

**THE DEVELOPMENT AND EXPANSION OF HOME-  
TELEHEALTH IN VHA: A PAPER SUMMARIZING THE  
DISCUSSIONS AND RECOMMENDATIONS GENERATED FROM  
A TWO DAY VHA MEETING ON HOME TELE-HEALTH IN APRIL  
2002**

<b>EXECUTIVE SUMMARY</b> .....	3
Results .....	4
General Recommendations: .....	4
Specific Recommendations:.....	4
Research considerations:.....	8
<b>SECTION A</b> .....	9
Background and scope of this paper: .....	9
<b>SECTION B</b> .....	10
Panel 1: Identifying Veterans’ Needs for Home-telehealth applications.....	10
Format and Composition of Panel: .....	10
Panel 1: Conclusions.....	16
Recommendations.....	17
<b>SECTION C</b> .....	18
Panel 2: Clinical Telehealth implementation.....	18
Format and composition of panel: .....	18
Panel 2: Conclusions.....	21
Recommendations.....	21
<b>SECTION D</b> .....	23
Panel 3: Technology Considerations for Home-Telehealth.....	23
Format and composition of panel: .....	23
Panel 3: Conclusions.....	30
Recommendations.....	30
<b>SECTION E</b> .....	31
Panel 4: The Management of Home-telehealth .....	31
Format and composition of panel: .....	31
Panel 4. Conclusions.....	36
Recommendations.....	36
<b>APPENDIX 1</b> .....	38
Attendees and Mail Reviewers of VHA Home-telehealth Consensus Recommendations .....	38
<b>APPENDIX 2</b> .....	40
Suggested Clinical Outcome Measures for Home-Telehealth.....	40
<b>APPENDIX 3</b> .....	41
<b>GLOSSARY</b> .....	41
<b>REFERENCES</b> .....	43

## **EXECUTIVE SUMMARY**

### **Background**

The Department of Veterans Affairs is recognized as a leader in developing home health care services involving the use of new information technologies (home-telehealth). Among the suggested benefits for home-telehealth is that it can move the locus of care for patients with chronic diseases from hospitals into the home. Home-telehealth is at the leading edge of health technology development and is arguably neither a single health care intervention nor a simple vehicle to facilitate care delivery. Instead home-telehealth should be considered as part of an overall “package of care”, something that can involve a range of health care interventions whose delivery is mediated via a number of different innovative information technologies. The current situation where the scientific evidence lags behind the immediate pragmatic advantages of using home-telehealth and cannot, therefore, provide comprehensive standards to support its uniform implementation or systematic evaluation, presents a quandary for VHA. Faced with a health technology that may increase the access of veterans to high quality care yet without adequate evidence to support it or a standard setting body to endorse it, the Telemedicine Strategic Healthcare Group in VHA convened a consensus meeting with the objectives of:

1. Reviewing the current evidence to support the implementation of home-telehealth
2. Creating recommendations to underpin the uniform adoption and systematic evaluation of home-telehealth in VHA
3. Suggesting a research and development agenda to establish an evidence base for the appropriate incorporation of home-telehealth into VHA

On April 18<sup>th</sup> and 19<sup>th</sup> 2002 a selected group that included VISN Clinical Managers, VACO program staff and field-based experts in home care (both public and private sector) and in the provision of long-term care (LTC) met to achieve the objectives described above and encapsulate these in a consensus document. Travel constraints imposed by budget restrictions meant that some of the expected invitees could not attend the meeting. They agreed to act as mail reviewers of this consensus document.

### **Methodology**

The format for the 18<sup>th</sup> and 19<sup>th</sup> 2002 VHA home-telehealth meeting consisted of 4 consecutive panel presentations. Previously prepared papers were presented at each of these panel sessions, and covered the following topics:

1. An assessment of needs for developing home-telehealth services
2. An evidence review and associated recommendations on what home-telehealth applications should be clinically implemented
3. Options for the technological infrastructure requirements to support home-telehealth
4. An appraisal of the managerial support and business processes needed to underpin home-telehealth usage

The task of each of the panels was to develop conclusions and presumptive recommendations, including setting the required level for an associated financial

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investment. These conclusions and recommendations required unanimous consensus of the meeting attendees and the mail reviewers for them to be included in this consensus recommendations document.

### **Results**

The outcome of the meeting was that the following sets of general and specific recommendations were developed.

#### **General Recommendations:**

1. VHA should expand its use of home-telehealth in a phased development, one that is based upon a standardized clinical approach and establishment of a uniform technological infrastructure.
2. A near-term investment of \$15 million dollars should be made to further expand home-telehealth within VHA and a further \$10 million HSR&D funding should be made available to explore the effectiveness of the technology on different populations.
3. VHA should strive to continue to be the national/international leader in the field of home-telehealth that it's existing home-telehealth expertise and unique information technology capacity makes possible.

#### **Specific Recommendations:**

### **NEEDS ASSESSMENT**

#### **Conclusions:**

1. There is a growing requirement for VHA to meet the non-institutional health care needs of its veteran population who have complex chronic illnesses and need for specialty care, long term care and end-of-life care.
2. Home-telehealth has the promise to play an important role in meeting these needs, and in shifting the location of care from institutional to non-institutional settings whenever feasible.
3. The role for home-telehealth in VHA is consistent with VHA's health care values and with the cost-effective delivery of care.

#### **Recommendations**

1. VHA should expand its use of home-telehealth.
2. The initial thrust for home-telehealth implementation should target high risk, high use, high-cost, patients.
3. The subsequent phase of implementation should involve primary and specialty care.
4. VHA should actively explore the use of home-telehealth to maintain the independence of veterans with chronic illnesses and reduce the unnecessary need to place these people in institutional care.
5. Criteria need to be established for patient selection and discharge criteria for home-telehealth care.

6. HSR&D programs in home-telehealth must assemble evidence on needs assessment methodologies, determining return on investment (ROI), assessing the impact of the technology, outcomes measurement, improving access to care, and establishing best practices.

### **CLINICAL IMPLEMENTATION**

#### **Conclusions:**

1. The current evidence on home-based telehealth shows mixed results in terms of “outcomes”.
2. In general, the cost effectiveness of home-based telehealth is not addressed in studies.
3. Patient satisfaction is high, but studies are descriptive and reasons why patients like home telehealth have not been properly explored.
4. Providers are more resistant to using the technology, but reasons for this have not been elucidated.
5. The American Telemedicine Association has published guidelines on home-based technologies. These revised guidelines now address non-video applications, but do not focus on disease-specific care. There are few telehealth specific outcome studies available to evaluate the efficacy of these technologies.

#### **Recommendations:**

1. The clinical implementation of home-telehealth should be driven by both cross cutting patient needs (e.g., medication management) and by disease specific care (e.g., CHF, diabetes).
2. Home-telehealth is a mechanism to enhance the delivery of care and should be considered as part of an overall “package of care”
3. A health management model should be used for implementing home-telehealth with disease management strategies that indicate benefits on
  - a. Medication management
  - b. Nutrition
  - c. Exercise
  - d. Smoking cessation
  - e. Moderating alcohol consumption
  - f. Wound care
  - g. Patient education
  - h. Preventive health
  - i. Chronic disease management
4. Home-telehealth should be delivered using the least complex technology that meets patient management goals.
5. Systematic evaluation of programs should be linked to specific goals
  - a. Building healthy communities
  - b. Improving access to care
  - c. Raising quality
  - d. Reducing hospital admission and other use of system resources
  - e. Reducing costs
  - f. Improving functional status

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- g. Raising levels of patient satisfaction
  - h. Reducing inappropriate medication requirements
  - i. Improving diagnostic parameters
  - j. Improving self care management and assist care givers
6. Technology should be targeted toward programs aimed at improving or maintaining health
  7. Specific diseases should be factored into the equation via a risk stratification e.g. involving VA/DoD Diabetes Guidelines
  8. Access to care needs to be included in the design of services
  9. Comprehensive management includes consideration of co-morbidities
  10. R&D agenda must address:
    - a. Which population/s will benefit from home-telehealth?
    - b. Who is at risk for adverse outcomes in the absence of monitoring of community-dwelling populations?
    - c. What patient needs are suited to specific technology?
    - d. What are the patient safety issues, and how can they be addressed?
    - e. What is the mechanism of effect in home-telehealth?
  11. Organizational support services are needed in home telehealth
  12. Through R&D studies, VHA can assemble an adequate sample size to make definitive statements regarding the efficacy of the home-based application / program under consideration
  13. In R&D studies, VHA must include a control group (either usual care or alternative treatment comparison). For program evaluations, managers must incorporate a systematic evaluation of the program processes and patient outcomes which are related to the defined service / program goals and VHA wide goals. This evaluation must be planned prior to implementing the program.

### **TECHNOLOGICAL INFRASTRUCTURE**

#### **Conclusions:**

1. A VHA-wide technology strategy for home-telehealth needs to be agreed upon.
2. This strategy must be based on VISTA and VISTA Imaging

#### **Recommendations:**

1. An open systems approach should be developed VHA wide for all home-telehealth technologies with common standards for all technical functions.
2. A common VISTA interface needs to be developed so that home-telehealth technologies can be “plug and play” throughout VHA for the convenience of patients and practitioners.
3. The Home-Telehealth Strategy that the Telemedicine SHG is developing from this paper needs to interface with the VHA’s Information Technology Strategy.
4. The future technological vision for home-telehealth needs to be clearly documented
5. Standards for home telehealth need to be developed by September 2002
6. A VHA home-telehealth technical advisory group is proposed by the Telemedicine SHG to act as an interface between the VHA home-telehealth community, the home-telehealth clinical user group and VHA Office of Information.

