extracted> |
| Last Modified: | Mon Aug 13 10:46:03 CDT 2018 |




PAMPI – Problems, Allergies, Medications, Procedures, Immunizations
Not currently included: Laboratory Results, Radiology Reports, Vital Signs, Notes, and Tricare Claims data
JLV is displayed within Millennium – Attaches to legacy DoD, VistA, other Cerner instances, eHealth Exchange

<u>Important</u>: Cerner provided Medicines and Allergies should be provided back to VA (HDR) and DoD (CDR)

# VA-DoD Data Comparison

| | Cerner Data Domain | VA Migration | DoD Migration |
|---|---|---|---|
| 1. | Demographics | X | X |
| 2. | Allergies | X | X |
| 3. | Conditions* | X | X |
| 4. | Immunizations | X | X |
| 5. | Laboratory Results | X | - |
| 6. | Medications | X | X |
| 7. | Procedures | X | X |
| 8. | Appointments | X | - |
| 9. | Encounters | X | - |
| 10. | Notes and Radiology Reports | X | - |
| 11. | Advance Directives | TBD | - |
| 12. | (Tricare for DoD) Claims Data | TBD | - |
| 13. | Providers | TBD | - |
| 14. | Questionnaires | TBD | - |

* Conditions are also referred to as problems/diagnoses

** Only Anatomic Pathology laboratory results

*The DoD Migration is focused on migrating the "PAMPI+" domains directly to Millennium, which constitute a subset of the domains VA is targeting for migration.*

| Document ID: 0.7.1705.630777-000004 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | [EXTERNAL] extremely confidential - eyes only - please do not forward or share - secva message this morning (3).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:03 CDT 2018 |

**To:** Wynn, Jackie (b)(6) @mitre.org]; Blackburn, Scott R. (DISABLED ACCT)[Scott.Blackburn@va.gov]
(b)(6)
**From:** Peter Levin
**Sent:** Thur 1/4/2018 10:58:02 AM
**Subject:** [EXTERNAL] extremely confidential - eyes only - please do not forward or share - secva message this morning

Jackie suggested last night that I close the loop with the secretary. She was right/great idea.

My message to him this morning, below.

Scott, literally my waking thought was of you. Best of luck with the surgery.

And best personal regards to both of you, -P

===

Hi David,

Three meetings yesterday:
1) with Windom and two MITRE reps - WH issues about my previous VA affiliation came up - I believe these were fully addressed to John's satisfaction. As you know, the outcome of the presidential election was a surprise; there are some hurt feelings from an appointee aspirant who thought I could have done more to help them *prior* to the election. This was also addressed to his satisfaction.

That said, we spent most of the hour reviewing information architecture, surprisingly good agreement (he liked the way I explained it, exactly the same way I explain it to you [PLL - and Scott and Jackie]). From a content perspective we are fully aligned, in sequence, priority, and most of the packaging. The discussion confirmed that.

2) unexpectedly, as I was walking out (coat on, rushing to elevator) Ash came out and asked me to speak to Camilo Sandoval, who I did not know or know of, and had not previously met. From a technical perspective, I had the identical conversation with him that I just had, literally minutes before, with John W. When I left I thought we were okay.

We weren't. I left the building and was well on my way to my office when John called me back.

3) we then had the architectural discussion for the third time, this time with Camilo, Ash, and Short (who came in late but was there for most of it, and did most of the talking after he arrived).

In a professional-but-clear way, after net five hours, I went around the table and asked each of the participants a) if there was any difference or deviation between the discussions we had independently and the ones we had together (the answer was no, as it should have been) and b) if whatever crisis or misunderstanding existed before the third meeting was fully and satisfactorily resolved (the answer was yes, as it should have been).

There were some things in the Camilo discussion that may be worth a short call (or visit, as you prefer).

Best, -P

| Document ID: 0.7.1705.630777-000005 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | [EXTERNAL] Fwd: amida weekly ehrm data migration update (4).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:03 CDT 2018 |

**To:** Blackburn, Scott R. (DISABLED ACCT)[Scott.Blackburn@va.gov]
**From:** Peter Levin
**Sent:** Thur 9/14/2017 9:43:47 PM
**Subject:** [EXTERNAL] Fwd: amida weekly ehrm data migration update
Amida VA EHRM Weekly Report -sept 14 -final.docx

Scott - confidential to you, please do not forward or share.