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7. The Telemedicine SHG is recommending the establishment of a VHA home-telehealth user group that links with the VHA home-telehealth technical advisory group. This group is to consider the clinical requirements of the technology.
8. The basic technological infrastructure to provide server and call center support for home-telehealth must not be decentralized beyond the VISN level.
9. Patient data must be specified as belonging to VHA in procurement contracts for home-telehealth systems and equipment.
10. Commercial vendors of home-telehealth technologies should be encouraged not to use preliminary VHA data for marketing purposes.

### MANAGEMENT SUPPORT

#### **Conclusions:**

1. VHA-wide management processes need to be instituted to create home telehealth networks of sufficient size and sophistication to meet the care needs of veteran patients in a consistent and coherent manner
2. A reimbursement system to finance home-telehealth long-term is crucial

#### **Recommendations:**

1. The Telemedicine SHG, in conjunction with its VHA home-telehealth technical advisory group and the VHA home-telehealth user group should work to develop an internal VHA accreditation process for home-telehealth programs in the future.
2. VHA must be able to code for home-telehealth workload. The workload capture system for home-telehealth must be acceptable for EPRP measurement purposes. Home-telehealth workload must be reimbursable in VHA and home-telehealth programs should use DSS code 179 as a primary code:  
*DSS 179 records workload by VA health care professionals using real-time videoconferencing as a means to replicate aspects of face-to-face assessment and care delivery to patients in their homes using telehealth. This assessment and care may include: health/social evaluations, wound management, exercise plans, patient appearance, monitoring patient self-care, medication management, monitoring vital signs, including pain. These telehealth encounters must be electronically documented in CPRS. VA Medical Centers providing this care will have made significant investment in the staffing and technological infrastructure required to support such complex care provision in the home environment. Coding via 118-690 should record other home-telehealth activity pending definitive coding.*
3. VHA management systems for home-telehealth should code and track:
  - a. Telephone usage
  - b. Disease management associated with home-telehealth
  - c. Home messaging devices such as Health Buddy
  - d. Real-time videoconferencing in home-telehealth
  - e. Personal Computers, chat rooms, and e-mail systems
4. A VERA allocations system is needed for home-telehealth
5. VHA must establish VERA workgroup for home-telehealth

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6. When appropriately coded using DSS-179 Home-telehealth should count in the same way as an HBPC visit does
7. VHA needs to identify what are the core competencies for home-telehealth.
8. A uniform tool such as one based on the VISN 8 home-telehealth scorecard should be developed into a home-telehealth assessment model for monitoring and evaluation of home-telehealth See Appendix 3.
9. Staffing models for home-telehealth need to be established.
10. Establish a nationally coordinated training system for home-telehealth
11. Funding using seed grants is needed to establish programs but this must avoid creating a culture of chasing money instead of meeting patient needs
12. If central funds are made available to VISN's for the expansion of home-telehealth the new programs that result must have a clearly identified patient need, a sound business case and an implementation plan that meets VHA's home-telehealth accreditation process.
13. Tele phone and e-mail mediated care are part of the continuum of home-telehealth and integrating these modalities should be included in the design of any intended home-telehealth system.

### **Research considerations:**

#### **Conclusions:**

Adequate scientific data to establish an evidence-based platform for home-telehealth is lacking at present. In the face of pragmatic pressure to implement home-telehealth, VHA needs to establish an appropriate health services research and development agenda to provide clinical evidence to support ongoing implementation.

#### **Recommendations:**

Through adequately funded and constructed studies the HSR&D agenda must address the following clinical priorities:

- a. Defining needs assessment methodologies to define which population/s will benefit from home-telehealth
- b. Whether the patients who derive benefits in pilot programs in VISN 8 and elsewhere are receiving services that augment or replace traditional forms of care
- c. What clinical outcome measures should be used to monitor/evaluate the transition of traditional care delivery to home-telehealth
- d. How home-telehealth fits into the wider continuum of care
- e. The impact of home-telehealth on the locus of care and medical decision-making

## **SECTION A**

### **Background and scope of this paper:**

VHA is a leader in the delivery of care into the home using new information technology-based systems (home-telehealth) that facilitate the clinical coordination of care. VHA has individual home-telehealth programs that are exemplary but there is no unified strategy for a VHA-wide implementation of home-telehealth. Preliminary experience with home-telehealth in VHA suggests that using this new mode of care delivery to the home may:

- Improve the quality of care
- Reduce hospital admissions and other resource utilization
- Be associated with high levels of patient satisfaction

On April 18<sup>th</sup> and 19<sup>th</sup> 2002 a 2-day meeting was held in Washington DC at which experts in the field discussed the needs assessment, clinical, technical and managerial considerations associated with developing and expanding home-telehealth. Appendix 1 lists the presenters and attendees at this meeting together with people who were not able to be present but have agreed to review and comment on this document.

The aims of the meeting were to:

1. Decide whether a widespread adoption of home telehealth is appropriate for VHA
2. Define areas where a uniformity of process and approach is appropriate
3. Recommend a coherent and achievable VHA strategy for home telehealth

This paper summarizes the evidence presented at the 4 panel sessions that constituted the meeting and from which consensus recommendations were drawn, together with the resultant recommendations.

## **SECTION B**

### **Panel 1: Identifying Veterans' Needs for Home-telehealth applications**

#### **Format and Composition of Panel:**

Panel 1 considered the following subtopics:

- Changing Demographics
- Challenging unmet health care needs, short, medium and long range
- Relationship to network performance standards
- Projections of level of technology needed to meet the needs
- Future data requirements
- Anticipated R & D impact

The presenters at the panel were Tom Edes MD, Marlis Meyer, MA and Michael Miller MD, PhD. The subsequent recommendations were the consensus of the panel and the rest of the attendees at the meeting.

#### **VHA's Domain's of Value and relationship to network performance standards**

The panel reviewed veterans' needs in relationship to VHA's domains of value, namely the domains of:

- Quality
- Function
- Access
- Patient Satisfaction
- Cost
- Healthy Communities

The panel concluded that the use of telehome care is consistent with supporting VHA's domains of value, and meeting performance measure expectations.

As performance measures have evolved in VHA since 1997, the use of home-telehealth fits with current performance targets that are linked to the above domains of health care values in VHA.

#### **Changing Demographics**

In 1997 a Robert Wood Johnson Foundation (RWJF) study estimated 99 million Americans had chronic health care needs<sup>1</sup> with 41 million (41%) of these having restricted activities of daily living (ADL) and 12 million (12%) unable to live independently<sup>1</sup>. A separate study 3 years later raised this estimate by 50% to 150 million Americans (66%) of whom had one or more chronic health conditions that impaired their quality of life<sup>2</sup>. An estimated \$660 billion (66% of the annual US \$1 trillion health expenditure) is spent delivering care to people with chronic disease<sup>2</sup>.

The escalating need to care for patients with chronic health care conditions is mirrored in the VHA. The number of veterans cared for by VHA has risen by 100% since 1995.

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There are now 6 million enrolled veterans being cared for by VHA at an annual cost of \$23 billion<sup>3</sup>. The health care needs of the veteran population are higher than the US average, especially for mental health services. However, utilizing the CDC's ratios cited above, a conservative estimate for the veteran population would indicate that 4 million enrolled veterans have one or more chronic health conditions<sup>3</sup> with 1.64 million having restrictions in performing ADL and 480,000 unable to live independent lives<sup>4</sup>. Extrapolating from these data, if VHA were to fully meet such a requirement for care it would translate into an annual cost for nursing home placements of \$24 billion<sup>i</sup>. Just fulfilling this demand for chronic care would exceed the VHA's annual budget by \$1 billion. This suggests a shortfall in how VHA currently meets these needs. The 1997 Federal Advisory Commission (FAC) on Long Term Care (LTC) assessed VHA's current and future LTC needs and confirmed this shortfall exists.

In 1997 the Federal Advisory Committee on LTC reported that VHA met on average 21% of veterans LTC needs. Underlying this was an inter-VISN variation of 13-35%. The preponderance of VHA LTC care needs (80%) was being provided within an institutional setting. The recommendations that stemmed from these findings were that VHA should:

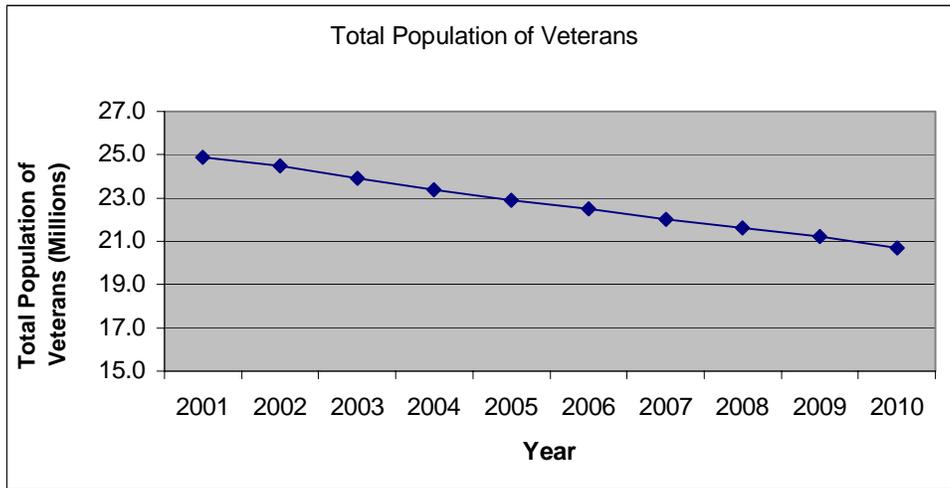
- Maintain current capacity for nursing home care
- Accommodate most of increased need for LTC through non-institutional care
- Triple the proportion of budget devoted to home & community-based care, from 2.5 to 7.5%
- Bring level of LTC for all up to the national average of 22%

Projecting the future need for LTC in VHA is a target that is constantly moving in response to changing demographics and levels of enrollment on the veteran population. Table A.1 shows the projected decline of 1.7% in the total veteran population that is anticipated to occur between the years 2000 and 2010. However, Table A.2 shows the increase in the number of unique veteran enrollees that is anticipated between 2001 and 2004. These data are at first sight contradictory. This seeming inconsistency is explained, in part, by the associated changes in age stratification of the veteran population that is detailed in Table A.3. The significance of this demographic stratification is the way in which the need for care is directly related to age as shown in Table A.4

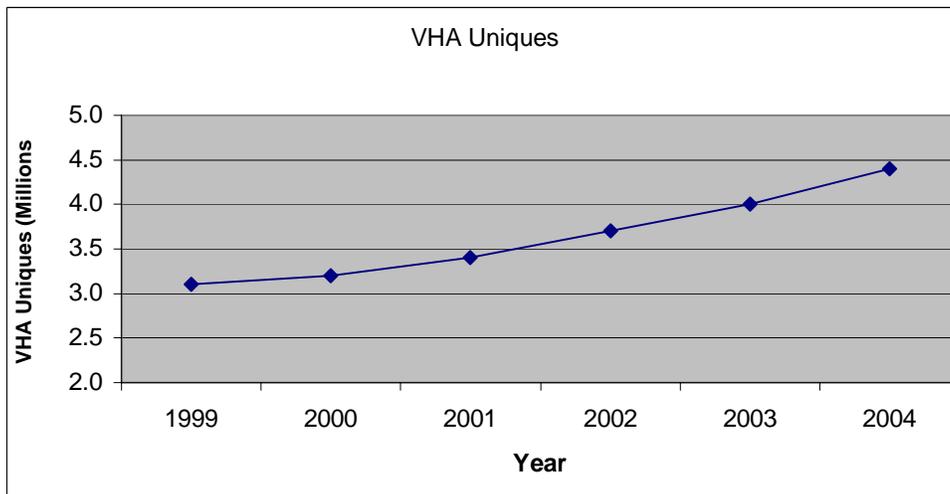
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<sup>i</sup> Assumes an average cost of care of \$50,000/person/year.

**Table A.1 Projected Changes in Veteran Population 2001 - 2010<sup>5</sup>**



**Table A.2 Projected Changes in VHA Uniques 2001 – 2004<sup>5</sup>**



**Table A.3 Changing Demographics of Veteran Population 2000-2010<sup>6</sup>**

Population group	2000 in millions	2010 in millions	% change
Veterans over 65 years	9.3	8.5	9
Veterans over 75 years	4.0	4.5	12
Veterans over 85 years	0.422	1.3	300

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Coupling the demographic data from Table A.3 with the increasing rates of disability associated with age in Table A.4 shows how the rates of disability in the VHA population will increase progressively as veterans aged 75 years and above skew the health care needs of veterans towards LTC.

**Table A.4 Percentage of over 65-year-old population with dependency in at least 1 ADL (bathing, dressing, toileting, transfer and feeding) Stratified by Age<sup>6</sup>**

<b>Population group</b>	<b>Percentage</b>
Age 65	10%
Age 75	18%
Age 85	47%

If, as the 1997 Federal Advisory Commission on Long Term Care recommendations suggests, VHA should meet more of the care needs of veterans with chronic health problems and this care should be non-institutional, where possible, Table A.5 anticipates the changing LTC requirements by health care sector between the years 2000 and 2005. These figures do not take account of the unknown and potential wildcard of the number of enrolled veterans. This figure may be influenced by:

1. The prevailing cost of health care in the private sector
2. Medication costs and co-payments
3. The general state of the US economy

**Table A.5 VHA Long-Term Care Planning Model Projections 2000 – 2005<sup>6</sup>**

<b>Year</b>	<b>Population numbers</b>	<b>Shortfall</b>
<b>Nursing Home Care LTC Planning Projections– need for care</b>		
FY00	40,800	
FY05	45,387(100% reliance: 178,846)	
<b>VA Home &amp; Community ADC LTC Planning Projections – need for care</b>		
FY00	14,111	
FY05	33,578 (16% reliance)	

Cognizant of the impending changes VHA Performance Plan and Strategic Targets for LTC are to increase the number of veterans receiving home & community-based care. Table A.6 shows how the VHA's goal is to triple average daily census (ADC) between 1997 (11,500) and 2006 (34,500). In meeting this goal VHA will provide care via H&CBC program such as HBPC; contract home care, VA and contract ADHC; Homemaker/HHA.

**Table A.6 VHA Strategic Targets for H&CBC 2001 – 2006<sup>6</sup>**

<b>YEAR</b>	<b>ADC</b>	<b>% incr prior yr</b>	<b>% incr FY00</b>
FY 2001	16,150	14.4%	14.4%
FY 2002	(21,679)	34%	53%
FY 2003	(26,994)	25%	91%
FY 2006	(34,500)	11%	144%

The Veterans Millennium Healthcare & Benefits Act (P.L. 106-117) has the following long term care mandates:

- Provide needed NH care for veterans who are 70% service-connected, or whose SC disability requires NH care
- Provide full array of institutional and non-institutional extended care services.
- Maintain staffing and level of extended care services at least at FY98 levels

Although the Millennium Bill has not mandated VHA to meet all the nursing home care needs of all veterans, an inexorable growth in the demand for chronic care that is above and beyond a concomitant increase in the need for acute care services is challenging the VHA to find innovative ways to serve its veteran population and contain costs.

**Challenging unmet health care needs, short, medium and long range**

Unmet health care and telehome care technology needs were provided (See Table A.7 below). These were identified as follows: Using percentages of high cost, high risk, high use populations as identified by the Community Care Coordination Service (CCCS) in VISN 8 (with the underlying assumption of this being somewhat representative nationally), the following categorization resulted which can be implemented in stepwise fashion:

- The short- term group is recommended for immediate implementation in a programmatic approach to home telehealth based on outcome data from VISN 8’s successful two-year experience as well as other VISNs’ early successes in improving quality while simultaneously reducing cost in this target population. This group represents 0.4% of the VA user population, and is identified by the combination of specific DRGs and a total cost at least \$25,000 per year. DRGs include CHF, COPD, Diabetes, mental health disorders and rehabilitation. This group, a subset of the medium term group representing .4% of the patient population, with specifically identified DRG’s, and an overall cost at or above \$25,000. DRG’s include, CHF, COPD, Diabetes, mental health disorders and rehabilitation.
- The medium term group would be phase two of the implementation process. This group includes and expands upon those in the short-term group. This medium term group represents 1.6% of the veteran user population, and includes additional diagnostic groupings such as SCI and dementia patients with care costs

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exceeding \$25,000 per year. VHA’s early experience suggests that home-telehealth interventions could benefit these groups as well.

- The long-term group – would be part of phase three of the implementation process and consist of the 41% of the chronic disease population, who were identified by the RWJF as having low ADL’s or limitations. This group, if not attended to early on in their disease state will become the high cost, high risk, high use population of the future. Early telehome care intervention has the potential for delaying this debilitating process while maintaining patient’s ability to function independently in their home.

Applying this criteria to the 4.1 unique veterans who use the system in FY 2001<sup>3</sup> the following results:

**Table A.7 Number of Veterans with Unmet Needs**

<b>Group</b>	<b>Number with unmet needs from 4.1 million uniques</b>
Short Term	16,400
Medium Term	65,500
Long Term	1,109,460

**Projections of level of technology needed to meet needs**

To project telehome technology needs the VISN 8 CCCS experience with 1300 patients and five different levels of technologies were used. Over time, as we move towards a more stable population it is projected that more and more in-home messaging devices would be utilized, and that the average cost per device decreases, see table below.

**Table A.8 Technology Needed to Support Veteran’s Unmet Needs**

	<b>Short Term N = 16,400</b>	<b>Medium Term N = 65,500</b>	<b>Long Term N = 1.11 M</b>
Current projected Patient costs	(Avg Cost \$25,000) \$410 M	(Avg Cost 25,000) \$1.64B	(Avg cost \$4,697) \$5.2B
# Telehealth Devices needed	11,152	44,540	754,800
Projected Cost for Devices	(Avg cost \$597) \$7M	(Avg cost \$522) \$23M	(Avg cost \$427) \$322M

**Future Data Requirements**

The panel suggested that the following data requirements be addressed nationally:

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- A standardized costing structure
- Standardized coding
- The establishment of telehomecare codes
- VERA recognition of telehomecare workload
- The creation of a telehomecare patient classification system

### **Anticipated R&D impact**

To illustrate the timeliness of this conference, the agendas of the April 2002 National Leadership Board and Clinical Managers meetings were reviewed. Numerous agenda items were focused on areas that seemed suitable for potential telehomecare research.