MITRE instructed us to stop sending these to VA (Windom, Short, Bates, Hilton, Mingo) three or four weeks ago; I doubt they forward these or anything like them to stakeholders there, so I don't know what they now know (or think). This report is sent by my program manager to theirs; I normally cc Jackie as a courtesy. Jimmy asked this week to be included.

I have not spoken with John W (or the secretary) since before Labor Day.

I did speak to David immediately after his "announcement" of the data migration strategy in mid-August, and advised caution on technical grounds. That was the last I spoke with him on this project. I have not spoken to him at all about the threat to end our work at MITRE. We *have* had brief (and successful) interactions on other non EHRM topics.

Most respectfully and best regards,

Peter

---------- Forwarded message ----------
From: **Peter Levin** (b)(6) @amida.com>
Date: Thu, Sep 14, 2017 at 4:05 PM
Subject: amida weekly ehrm data migration update
To: "Wynn, Jackie" <(b)(6) @mitre.org>, "Providakes, James F." (b)(6) @mitre.org>
Cc: "Fugate, Tom" <(b)(6) @mitre.org>

Dear Jackie, dear Jimmy,
please find attached the Amida weekly report, due today.

Its long, I know. We've been at it now for 6 weeks, and this is basically what I would have expected in terms of depth, synthesis, and detail.

Please note that the go-forward plan (something we worked on hard last week) is included in Appendix A, exhibit 7 (the data migration plan and LOE).

Also, if you just look at one thing, please go to figure 9 on page 23. Honestly, this is the "money shot" because it is such a good example. Basically it is really hard to do data mapping (right). The caption reads:

The Vx130 Immunization Domain includes 18 fields, and the Cerner Immunization Data Domain model includes 23 fields. This figure illustrates the beginning of a crosswalk to show example migration paths for six fields from the source data model to the target Cerner model. Note that this is an incomplete crosswalk intended only for purposes of illustration.

Many thanks and best regards,

Peter

| Document ID: 0.7.1705.630777-000006 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | Amida VA EHRM Weekly Report -sept 14 -final.docx <extracted> |
| Last Modified: | Mon Aug 13 10:46:03 CDT 2018 |

CONFIDENTIAL

Amida

# Weekly Status Report
# For the MITRE Corporation

# On Data Migration Support for VA Electronic Health Record Modernization

September 14, 2017

Jeremy Collins
Joy Hwang
Matthew McCall
Leslie Ramirez
Afsin Ustundag
Peter L. Levin

Prepared by
Amida Technology Solutions, Inc.

Amida

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# II. Weekly Summary

## September 2 - September 8

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| Document ID: 0.7.1705.630777-000007 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | [EXTERNAL] Re: call today? (5).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:03 CDT 2018 |

**To:** Blackburn, Scott R. (DISABLED ACCT)[Scott.Blackburn@va.gov]
**From:** Peter Levin
**Sent:** Mon 9/4/2017 6:40:27 PM
**Subject:** [EXTERNAL] Re: call today?

Okay, that was quick.
I don't know if this is you in the background, but I just got a call from a "VA insider" saying that VA has told MITRE *not* to cut us, but to cut themselves back.

I can't wait to speak to you on Thursday (or later) ;)

THANKS and best,

-P

On Mon, Sep 4, 2017 at 1:20 PM, Peter Lev(b)(6) @amida.com> wrote:

Hi Scott,
I hope this finds you well and enjoying your last weekend, for now ;), as a federal employee. I am sorry to disturb you. I hope you'll agree it was the right thing to do.

Good news and bad news:

The good news is that Marcy and Rob apparently had a good discussion this week. You may or may not know this, and you may or may not understand this, but it is a direct result of your "intervention". I can explain as useful. But it was useful.

The bad news is that things with EHRM are going off the rails a bit. My advice from folks you know and trust is to raise this to David. I can see this going both ways. On the one hand, he needs to know. On the other hand, it will hurt Windom (which I absolutely don't want).

The root cause of the trouble is that he (David, and John W) are being told that everything is "all set" on data migration. It is simply not true. The people doing the telling are eager to see MITRE/Amida bounced from the team. I got that call on Friday afternoon.

As usual, the contractors are just telling leadership what they want to hear. And the government employees have an agenda all their own. I personally admire Windom a lot, but he does not have the technical judgment to make a decision, and he is relying on Short a lot. Sweeping stuff under the rug (for the next guy) is a pretty typical VA approach.

Indeed, the reason so many programs have failed at VA is because people don't accept and deal with the truth. Eventually that blows up and kills the program. This is what happened to HealtheVet, CoreFLS, Strategic Asset Management, Scheduling, and many other big VA IT programs. The only way we made VBMS successful was by forcing VBA and OIT to deal with all the hard truths of the program. That's exactly not what's happening here.

My draft to the secretary is below, and I think I should send it later this evening or very first thing (6am) tomorrow. Your advice and perspective would be invaluable.

Thanks and best,

Peter

==========

Mr. Secretary:

This email is to alert you that I have been told my contract with VA to analyze the data migration plan for Cerner is at risk

and may be cancelled as soon as tomorrow.

Senior members of the program office are not happy that I continue to tell you that I do not believe their data migration plan is adequate, and will put the program at long-term risk.

For as long as you care to hear it, I will continue to tell you the facts as I see them.

And yes, this also means I am willing to forgo my sub-contract to do so. You should expect nothing less from any of us.

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|---|---|
| Document ID: 0.7.1705.630777-000008 | |
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | EsaEmbeddedMsg (6).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:03 CDT 2018 |

**To:** Peter Levin (b)(6) @amida.com]
**Cc:** Short, John (VACO)[John.Short@va.gov]
**From:** Blackburn, Scott R.
**Sent:** Wed 2/21/2018 7:47:29 PM
**Subject:** RE: [EXTERNAL] data migration (request from jackie/mitre)

I'm guessing John Short is the right guy to talk to here

**From:** Peter Levin (b)(6) @amida.com]
**Sent:** Wednesday, February 21, 2018 7:14 AM
**To:** Blackburn, Scott R.
**Subject:** [EXTERNAL] data migration (request from jackie/mitre)

Hi Scott,

Jackie asked me to follow up with you regarding a data migration task (or initiative?) that you are heading (or just know about?).

Thinking about you guys a lot; eager to see you at your convenience.

Best,

-P

617-921-0471

| Document ID: 0.7.1705.630777-000009 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | EsaEmbeddedMsg (7).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:03 CDT 2018 |

**To:** Blackburn, Scott R. (DISABLED ACCT)[Scott.Blackburn@va.gov]
**From:** Peter Levin
**Sent:** Wed 2/21/2018 12:13:37 PM
**Subject:** [EXTERNAL] data migration (request from jackie/mitre)

Hi Scott,
Jackie asked me to follow up with you regarding a data migration task (or initiative?) that you are heading (or just know about?).

Thinking about you guys a lot; eager to see you at your convenience.

Best,

-P

617-921-0471

| | |
|---|---|
| Document ID: 0.7.1705.630777-000010 | |
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | FW: [External] connecting scott to charlie (8).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:03 CDT 2018 |

**To:** James, Bill[Bill.James@va.gov]
**From:** Blackburn, Scott R.
**Sent:** Tue 11/7/2017 12:57:39 AM
**Subject:** FW: [External] connecting scott to charlie

Do you know this guy?

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**From:** De Sanno, Charles [USA] (b)(6) @bah.com]
**Sent:** Monday, November 06, 2017 11:23 AM
**To:** Peter Levin; Blackburn, Scott R.
**Subject:** [EXTERNAL] Re: [External] connecting scott to charlie

Peter, thank you very much for the introduction!

Scott, I'd love to have the opportunity to meet you and discuss OIT and future road ahead. I can also discuss the past if interested as I created OIT in 2006 and ran engineering and operations for 8 years before leaving. I am the architect of many systems and processes still in place at VA. Additionally, I architected and won MASS while at Leidos and of course the EHRM PMO at Booz Allen.

My goal is to help in any way!

Perhaps we can synch up in person soon! I know you are very busy, so please let me know who I can work with to possibly find some time whether it be in person or via phone!

My cell is (b)(6)

Thank you!

Charlie De Sanno
Partner, Booz Allen Hamilton

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**From:** Peter Levin <(b)(6) @amida.com>
**Sent:** Saturday, November 4, 2017 10:57:10 AM
**To:** Blackburn, Scott R.; De Sanno, Charles [USA]
**Subject:** [External] connecting scott to charlie

Dear Scott, dear Charlie,

with this email I'd like to briefly connect you.

Scott is the recently-former interim deputy secretary, and the acting CIO at VA. It has been a great privilege and joy to get to know and occasionally work with him.