These agenda items included:

- Palliative Care
- Patient Safety Initiatives (smart home)
- Sleep Apnea Disorders
- Capacity Reports
- Waiting times update

A review of VA HSR&D progress reports for fiscal year 2001 revealed ongoing research in telehomecare and related technologies in a number of areas, including:

- Effectiveness and cost impact of a telecommunications system in COPD
- An evaluation of Home-Based Telemedicine services
- Randomized trial of a telephone intervention in Heart Failure patients
- Online family education to promote treatment compliance in Schizophrenia
- Centralized telephone outreach to assist smoking cessation among veterans
- Trial of a tailored message program to implement CHF guidelines
- Improving diabetes care via telephone assessment and patient education

Future R&D needs in support of telehomecare include studies regarding:

- Quality/Efficacy of home-telehealth
- Use of telehomecare as a translation tool: QUERI
- Cost Effectiveness of telehomecare
- Applicability/feasibility:
  - Primary Care
  - Specialty Care/post acute care
  - Long Term Care/H&CBC
  - Mental Health
  - Special Disabilities, including SCI
- Health System Research on the role of telehomecare in the continuum of care
- VA/DoD, VA/CMS

### **Panel 1: Conclusions**

1. There is a growing requirement for VHA to meet the non-institutional health care needs of its veteran population who have complex chronic illnesses and need for specialty care, long term care and end-of-life care.

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2. Home-telehealth has the promise to play an important role in meeting these needs, and in shifting the location of care from institutional to non-institutional settings whenever feasible.
3. The role for home-telehealth in VHA is consistent with VHA's health care values and with the cost-effective delivery of care.

### **Recommendations**

1. VHA should expand its use of home-telehealth.
2. The initial thrust for home-telehealth implementation should involve high-cost low volume patient groups.
3. The subsequent phase of implementation should involve primary and specialty care.
4. VHA should actively explore the use of home-telehealth to maintain the independence of veterans with chronic illnesses and reduce the unnecessary need to place these people in institutional care.
5. The use of home-telehealth to facilitate specialty and sub-specialty care should be explored. (Post acute care follow-up, palliative care, sleep apnea, etc.)
6. Criteria need to be established for patient selection and discharge criteria for home-telehealth care.
7. HSR&D programs in home-telehealth must assemble evidence on needs assessment methodologies, determining return on investment (ROI), assessing the impact of the technology, outcomes measurement, improving access to care, and establishing best practices.
8. Needs assessment data to support home-telehealth in general and specialty care must be gathered VHA wide.

## SECTION C

### **Panel 2: Clinical Telehealth implementation**

#### **Format and composition of panel:**

Panel 2 considered the clinical justification for the use of home-telehealth. This panel was a logical extension to Panel 1. Having established a patient need for home-telehealth in VHA the panel was tasked to review the “evidence” to support clinical applications that might meet these needs. The panel presenters were of: Rita Kobb, Bonnie Wakefield and Ruth Weinstock. The subsequent recommendations were the consensus of the panel and the rest of the attendees at the meeting.

#### **Background information:**

Telehealth holds great promise in increasing access to high quality health care, enhancing patient satisfaction, and managing resource utilization. Although over 300 telehealth programs have been implemented nationwide, there is little empirical evidence supporting the efficacy and cost effectiveness of telehealth, i.e., most of the literature on telehealth is descriptive and anecdotal in nature. This section reviews the current evidence base for telehealth home care.

Four reviews have been published describing telehealth research across a wide range of patient populations. These reviews have addressed telephone-based health care (Balas et al., 1997)<sup>7</sup>, patient satisfaction with interactive video consultation (Mair & Whitten<sup>8</sup>, 2000), and clinical trials in home and office based care (Currell, Urquhart, Wainwright, & Lewis, 2001<sup>9</sup>; Hersh et al., 2001<sup>10</sup>). Each review will be summarized, followed by a brief description of studies published subsequent to the reviews. This section finishes with panel recommendations.

The first review (Balas et al., 1997<sup>5</sup>), summarized, categorized, and evaluated randomized controlled trials evaluating distance medicine technologies. To be included in the review, studies met three eligibility criteria:

1. The study was a prospective randomized controlled trial
2. Electronic communication between two parties in separate locations was a key component of the intervention
3. Processes or patient outcomes were measured.

Studies were identified through a computerized search of the literature covering the years 1966-1996. Of the 80 trials reviewed, 7 used computerized communications and 73 used telephone-based communication. Of these 80 trials, 61 (76%) were studies in which the provider initiated the communication with patients and 50 (63%) reported positive outcomes or benefits. The approaches used and patient populations included in these studies are summarized in Table 1. Based on this review, the investigators concluded there were significant benefits for distance medical care in the areas of immunizations and vaccination rates, mammography rates, glucose levels and diet in people with diabetes, lifestyle changes during cardiac rehabilitation programs, and pain and function in patients with osteoarthritis. Reviewed studies showed mixed results in the effect of

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distance medicine in tobacco use prevention. Only two studies tested physician-initiated communication; 26 trials reported nurse-initiated communication, and 13 studies used non-healthcare staff to initiate communication. For the most part, studies did not address costs or cost effectiveness of the intervention.

**Table 1. Summary of Studies Included in Review by Balas et al. (1997<sup>5</sup>)**

<b>Transmission Mode</b>	<b>Patient Populations</b>
<u>Computer interventions (n=7 studies)</u> 100% positive outcomes	Transmit glucose values Access to health information Exercise monitoring
<u>Telephone follow-up interventions (n=37 studies)</u> 20 with positive outcomes	Emergency room Acute MI and CABG Mammography scheduling Osteoarthritis Tobacco use prevention in children
<u>Telephone reminders (n=23 studies)</u> 14 with positive outcomes	Appointment-keeping Immunizations Medication compliance Diabetic foot care
<u>Interactive telephone systems (n=6 studies)</u> 5 with positive outcomes	Caregivers for Alzheimer's patients Problem drinkers Medications Immunizations & vaccinations
<u>Telephone access (n=4 studies)</u> 100% with positive outcomes	After hours phone access for emergency consultation, clarification of instructions, emotional support
<u>Telephone screening (n=3 studies)</u> 1 with positive outcomes	<b>Documentation of clinical and administrative data on broad population</b> Health related quality of life assessments Family assessments in primary care

A second review focused on patient satisfaction with telemedicine (Mair & Whitten, 2000<sup>6</sup>). Studies were identified through a computerized search of the literature covering 1966-1998. Clinical trials that explored patient satisfaction with real time interactive video consultation were included in the review. Of the 32 studies included in the review, three were studies of home-based telemedicine. These three studies had relatively small sample sizes (n= 3, 20, 22). Most studies were demonstrations or feasibility studies, and thus exhibited a number of methodological deficiencies, including small convenience samples, lack of a control group and use of investigator-developed instruments to measure satisfaction. While patients were generally satisfied with this mode of interaction in the studies reviewed, important issues were not addressed. These issues include lack

## 19<sup>th</sup> June 2002 Draft Document Please Do Not Cite or Circulate

of attention to the reasons patients are satisfied or dissatisfied and failure to address how the interactive video consultation affected patient provider communication.

The third review was conducted by Hersh and colleagues (2001)<sup>8</sup> under a contract from the Agency for Healthcare Research and Quality. A similar review was conducted by Currell, Urquhart, Wainwright, & Lewis, 2001<sup>7</sup>. Since all studies reviewed by Currell et al. were included in the Hersh<sup>8</sup> review, only the report by Hersh is discussed here. This review evaluated the efficacy of telemedicine interventions for health outcomes in two classes of applications: home-based and office / hospital-based. The focus of the review was whether telemedicine systems improved clinical outcomes. Criteria for inclusion in the review were that the study was relevant to the topic and contained data on outcomes of clinical care that compared telemedicine with a control group of in-person care. Excluded were studies that used only telephone care or electronic mail or provided advice directly to the public. The investigators searched major electronic data bases covering the years from 1966-2000, reviewed telemedicine reports and compilations and three systematic reviews different in scope from their study, identified articles from reference lists, contacted known telemedicine experts, and hand searched the two major telemedicine journals. Over 4000 references were identified. Applying the inclusion criteria yielded 19 articles on home-based telemedicine. Of those, only 8 met the criteria for Class I studies (properly designed randomized controlled study). Of the 19, the most common home-based telemedicine application was for monitoring blood glucose in patients with diabetes (n=8). The remainder focused on general chronic disease management (n=3), hypertension (n=2), AIDS (n=2), and one each in the area of Alzheimer's disease, home exercise in patients with cardiac disease, families of children in a neonatal intensive care unit, and pediatric home ventilator patients. The strongest evidence for efficacy of telemedicine relative to clinical outcomes comes from chronic disease management, hypertension, and AIDS. While the most studied area is diabetes, these investigators found the benefits inconclusive when HgbA1c levels were used as the outcome measure.

The panel was asked to review the evidence for selected populations of patients, including those with congestive heart failure (CHF), diabetes, in need of post-operative care, mental health problems, palliative care, and spinal cord injury (SCI). Based on the reviews described in the previous section, the evidence base is limited on the efficacy of home-based telehealth interventions in these populations. Since the reviews were published, two additional studies focused on two of these populations have been published. The first is a trial of home-based interventions for patients with heart failure (Jerant, Azari, & Nesbitt, 2001<sup>11</sup>). The investigators compared interactive video, telephone calls, and usual outpatient care in 37 subjects. On average, health care utilization and thus cost of care was reduced in the intervention groups compared to usual care. However, consistent with previous research, the samples size in the study was small. The second study included 111 newly injured SCI patients who received interactive video, telephone calls, or usual outpatient care for nine weeks following discharge. For patients who completed one-year of follow-up, health related quality of life scores were higher and mean annual hospital days were lower in the intervention group patients.

## **19<sup>th</sup> June 2002 Draft Document Please Do Not Cite or Circulate**

The Informatics for Diabetes Education and Telemedicine (IDEATel) Project is a four-year demonstration project<sup>12</sup> funded by the Centers for Medicare and Medicaid Services with the overall goals of evaluating the feasibility, acceptability, effectiveness, and cost-effectiveness of telemedicine in the management of older patients with diabetes. The study is designed as a randomized controlled trial<sup>13</sup> and is being conducted by a statewide consortium in New York. Eligibility requires that participants have diabetes, are Medicare beneficiaries, and reside in federally designated medically underserved areas. A total of over 1500 participants have been randomized, half in New York City (the urban component) and half in other areas of the state (the rural component).