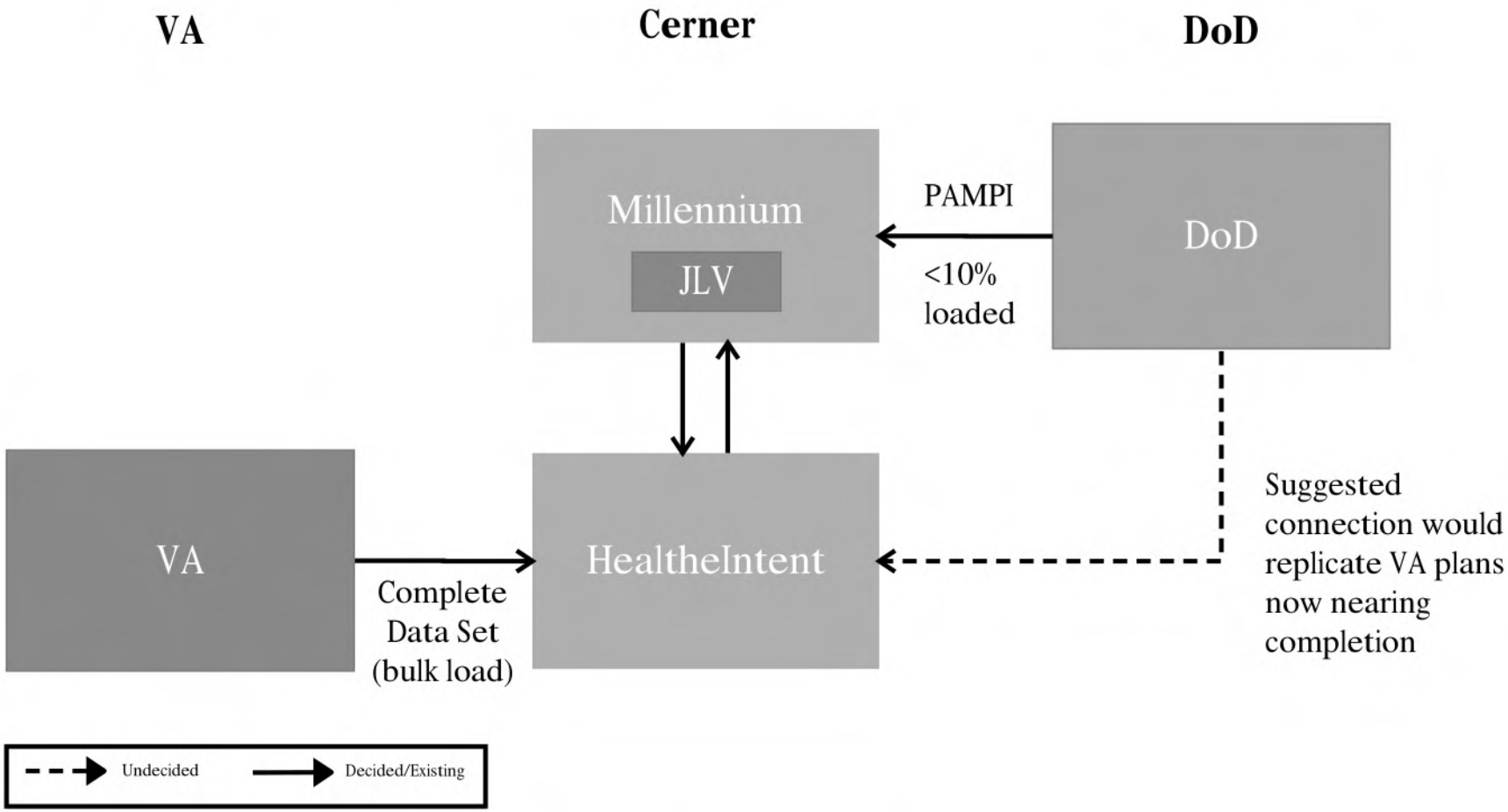
Charlie was a deputy CIO when we both worked for Roger, and someone I admire and trust as a "no nonsense, get it done" guy with a tremendous sense of humor and wonderful administrative touch. He is today at BAH and is leading the EPMO effort on their behalf.

I warmly recommend you to each other.