Intervention participants receive a home telemedicine unit that provides synchronous videoconferencing over standard telephone lines with a project-based nurse and dietitian, electronic transmission of home finger stick glucose and blood pressure data, and Web access to a project web site and web-based educational materials. Providing these functions through the home telemedicine unit requires tight integration of six components: the home telemedicine unit itself, case management software, a clinical information system, web-based educational material, data security, and networking and telecommunications. These six components were integrated through a variety of interfaces, providing a system that works well for patients and providers. End points include hemoglobin A1c, blood pressure and lipid levels; patient and provider satisfaction, health care service utilization; and costs. The project is intended to provide data to help inform regulatory and reimbursement policies for electronically delivered health care services.

### **Panel 2: Conclusions**

1. The current evidence on home-based telehealth shows mixed results in terms of “outcomes”.
2. In general, the cost effectiveness of home-based telehealth is not addressed in studies.
3. Patient satisfaction is high, but studies are descriptive and reasons why patients like home telehealth have not been properly explored.
4. Providers are more resistant to using the technology, but reasons for this have not been elucidated.
5. The American Telemedicine Association has published guidelines on home-based technologies. These revised guidelines now address non-video applications, but do not focus on disease-specific care. There are few telehealth specific outcome measures available to evaluate the efficacy of these technologies.

### **Recommendations**

1. The clinical implementation of home-telehealth should be driven by both cross cutting patient needs (e.g., medication management) and by disease specific care (e.g., CHF, diabetes).
2. Home-telehealth is a mechanism to enhance the delivery of care and should be considered as part of an overall “package of care”
3. A health management model should be used for implementing home-telehealth with disease management strategies that indicate benefits on

## 19<sup>th</sup> June 2002 Draft Document Please Do Not Cite or Circulate

- f. Medication management
  - g. Nutrition
  - h. Exercise
  - i. Smoking cessation
  - j. Moderating alcohol consumption
  - k. Wound care
  - l. Patient education
4. Home-telehealth should be delivered using the least complex technology that meets patient management goals.
  5. Systematic evaluation of programs should be linked to specific goals
    - a. Building healthy communities
    - b. Improving access to care
    - c. Raising quality
    - d. Reducing hospital admission
    - e. Reducing costs
    - f. Improving functional status
    - g. Raising levels of patient satisfaction
    - h. Reducing inappropriate medication requirements
  6. Technology should be targeted toward programs aimed at improving health
  7. Specific diseases should be factored into the equation via a risk stratification e.g. involving VA/DoD Diabetes Guidelines
  8. Access to care needs to be included in the clinical design of services
  9. Comprehensive management includes consideration of co-morbidities
  10. R&D agenda must address:
    - a. Which population/s will benefit from home-telehealth
    - b. Who is at risk for adverse outcomes in the absence of monitoring of community dwelling populations?
    - c. What patients are suited to specific technology?
    - d. What are the patient safety issues, and how can they be addressed?
    - e. What is the mechanism of effect in home-telehealth?
  11. Organizational support services needed in telemedicine
  12. Through R&D studies, VHA can assemble an adequate sample size to make definitive statements regarding the efficacy of the home-based application / program under consideration
  13. In R&D studies, VHA must include a control group (either usual care or alternative treatment comparison). For program evaluations, managers must incorporate a systematic evaluation of the program processes and patient outcomes which are related to the defined service / program goals and VHA wide goals. This evaluation must be planned prior to implementing the program.

## **SECTION D**

### **Panel 3: Technology Considerations for Home-Telehealth**

#### **Format and composition of panel:**

Panel 3 considered the technological framework for the implementation of home-telehealth in VHA. This panel was a logical extension to the preceding 2 panels. Having established a patient need for home-telehealth in VHA and identified appropriate clinical interventions to meet this need the panel was tasked to answer specific questions relating to the technology choices that are most appropriate to meet these patient and clinical needs. The panel presenters were of: Ruth Dayhoff MD, Joseph Erdos MD, Woody Levin and Avi Sadan. The subsequent recommendations were the consensus of the panel and the rest of the attendees at the meeting.

#### **Background information:**

#### **Question 1. Should the current hybrid system or an enterprise-wide home-telehealth infrastructure should be the preferred solution for VHA in expanding its home-telehealth delivery capacity?**

The VA enterprise network currently consists of the VA intranet on which facilities within a VISN are linked by 1.5 to 3 megabit per second (mbs) telecommunication lines. VISNs in turn are joined to the VHA backbone (usually at two locations) at speeds of 4-10 mbs. The VHA backbone operates at speeds of 4-16 mbs and links all VISNs, CO, and the Austin Automation Center, and other sites. The VHA has three certified gateways/firewalls where the VHA wide areas network (WAN) joins the Internet. Several VISNs also have their own certified gateways/firewalls for Internet access. Users can access the network from home by dial up connections to the national remote access server (RAS). Most VISNs and local facilities also maintain their own local RAS servers for dial in access.

Currently the VISNs with O-CIO's guidance design and fund their WANS dependent on the VISNs business needs. Due to the sheer size, variability from VISN to VISN, data routing complexity, data volume, and limited capacity, the current architecture of the VA WAN would limit some telemedicine applications at a centralized enterprise level. These applications may include videoconferencing (which may require bandwidth of up to 384 kbs speed) and may require priority routing. Another intensive application is high resolution imaging which may involve movement of 1-10 mb files function best on separate virtual network. To accomplish this all routers across the enterprise must be programmed to recognize and prioritize these files and the devices they originate from.

Ideally the VA would have an enterprise-wide WAN architecture capable of intelligently prioritizing and routing video, images and data with a capacity that is expandable during times of peak use. This would require a higher degree of standardization and design at the

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VISN level and increased O-CIO oversight to assure that routing rules are propagated throughout the VA WAN. Alternatively the VA WAN could be centralized to CO for design and maintenance. This would require funding to be shifted.

The critical link from the patient's home to clinician sitting at the VA WAN can be handled several ways. The connection can be made over a phone line to a facility or VISN RAS server. This limits the effective line speed to approximately 50 kbs. For video or imaging applications a facility can install a higher speed line to a patient's house or clinic to increase the bandwidth (SW 56, 128 kbs, T1 at 1.5 mbs) and terminate it on the facility WAN. Although self-evident it is worth remembering that the higher the bandwidth the more costly the line charges.

The VA is currently moving from test to production an enterprise Virtual Private Network (VPN) solution for WAN connectivity. With it users can safely and securely access the VA WAN from a workstation or telemedicine device located at any point on the intranet. If the VPN solution can be extended to the patient's home this would allow the telemedicine device to connect to the VA WAN through what ever internet server provider (ISP) and modality (DSL, ISDN, cable modem, satellite) that is commercially available to the patient. In the VA New England Healthcare System we have demonstrated that reasonable telemedicine can be accomplished over conventional phone lines. As the VA VPN is expanded and made accessible to patients and CBOCs secure high-speed access to the VA WAN will increase and true golden age of telemedicine will arrive.

### **Question 2. How should the VISTA and VISTA imaging interface should be achieved and managed long-term using an open systems approach?**

The healthcare delivery paradigm shift witnessed over the last 15 years has been toward an outpatient model with shorter hospital stays, and greater patient-centric responsibility. This movement will continue and the home telemedicine patient will be viewed as the ultimate 'outpatient'. This is a natural evolution that minimizes expenses to the healthcare institution and maximizes convenience to the patient. With the inevitability of these changes should go the recognition, on the part of the VA, that the patient record must expand to include data collected in the home via telemedicine. To assure the integrity of the medical record data this data integration must be addressed.

Aside from manual entry, there are several ways to pass data in the correct format and form to VistA where it can be linked to the patient record. These include HL7 (Health Level 7 protocol), the RPC Broker (Remote Procedure Call), SQLI (System Query Language Interface) and XML (Extended Markup Language). These protocols and procedures are maintained by the VA IIS group (Information Infrastructure Services of the VA, see <http://vista.med.va.gov/iis/index.html>). Each approach as its strengths and weaknesses and it is the recommendation of these panel members that suggestions and ideas be solicited from the VA IIS group before finalizing any action plan to integrate data into VistA.

## 19<sup>th</sup> June 2002 Draft Document Please Do Not Cite or Circulate

VA's Vista Imaging is developing a software component (OCX) that is accessible with many programming languages and passes data to the RPC broker. This will permit third party software to add images to VistA that are linked to the patient record. This Object Oriented (OO) approach offers broad functionality and can exploit the abundance of OO programmers, making it easier for vendors to support their products. This component will soon be under test in VISN 1 within the context of their existing telemedicine project. This technique should solve the problem of linking images (and other objects, i.e. wav files) to the patient record from remote sources. This component and other approaches will be discussed by the VistA Imaging Team

### **Question 3. What are the HIPAA and other information security considerations?**

The HIPAA legislation covers the issues relating to patient rights for privacy of their medical data as well as access to their records. The regulations have generated some controversy and are currently undergoing some revision. This process is managed under the Dept of HHS and their Office for Civil Rights (OCR). See <http://www.hhs.gov/ocr/hipaa/>.

Several issues are currently open for public comment, as the initial regulations have broad ranging-implications and may result in significant expense for the VA and private healthcare systems to achieve compliance. These regulations affect telemedicine practice in two fundamental areas:

- Patient access to their own records
- Security and privacy of all data.

When data collected in the home or more specifically, outside of the hospital, whether or not it is merged with the hospital's electronic medical record, it must still be available to the patient. This implies that those data elements should be retained and be made available to the patient on request, similar to current requests for medical records, which include the data stored in CPRS. Currently this is accomplished by printing CPRS labs progress notes etc., and giving the printouts to the patient. The HIPPA regulations will provide motivation to developers and architects to include All patient data in a single common repository, which would simplify the process of a patient having access to this data, assuring it is backed up and is archived in compliance with all current and future standards

Security of the data and of the telemedicine devices and servers is of paramount importance as they are connected to VA WAN and to VistA. A flaw in the user authentication process, software or hardware defects can corrupt the data or be exploited to gain access to the entire VA network. All major systems in the VA (VistA, VistA Imaging, Network, Servers, Firewalls/Gateways) undergo a Certification and Accreditation Process (C&A ) to assure they are in compliance with Office of Materials and Budget standards for cyber security. The VA New England Healthcare System has addressed these potential vulnerabilities by bringing in an outside security consultant to

## 19<sup>th</sup> June 2002 Draft Document Please Do Not Cite or Circulate

survey the existing system and make recommendations for its improvement. This C&A process was completed successfully in 2001 and should act as a guide to best practice for deployment of similar systems.

This C&A process is a very technical, expensive and time-consuming assessment that must be performed on new systems. The cost and effort required to build and maintain such a system favors a more centralized approach where enough resources can be dedicated to accomplish the initial task and can be dedicated for ongoing monitoring and improvement..

### **Question 4. What would be a coherent networking support infrastructure that includes call centers, location of servers, firewalls and direct patient access?**

The implementation of a national telemedicine system would be most easily accomplished through a more centralized approach assuming centralized funding is available and the centralized program is responsive to end user needs. It would facilitate the development of standardized and rules and methodology for data to be incorporated into VistA or VistA Imaging and accelerate software development. The infrastructure is by and large present to accomplish this but has some limitations due to lack of standardization. The VA CIO is aware of this and has made it a priority to address these shortcomings.

There are Pros and Cons of centralized and decentralized approaches and values in both.

#### **Centralized System**

##### **Pros**

- Better control and monitoring possible
- More consistent implementation possible, same hardware, software versions, etc
- More uniform data and physical security practices possible
- Due to economies of scale able to devote relatively better and more resources
- Many of the ongoing initiatives; Security, VistA imaging, WAN upgrades can be leverage and/or expanded.

##### **Cons**

- Centralized resources are vulnerable to WAN, LAN, power, physical perturbations and terrorism. Safeguarding against these events is very expensive.
- Loss of a centralized resource can affect hundred of thousands of users
- Funding issues of who is in charge and who will pays and how is payment assessed
- Individual site differences are difficult to manage
- Trouble shooting and customization is difficult
- Time zones and response time across large distances become an issue

## 19<sup>th</sup> June 2002 Draft Document Please Do Not Cite or Circulate

- Retrieval of images, sounds or video from a central location is slow or requires a high speed WAN (expensive)

### Decentralized System

#### Pros

- Responsibility resides locally for maintenance, problem resolution, user inquiries, etc.
- Some protection from WAN outages or centralized failure to national system. Only the affected facility would be down and could still access data via the LAN.
- Possible funding advantages, existing structure can be used, personnel, etc.
- Management and development is closer to the field which may provide more user and patient centric ideas and innovations
- Local customization and user needs may be better managed.

#### Cons

- Possible inconsistent application of best practice for data security, patient access, etc.
- More inconsistent quality of service
- Hardware and software version issues
- Central reporting and monitoring more involved, costly
- Integration of data with Vista more intensive
- Can be subject to fluctuations in funding and staffing
- Can have a lack of documentation
- Loss of a critical person to retirement, promotion, or adverse event can lead to the projects failure

**Question 5. What are the relative options of phasing network development with installation overhead costs, depreciation, staffing and maintenance costs for an enterprise-wide system based on either a) the current hybrid model or VHA enterprise-wide system?**

Challenges in the implementation of an enterprise-wide telemedicine system include the costs associated with the initial purchase or development, recurring charges (maintenance or support), integration with existing data, telecommunication costs, initial security analysis and ongoing monitoring, data storage and retention, and end user (patient) installation, support and empowerment.

#### **Initial and recurring cost**

This cost would be fall on the individual site/VISN and range from \$2000 to \$9000 for a telemedicine unit based on the unit type and functionality. The recurring equipment maintenance costs can range from zero (if it brakes you buy a new one) to 10% of the purchase price. What you get in your maintenance agreement (hardware / software upgrades, facility or site (patient home) support, and turn around time for repair /

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replacement need to be carefully spelled out. Telemedicine devices are not as numerous as PCs or laptops so vendors don't have the economy of scale for support services (high cost per unit). Also telemedicine by its nature serves people that may be remote from urban settings leading to high costs for on site maintenance agreements.

Telemedicine servers and enterprise servers are expensive and require high-level technical staff to maintain, support and interface them with VistA and the telemedicine devices. At this point there is no standardized telemedicine application and no standardized VistA interface to move all the data elements that one might be gathering. Interfacing work is costly. Staff must be also available to maintain the system, perform hardware and software upgrades, perform security upgrades and perform modifications for new or improved functionality.

### **Data Integrity, Integration and Storage**

With the ever-increasing patient panel size and the increased data clinicians are required to access and manage, data from telemedicine should be integrated with VistA where possible. The data should be accessible through the CPRS GUI directly (data elements stored in the correct structure in VistA) or through a pull down menu on the CPRS GUI. The time, effort and expense and expertise associated with this level of programming makes this a VISN or O-CIO level task. Additional concerns are preserving the integrity of data from the time it is captured by a peripheral, stored on the telemedicine device, transmitted to a telemedicine server before passage to VistA and the final integration into the electronic medical record. As telemedicine/devices are medical devices they require FDA certification that the data retains its integrity from the time it is captured to its final residence. All data must be stored in accordance with standards set by OMB or HHS for time of retention and storage media. The data security, retrieval, access to and logging of activity must be in compliance with current and future HIPPA standards.

### **Telecommunication Costs**

The VA has invested heavily and will continue to invest and improve its telecommunication infrastructure and WAN capacity and security. This investment can be leveraged at moderate cost to link the patient to VA and shift the focus of care from the hospital setting to the home. Relatively inexpensive methods to achieve the linkage of the patient to the clinician on the VA WAN include giving patients 1-800 Remote Access accounts (cost per minute of approximately 4 cents), the installation of dedicated lines to remote clinics, or the extension of VPN methodology to patients receiving telemedicine.

### **Security Analysis And Maintenance**

Adding a user or attaching any device to the VA WAN increases the vulnerability of the VA network, computers, servers, VistA and data to possible misuse. This should not prevent us from extending telemedicine but we should employ the same methodology of security analysis that we have in place when we add other systems or users to our network. These include; a formal security analysis of telemedicine hardware and software, formal user agreements (patient) with the establishment of unique user accounts with strong passwords and/or machine authentication, limiting access to the data that the

## **19<sup>th</sup> June 2002 Draft Document Please Do Not Cite or Circulate**

user (patient) needs to know, and establishing audit capabilities and a process of ongoing review of audits.

Once the initial security work has been completed and certified the process by which the system is patched or upgraded as needed in a timely manner as security vulnerabilities are identified must be in place. This is very difficult to do and requires discipline!

### **Question 6. What would be the equipment and other cost considerations at a facility/VISN level to utilize an enterprise-wide home-telehealth system?**

The costs associated with running a telemedicine or telehealth arise from several areas; end user equipment, the telemedicine server, wide area network charges, server integration development and operation charges, and patient assessment device deployment and management.

#### **Devices**

Are facility-based and vary in price from hundreds (allow minimum communication and data passage) to hundred of thousands for teleradiology or telepathology applications. Ideally the devices should have a range of functionality that are matched and are assigned to patients based on their needs.

#### **Servers**

Are big-ticket items to buy and support but add the ability to transform and integrate data from multiple telemedicine devices into VistA and the electronic medical record. They can aggregate and display data and functionality that is currently not available in VistA such as patient education, streaming video education, videoconferencing. They also allow security and data accessibility policies to be set and monitored. They allow data to be backed up and or mirrored for contingency planning. Running them requires a knowledgeable administrator and should be centralized with the server running a telemedicine for a VISN or multiple VISNs. If the server and applications are designed correctly servers are very scalable and flexible so that cost or difficulty of adding additional devices is minimal.

#### **Patient assessment**

Patients should be assessed as to their ability to benefit from a telemedicine intervention and the level and duration of the intervention should be established before the patient is assigned to telemedicine. This person who accomplishes this task and are assigned the device should have some technical and computer skills, patient assessment skills teaching skills and be a good program manager. The typical multi-purpose VA employee!

### **Question 7. Are there possibilities for the outsourcing of the supply, installation and maintenance of the home-telehealth equipment that is provided in patient's homes?**

## **19<sup>th</sup> June 2002 Draft Document Please Do Not Cite or Circulate**

These functions can be outsourced and should be considered in a strict at a cost / benefits analysis of outsourcing these functions verses the cost of VA management. In VISNs that have very large geographical distances separating a telemedicine user from the facility the possibility that a company (local phone company) could be subcontracted for installation and support should be strongly examined.

### **Question 8. What are the major technical challenges that have yet to be resolved with an estimated budget and time frame?**

The major technical challenges facing telemedicine include the heterogeneity of telemedicine data and devices, the absence of a easily programmable but secure portal by which to pass data into VistA and the lack of data structures within VistA/VistA imaging to hold some telemedicine data elements.