Best regards,

Peter

| Document ID: 0.7.1705.630777-000013 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | Levin slide on DoD data sharing -october 2017.pptx <extracted> |
| Last Modified: | Mon Aug 13 10:46:03 CDT 2018 |




PAMPI – Problems, Allergies, Medications, Procedures, Immunizations
Not currently included: Laboratory Results, Radiology Reports, Vital Signs, Notes, and Tricare Claims data
JLV is displayed within Millennium – Attaches to legacy DoD, VistA, other Cerner instances, eHealth Exchange

<u>Important</u>: Cerner provided Medicines and Allergies should be provided back to VA (HDR) and DoD (CDR)

# VA-DoD Data Comparison

| | Cerner Data Domain | VA Migration | DoD Migration |
|---|---|---|---|
| 1. | Demographics | X | X |
| 2. | Allergies | X | X |
| 3. | Conditions* | X | X |
| 4. | Immunizations | X | X |
| 5. | Laboratory Results | X | - |
| 6. | Medications | X | X |
| 7. | Procedures | X | X |
| 8. | Appointments | X | - |
| 9. | Encounters | X | - |
| 10. | Notes and Radiology Reports | X | - |
| 11. | Advance Directives | TBD | - |
| 12. | (Tricare for DoD) Claims Data | TBD | - |
| 13. | Providers | TBD | - |
| 14. | Questionnaires | TBD | - |

* Conditions are also referred to as problems/diagnoses

** Only Anatomic Pathology laboratory results

*The DoD Migration is focused on migrating the "PAMPI+" domains directly to Millennium, which constitute a subset of the domains VA is targeting for migration.*

| | |
|---|---|
| Document ID: 0.7.1705.630777-000016 | |
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | RE: [EXTERNAL] check in (12).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:03 CDT 2018 |

**To:** Peter Levin (b)(6) @amida.com]
**From:** Blackburn, Scott R.
**Sent:** Wed 4/4/2018 12:39:41 AM
**Subject:** RE: [EXTERNAL] check in

Thanks for the note. I'm trying to keep IT momentum going. EHRM is completely up in the air until leadership questions shake out.

**From:** Peter Levin (b)(6) @amida.com]
**Sent:** Tuesday, April 03, 2018 12:23 PM
**To:** Blackburn, Scott R.
**Subject:** [EXTERNAL] check in

Hi - just a quick hello and sign of life. Hope you're holding up okay. I've enjoyed and appreciated your social media posts/tweets. Best, -P

There were some things in the Camilo discussion that may be worth a short call (or visit, as you prefer).

Best, -P

Document ID: 0.7.1705.631071

From: Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=vacosandoc>
To: Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt)/cn=recipients/cn=vacosandoc>
Cc:
Bcc:
Subject: FW: Please Review Tonight
Date: Mon Aug 13 2018 11:46:03 EDT
Attachments: [EXTERNAL] call today? (1).msg
[EXTERNAL] dod data sharing (2).msg
Levin slide on DoD data sharing -october 2017.pptx
[EXTERNAL] extremely confidential - eyes only - please do not forward or share - secva message this morning (3).msg
[EXTERNAL] Fwd: amida weekly ehrm data migration update (4).msg
Amida VA EHRM Weekly Report -sept 14 -final.docx
[EXTERNAL] Re: call today? (5).msg
EsaEmbeddedMsg (6).msg
EsaEmbeddedMsg (7).msg
FW: [External] connecting scott to charlie (8).msg
FW: [EXTERNAL] dod data sharing (9).msg
ATT00001.htm
Levin slide on DoD data sharing -october 2017.pptx
FW: [EXTERNAL] roger baker (10).msg
RE: [EXTERNAL] check in (11).msg
RE: [EXTERNAL] check in (12).msg
RE: [External] connecting scott to charlie (13).msg
RE: [EXTERNAL] extremely confidential - eyes only - please do not forward or share - secva message this morning (14).msg
RE: [EXTERNAL] follow-up from our last meeting (15).msg
RE: [EXTERNAL] Fwd: meeting with rob on wednesday (16).msg
RE: [EXTERNAL] stakeholder enterprise portal (sep) and ebenefits (17).msg
RE: [EXTERNAL] susan perez (18).msg
RE: RE: [EXTERNAL] thursday check in (19).msg
RE: Schedule important: Jack Bates' Availability - Peter needs to re-schedule (20).msg
RE: Schedule important: Jack Bates' Availability - Peter needs to re-schedule (21).msg
Windom (22).msg

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Camilo Sandoval

202-461-6910

From: Sandoval, Camilo J.