### **Panel 3: Conclusions**

1. A VHA-wide technology strategy for home-telehealth needs to be agreed upon.
2. This strategy must be based on VISTA.

### **Recommendations**

1. An open systems approach should be adopted VHA wide for all home-telehealth technologies with common standards for all technical functions.
2. A common VISTA interface needs to be developed so that home-telehealth technologies can be “plug and play” throughout VHA for the convenience of patients and practitioners.
3. The Home-Telehealth Strategy that the Telemedicine SHG is developing from this paper needs to interface with the VHA’s Information Technology Strategy.
4. The future technological vision for home-telehealth needs to be clearly documented
5. Standards for telemedicine need to be developed by September 2002
6. A VHA home-telehealth technical advisory group must be created by the Telemedicine SHG to interface between the VHA home-telehealth community, the home-telehealth clinical user group and VHA Office of Information.
7. The Telemedicine SHG must create a VHA home-telehealth user group that links with the VHA home-telehealth technical advisory group and this must consider the clinical requirements of the technology.
8. The basic technological infrastructure to provide server and call center support for home-telehealth must not be decentralized beyond the VISN level.
9. Patient data must be specified as belonging to VHA in procurement contracts for home-telehealth systems and equipment.
10. Commercial vendors of home-telehealth technologies should be encouraged not to use preliminary VHA data for marketing purposes.

## SECTION E

### **Panel 4: The Management of Home-telehealth**

#### **Format and composition of panel:**

Panel 4 considered the management support for implementing home-telehealth in VHA. This panel was a logical extension to the preceding 3 panels. Having established a patient need for home-telehealth in VHA and identified appropriate clinical interventions to meet and selected a technology infrastructure this panel was tasked to answer specific questions relating to the management processes to support this home-telehealth environment. The panel presenters were of: Ellen Clements, Pat Ryan, Donna Vogel with Adam Darkins giving a brief presentation on coding for telemedicine. The subsequent recommendations were the consensus of the panel and the rest of the attendees at the meeting.

#### **Background information:**

##### **Coding and Reimbursement for Home-Telehealth:**

No uniform policies exist to reimburse for home telehealth equipment or services in either the government or commercial sectors. Although, telemedicine technology makes it possible to deliver health care services over a distance, few payers cover these services. Federally funded Medicare and Medicaid programs provide only limited coverage. Several Medicaid programs, some Blue Cross/Blue Shield plans and a few other private insurers pay for some home telehealth services. Federal Medicaid<sup>14</sup> law does not recognize telemedicine as a distinct service and each state has the option of providing reimbursement for services. Medicare has been more cautious in reimbursing telemedicine services that traditionally require face-to-face contact between the patient and the provider including home care. Individual private insurance carriers have different telemedicine policies and coverage.

VHA policy on workload capture and reimbursement should address the fact that telemedicine, including home telehealth, is not a specialty or distinct service, it is another way to deliver health care to patients and does not need a separate set of CPT codes. Therefore, CPT codes that are used for face-to-face clinic visits can be used with telemedicine if a suitably appended modifier is included. Clinic stops have implications for the ARC patient classification and costing processes:

- ARC does not incorporate or use modifiers, so these services would be considered in the VERA allocation if entered as encounters and transmitted to the National Patient Care database. Unless the facility has made clinics non-billable in the billing package, billing will be sent to the billing package via Patient Care Encounter for home-telehealth visits.
- It is important to note that the ARC extracts only the primary clinic stop (from DSS) and does not use data located in the secondary location in the classification and costing processes.

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- Inaccurate coding can have negative results that include compromised data integrity, risk of audit or review, possible implications of fraud and abuse.

The use of CPT codes for case management and care coordination services for coding and reimbursement need to be addressed by VHA. Case management is the process in which a physician [provider] is responsible for the direct care of a patient and for initiating, supervising, coordinating or controlling access to other health care services needed by the patient. CPT codes 99371, 99372 and 99373 are used for telephone case management services for physician phone calls to an established patient to provide advice on a new problem, to initiate therapy that can be handled by telephone, to discuss test results in detail, to coordinate medical management of a new problem, to discuss and integrate new information and details, or to initiate a new plan of care. CPT code 99374 for Care plan oversight for home care services are reimbursed under Medicare. Specifically, “physician supervision of a patient under care of home health agency (patient not present) in home requiring complex care modalities involving regular physician development and/or revision of care plans, review of subsequent reports of patient status, review of related laboratory and other studies, communication (including phone calls) for purposes of assessment or care decisions with other health care professional and other non-physician professional involved in patient’s care, integration of new information into the medical treatment plan and/or adjustment of medical therapy, within a calendar month<sup>15</sup>.”

VHA needs to develop national standards for coding home telehealth activities. Reimbursement is required to cover equipment, line charges and administrative costs. A National Directive with clearly defined procedure codes is critical to ensuring home telehealth coding consistency throughout the VHA. This coding will facilitate accurate workload capture, appropriate third party reimbursement and VERA allocation. This ability to code for workload and reimbursement is a prerequisite for home-telehealth activities to expand throughout VHA.

### **VERA**

The DSS system, which has been designated as the VHA’s new cost accounting system, is used as the basis for VERA<sup>16</sup> allocations beginning in FY 2002 to ensure equitable distribution of the \$21 billion dollar veteran health care budget. Tele-homecare code 179 is used to capture home telehealth visits/workload and the following definition of this code has been proposed for adoption by DSS:

*DSS code 179 records workload by VA health care professionals using real-time videoconferencing as a means to replicate aspects of face-to-face assessment and care delivery to patients in their homes using telehealth. This assessment and care may include: health/social evaluations, wound management, exercise plans, patient appearance, monitoring patient self-care, medication management, monitoring vital signs, including pain. These telehealth encounters must be electronically documented in CPRS. VA Medical Centers providing this care will have made significant investment in the staffing and technological infrastructure required to support such complex care provision in the home environment.*

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VERA has become increasingly important to VHA funding and is receiving more attention at the facility level. To reimburse for home-telehealth under VERA the following issues must be addressed:

1. VERA allocation must recognize remote homecare visits since there is agreement that telemedicine, including home telehealth, is not a specialty or distinct service, but rather another way to deliver health care. In the VERA Home Based Primary Care Complex Care classification, a patient is classified as complex if there are at least 10 visits with certain CPT codes during the year in any combination of the following: a) The 170 - 178 series of stop codes (except telephone); b) Stop code 118 (Other home based program); c) Fee file visits where the two digit purpose of a visit code is 70 (Home Visit Nurse) or 71 (Home Visit – Other). Note: CPT codes require a RVU of greater than 0 or use of G Codes that do not have a RVU attached qualify as one of the ten visits<sup>5</sup>.
2. Findings from a workgroup cited in a 1999 VHA Executive Decision Memo from the Deputy Under Secretary for Health support “All workload associated with Home Care be considered the same in the VERA process regardless to how it was provided or designated.”<sup>17</sup> This supports including stop code 179 for qualifying visit requirements.
  - Studies show that home telehealth significantly decreases on-site home nursing visits through early detection and timely intervention, decreasing complications and avoiding additional home visits<sup>11,18,19</sup>. Fewer home visits increases the productivity and efficiency of home-based nurses resulting in more patients being served. This can translate into an increased number of patients that can potentially meet home based primary care complex care requirements and more dollars reimbursed to networks.
3. Workload encounter forms must be set up in VISTA for each clinic established. CPRS progress notes must include electronic documentation to support CPT codes and appropriate billing. Clinic stop sequencing needs to be considered since it impacts the patient classification and patient costing processes performed by the ARC. ARC extracts only the Primary clinic stop in all of its data processing. Clinics (including Home-Telehealth clinics) that do not have workload and stop codes with electronic documentation supporting key components such as a problem focused interval history, a problem focused examination and medical decision-making must be made non-count so billing issues do not arise.

### **Monitoring and Evaluation:**

The VA must identify specific performance measures to systematically monitor and evaluate home telehealth as a tool to deliver care and to quantify and determine its effect on quality of life and cost effectiveness. Monitoring and evaluation should reflect care coordination/case management processes, performance improvement and return on investment analysis. The performance measures should include:

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1. Clinical and economic measures including diabetic monitors with A1C values, resource utilization, associated costs such as beneficiary travel costs, adverse events, functional status, long term care placements, and efficiency monitors including workload data. Economic measures should include VERA classification, number of patients on home telehealth for specific disease states. Monitoring travel costs would be beneficial since many patients reside great distances from the medical facility, have limited transportation, and are eligible for travel benefits.
2. Specific utilization measures including acute care admissions, bed days of care, nursing homes admissions, scheduled and unscheduled clinic visits (including ER visits). Other performance measures should include patient and provider satisfaction and functional status (SF36V or SF12).
3. Research requires ongoing monitoring and evaluation including completing consent forms, submitting progress reports, providing and documenting patient and staff education, documenting skills and competencies, documenting and reporting outcomes and adverse events, and monitoring and addressing patient and provider satisfaction.

### **Future management evaluation of home-telehealth:**

The VHA must thoroughly study and provide outcome data supporting the effectiveness of home telehealth and evaluate and determine what is appropriate, effective and cost-effective. Home telehealth research has shown improved clinical outcomes and decreased errors, injuries, and unnecessary resource use in high-risk patients<sup>19,20,21</sup>.