Sent: Friday, May 04, 2018 2:12 AM
To: Spero, Casin D. <Casin.Spero@va.gov>; Hayes-Byrd, Jacquelyn <Jacquelyn.Hayes-Byrd@va.gov>; O'Rourke, Peter M. <Peter.ORourke@va.gov>
Subject: RE: Please Review Tonight

Pete—

This request from members of congress is based on inaccurate reporting by Arthur Allen from Politico, which was fueled by David Shulkin and Scott Blackburn. In fact, the real outside interference and conflict of interest came from Peter Levin, who was attempting to shape the direction of ongoing contract negotiations between the VA and Cerner. According to John Windom and Ash Zenooz, on several occasions Secretary Shulkin suggested to the EHRM team that Peter Levin be hired as a direct contractor. When those efforts failed, Peter Levin then acquired VA contracts through MITRE with Secretary Shulkin's influence. Please note that Peter Levin, Scott Gould, Stephen Ondra and Michele Flournoy (married to Scott Gould) all work for or are associated with AMIDA and MITRE. Ironically, they were all senior VA or DOD employees under the Obama administration with access to insider information.

A key question Arthur Allen and interested members of congress should investigate and write about is, why did Shulkin and Blackburn continue to communicate with Peter Levin, and put undue pressure on John Windom to hire Peter Levin's firm—AMIDA—as a contractor. Also, why was Shulkin in such a rush to sign the Cerner contract last year(Oct/Nov) when there was over 51 major findings and recommendations added to the contract over the past several months? And for the record, it was a team of top medical CIOs and practitioners—put together by Ike Perlmutter and Bruce Moskowitz—who identified the flaws in the contract and made the recommendations, not MITRE. MITRE had advised against a strategic pause, and then took credit for the work done after.

Please read attachments.

From: Spero, Casin D.
Sent: Thursday, May 03, 2018 7:31 PM
To: Sandoval, Camilo J.; Hayes-Byrd, Jacquelyn; O'Rourke, Peter M.
Subject: RE: Please Review Tonight

Good info Cam, we may want to remind the interested parties of that.

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From: Sandoval, Camilo J.
Sent: Thursday, May 03, 2018 4:13:22 PM
To: Hayes-Byrd, Jacquelyn; O'Rourke, Peter M.; Spero, Casin D.
Subject: RE: Please Review Tonight

Thank you Jacquie. If we go back to Shulkin's EHRM hearing testimony, he mentions under oath that he and Scott Blackburn requested outside, non-governmental help from the top 5 Medical CIO's. These experts are who alerted him to the many interoperability issues previously unknown to Cerner or VA staff.

From: Hayes-Byrd, Jacquelyn
Sent: Thursday, May 03, 2018 5:42 PM
To: O'Rourke, Peter M.; Sandoval, Camilo J.; Spero, Casin D.
Subject: Please Review Tonight

Please see these two documents tonight as the Dep Sec provided this to Colonel Gainey late this afternoon

And Andy will be giving it to the Secretary first in the a.m. don't want you to be blindsided and I would like for you to be prepared to discuss.

Jacquie

From: Washington, Conrad
Sent: Thursday, May 03, 2018 5:32 PM
To: Hayes-Byrd, Jacquelyn
Subject: REQUESTED SCAN

Conrad Washington

Special Assistant

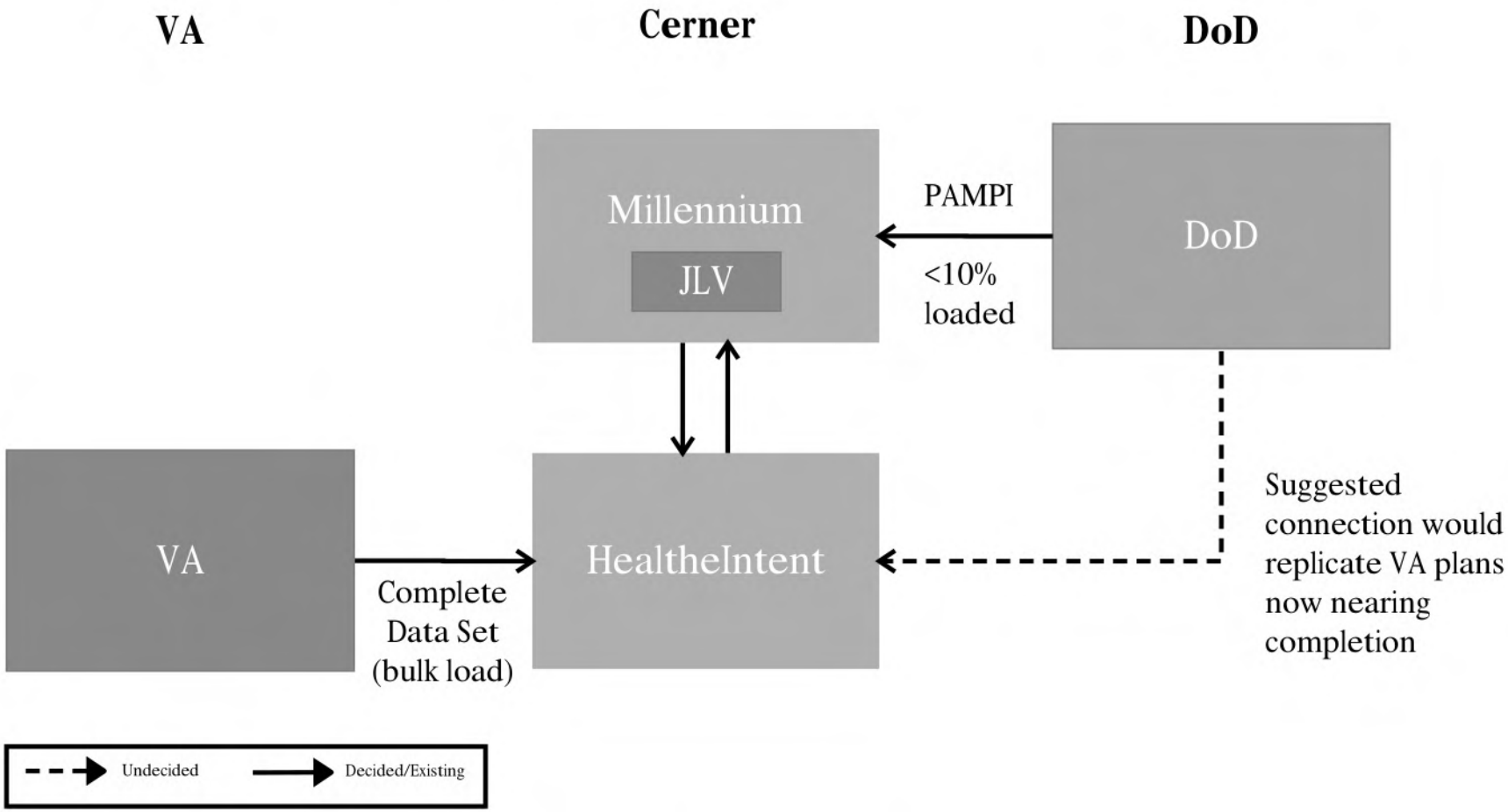
Office of the Secretary

810 Vermont Ave, NW

Washington, DC 20420

202-461-7865 (O)

Conrad.washington@va.gov

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| 8. | Appointments | X | - |
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** Only Anatomic Pathology laboratory results

*The DoD Migration is focused on migrating the "PAMPI+" domains directly to Millennium, which constitute a subset of the domains VA is targeting for migration.*

| Document ID: 0.7.1705.631071-000004 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | [EXTERNAL] extremely confidential - eyes only - please do not forward or share - secva message this morning (3).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:03 CDT 2018 |

**To:** Wynn, Jackie (b)(6) @mitre.org]; Blackburn, Scott R. (DISABLED ACCT)[Scott.Blackburn@va.gov]
**From:** Peter Levin
**Sent:** Thur 1/4/2018 10:58:02 AM
**Subject:** [EXTERNAL] extremely confidential - eyes only - please do not forward or share - secva message this morning

Jackie suggested last night that I close the loop with the secretary. She was right/great idea.

My message to him this morning, below.

Scott, literally my waking thought was of you. Best of luck with the surgery.

And best personal regards to both of you, -P

===

Hi David,

Three meetings yesterday:
1) with Windom and two MITRE reps - WH issues about my previous VA affiliation came up - I believe these were fully addressed to John's satisfaction. As you know, the outcome of the presidential election was a surprise; there are some hurt feelings from an appointee aspirant who thought I could have done more to help them *prior* to the election. This was also addressed to his satisfaction.

That said, we spent most of the hour reviewing information architecture, surprisingly good agreement (he liked the way I explained it, exactly the same way I explain it to you [PLL - and Scott and Jackie]). From a content perspective we are fully aligned, in sequence, priority, and most of the packaging. The discussion confirmed that.

2) unexpectedly, as I was walking out (coat on, rushing to elevator) Ash came out and asked me to speak to Camilo Sandoval, who I did not know or know of, and had not previously met. From a technical perspective, I had the identical conversation with him that I just had, literally minutes before, with John W. When I left I thought we were okay.

We weren't. I left the building and was well on my way to my office when John called me back.

3) we then had the architectural discussion for the third time, this time with Camilo, Ash, and Short (who came in late but was there for most of it, and did most of the talking after he arrived).

In a professional-but-clear way, after net five hours, I went around the table and asked each of the participants a) if there was any difference or deviation between the discussions we had independently and the ones we had together (the answer was no, as it should have been) and b) if whatever crisis or misunderstanding existed before the third meeting was fully and satisfactorily resolved (the answer was yes, as it should have been).

There were some things in the Camilo discussion that may be worth a short call (or visit, as you prefer).

Best, -P

| Document ID: 0.7.1705.631071-000005 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | [EXTERNAL] Fwd: amida weekly ehrm data migration update (4).msg <extracted> |
| Last Modified: | Mon Aug 13 10:46:03 CDT 2018 |

**To:** Blackburn, Scott R. (DISABLED ACCT)[Scott.Blackburn@va.gov]
**From:** Peter Levin
**Sent:** Thur 9/14/2017 9:43:47 PM
**Subject:** [EXTERNAL] Fwd: amida weekly ehrm data migration update
Amida VA EHRM Weekly Report -sept 14 -final.docx

Scott - confidential to you, please do not forward or share.

MITRE instructed us to stop sending these to VA (Windom, Short, Bates, Hilton, Mingo) three or four weeks ago; I doubt they forward these or anything like them to stakeholders there, so I don't know what they now know (or think). This report is sent by my program manager to theirs; I normally cc Jackie as a courtesy. Jimmy asked this week to be included.

I have not spoken with John W (or the secretary) since before Labor Day.

I did speak to David immediately after his "announcement" of the data migration strategy in mid-August, and advised caution on technical grounds. That was the last I spoke with him on this project. I have not spoken to him at all about the threat to end our work at MITRE. We *have* had brief (and successful) interactions on other non EHRM topics.

Most respectfully and best regards,

Peter

---------- Forwarded message ----------
From: **Peter Levin** <(b)(6) @amida.com>
Date: Thu, Sep 14, 2017 at 4:05 PM
Subject: amida weekly ehrm data migration update
To: "Wynn, Jackie" <(b)(6) @mitre.org>, "Providakes, James F. (b)(6) @mitre.org>
Cc: "Fugate, Tom" <(b)(6) @mitre.org>

Dear Jackie, dear Jimmy,
please find attached the Amida weekly report, due today.

Its long, I know. We've been at it now for 6 weeks, and this is basically what I would have expected in terms of depth, synthesis, and detail.

Please note that the go-forward plan (something we worked on hard last week) is included in Appendix A, exhibit 7 (the data migration plan and LOE).

Also, if you just look at one thing, please go to figure 9 on page 23. Honestly, this is the "money shot" because it is such a good example. Basically it is really hard to do data mapping (right). The caption reads:

The Vx130 Immunization Domain includes 18 fields, and the Cerner Immunization Data Domain model includes 23 fields. This figure illustrates the beginning of a crosswalk to show example migration paths for six fields from the source data model to the target Cerner model. Note that this is an incomplete crosswalk intended only for purposes of illustration.

Many thanks and best regards,

Peter

| Document ID: 0.7.1705.631071-000006 | |
|---|---|
| Owner: | Sandoval, Camilo J. </o=va/ou=exchange administrative group (fydibohf23spdlt) /cn=recipients/cn=vacosandoc> |
| Filename: | Amida VA EHRM Weekly Report -sept 14 -final.docx <extracted> |
| Last Modified: | Mon Aug 13 10:46:03 CDT 2018 |

CONFIDENTIAL

Amida

# Weekly Status Report
# For the MITRE Corporation

# On Data Migration Support for VA Electronic Health Record Modernization

September 14, 2017

Jeremy Collins
Joy Hwang
Matthew McCall
Leslie Ramirez
Afsin Ustundag
Peter L. Levin

Prepared by
Amida Technology Solutions, Inc.

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