Future research needs and recommendations include:

1. Replicate studies to support findings, specifically studies evaluating and demonstrating the efficacy, safety, reliability and outcomes of home telehealth. We need to work with the Office of Research and Development and Cooperative Studies to obtain research funding and should consider partnering with the private sector and other government agencies. A growing number of health maintenance and health care organizations including Kaiser Permanente, NYL Plans (New York NY) and University of Illinois at Chicago (UIC) Medical Centers are funding home telehealth pilot projects to get data on its effectiveness. Replicating these studies would be of benefit.
2. Develop a collective inventory of VA home telehealth research with outcome data indicating specific disease states being monitored, the technology used and frequency of home telehealth visits with associated costs. Best telehealth practices can be established by evaluating care coordination, technology, and patient and provider satisfaction. Identifying patients receiving specific home telehealth interventions/services and monitoring utilization across the entire continuum of care will be beneficial.

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3. Develop a home telehealth cost/benefit model including costing methodology incorporating clinical workload, telecommunication costs, revenue, and cost avoidance, and associated benefits including improved efficiency and decreased travel.
4. Support clinical and cost effectiveness through research using large population samples targeting high cost conditions that might benefit from home telehealth. These populations should include but not be limited to congestive cardiac failure treatment, diabetes care, early post-operative discharge, mental health problems, palliative care and spinal cord injury/dysfunction.
5. Identify the strengths and weaknesses of existing programs relative to the patient population and include cost and outcome data.
6. Identify the need for program expansion, new home telehealth program development, existing program modification and potential innovative home telehealth solutions.

### **Patient satisfaction with home-telehealth:**

It is important that patient perceptions with home-telehealth are systematically collected and reported<sup>22</sup>. Home-based health care may have significant impact on home caregivers, as well as patients receiving treatment at home<sup>23</sup>.

### **Credentialing and privileging for home-telehealth:**

Clinical privileging refers to the process by which a licensed practitioner is permitted by law and his/her healthcare facility to practice independently, and provide medical or other patient care services within the scope of the individual's license, based on the individual's clinical competence as determined by peer references, professional experiences, health status (as it relates to the individual's ability to perform the requested clinical privileges), education, training, and licensure. In January 2001 the Joint Commission on the Accreditation of Health Care Organizations (JCAHO) introduced standards for credentialing and privileging for telemedicine<sup>24</sup>. These standards did not cover home-telehealth. In consultation with JCAHO VHA developed guidance for the credentialing and privileging of practitioners when using home-telehealth<sup>25</sup>. This guidance is currently in the form of a Draft VHA Directive that is in the final stages of the concurrence process.

### **Program Accreditation for Home-Telehealth:**

There is no system to accredit home-telehealth programs, either within VHA or outside. If there is going to be the uniformity and consistency of practice and process that is required to expand home-telehealth in VHA a consistent model needs to be elaborated together with a system to accredit this as having met agreed criteria. If VHA were to develop these there would be considerable interest from other organizations e.g. JCAHO to work with VHA.

**Panel 4. Conclusions**

1. VHA-wide management processes need to be instituted to create home telehealth networks of sufficient size and sophistication to meet the chronic care needs of veteran patients in a consistent and coherent manner
2. A reimbursement system to finance home-telehealth long-term is crucial

**Recommendations**

1. The Telemedicine SHG, in conjunction with its VHA home-telehealth technical advisory group and the VHA home-telehealth user group should work to develop an internal VHA accreditation process for home-telehealth programs in the future.
2. VHA must be able to code for home-telehealth workload. The workload capture system for home-telehealth must be acceptable for EPRP measurement purposes.
3. Home-telehealth workload must be reimbursable in VHA home-telehealth programs using DSS code 179 as a primary code:  
*DSS 179 records workload by VA health care professionals using real-time videoconferencing as a means to replicate aspects of face-to-face assessment and care delivery to patients in their homes using telehealth. This assessment and care may include: health/social evaluations, wound management, exercise plans, patient appearance, monitoring patient self-care, medication management, monitoring vital signs, including pain. These telehealth encounters must be electronically documented in CPRS. VA Medical Centers providing this care will have made significant investment in the staffing and technological infrastructure required to support such complex care provision in the home environment. Coding via 118-690 should record other home-telehealth activity pending definitive coding.*
4. VHA management systems for home-telehealth should code and track:
  - a. Telephone usage
  - b. Disease management associated with home-telehealth
  - c. Home messaging devices using systems such as Health Buddy
  - d. Real-time videoconferencing in home-telehealth
  - e. Personal Computers, chat rooms, and e-mail systems
4. A VERA allocation is needed for home-telehealth
5. When appropriately coded using DSS-179 home-telehealth should count in the same way as an HBPC visit does.
6. VHA needs to identify what are the core competencies for home-telehealth.
7. A uniform tool such as one based on the VISN 8 home-telehealth scorecard should be developed into a home-telehealth assessment model for monitoring and evaluation of home-telehealth See Appendix 3.
8. Staffing models for home-telehealth need to be established.
9. Establish a nationally coordinated training system for home-telehealth
10. Funding using seed grants is needed to establish programs but this must avoid creating a culture of chasing money instead of meeting patient needs
11. If central funds are made available to VISN's for the expansion of home-telehealth the new programs that result must have a clearly identified patient need,

- a sound business case and an implementation plan that meets VHA's home-telehealth accreditation process.
12. Telephone and e-mail mediated care are part of the continuum of home-telehealth and integrating these modalities should be included in the design of any intended home-telehealth system.

### **RESEARCH CONSIDERATIONS**

#### **Conclusions:**

Adequate scientific data to establish an evidence-based platform for home-telehealth is lacking at present. In the face of pragmatic pressure to implement home-telehealth VHA needs to establish an appropriate health services research and development agenda to provide clinical evidence to support ongoing implementation.

#### **Recommendations:**

Through adequately funded and constructed studies the HSR&D agenda must address the following clinical priorities:

- a. Defining needs assessment methodologies to define which population/s will benefit from home-telehealth?
- b. Whether the patients who derive benefits in pilot programs in VISN 8 and elsewhere are receiving services that augment or replace traditional forms of care?
- c. What clinical outcome measures should be used to monitor/evaluate the transition of traditional care delivery to home-telehealth?
- d. How home-telehealth fits into the wider continuum of care?
- e. The impact of home-telehealth on the locus of care and on medical decision-making?

## APPENDIX 1.

### Attendees and Mail Reviewers of VHA Home-telehealth Consensus Recommendations

<b>Name</b>	<b>Expertise</b>	<b>Job/Title</b>	<b>Station</b>	<b>Participation</b>
<i>Elizabeth Adams</i>	<i>Program Analyst</i>	<i>VHA Technology Assessment Program</i>	<i>Boston, MA</i>	<i>Attendee</i>
<i>Martha Bryan</i>	<i>Scientific Review Board</i>	<i>VHA HSR&amp;D</i>	<i>Washington DC</i>	<i>Attendee</i>
<i>Ellen Clements</i>	<i>SCI (Coding)</i>	<i>Telemedicine Coordinator</i>	<i>Augusta, GA</i>	<i>Panel Panel#4</i>
<i>Adam Darkins</i>	<i>Telemedicine</i>	<i>Acting Chief Consultant</i>	<i>Denver, CO</i>	<i>Moderator</i>
<i>Ruth Dayhoff</i>	<i>Medical informatics</i>	<i>Director Imaging</i>	<i>Silver Springs</i>	<i>Panelist Panel #3</i>
<i>Thomas Edes</i>	<i>Geriatrics &amp; Extended Care</i>	<i>Physician</i>	<i>Washington DC</i>	<i>Panelist Panel#1</i>
<i>Joseph Erdos</i>	<i>Physician</i>	<i>CIO</i>	<i>West Haven, CT</i>	<i>Panelist Panel#3</i>
<i>Judith Feldman</i>	<i>Clinical Manager</i>	<i>VISN 3</i>	<i>Bronx NY</i>	<i>Not confirmed</i>
<i>Larry Flesh</i>	<i>Clinical Manager</i>	<i>VISN 2</i>	<i>Albany NY</i>	<i>Attendee</i>
<i>Sheila Gelman</i>	<i>Clinical Manager</i>	<i>VISN 10</i>	<i>Ohio</i>	<i>Attendee</i>
<i>Paulette Ginier</i>	<i>Physician</i>	<i>Physician</i>	<i>Fresno, CA</i>	<i>Mail reviewer</i>
<i>Barry Graham</i>	<i>Clinical Manager</i>	<i>VISN 14</i>	<i>Lincoln, Nebraska</i>	<i>Attendee</i>
<i>Marsha Goodwin</i>	<i>Geriatrics/Extended Care</i>	<i>Acting Chief Consultant</i>	<i>Washington DC</i>	<i>Attendee</i>
<i>David Hales</i>	<i>Homecare</i>	<i>Physician Geriatrics/Extended Care</i>	<i>Dallas, TX</i>	<i>Not confirmed</i>
<i>Margaret Hammond</i>	<i>Spinal Cord Injury</i>	<i>Chief Consultant</i>	<i>Seattle, WA</i>	<i>Mail Reviewer</i>
<i>Paula Hensley</i>	<i>Homecare</i>	<i>Physician Geriatrics/Extended Care</i>	<i>Fresno, CA</i>	<i>Not confirmed</i>
<i>Michelle Hill</i>	<i>Homecare SCI</i>	<i>SCI Telehealth Coordinator</i>	<i>Palo Alto, CA</i>	<i>Mail Review</i>
<i>Rita Kobb</i>	<i>Homecare</i>	<i>Nurse Practitioner</i>	<i>Lake City, FL</i>	<i>Panelist Panel#4</i>
<i>Peter Kuzmac</i>	<i>Information Technology</i>	<i>Computer Specialist</i>	<i>Silver Springs</i>	<i>Not confirmed</i>
<i>Laurent Lehmann</i>	<i>Mental Health SHG</i>	<i>Chief Consultant</i>	<i>Washington DC</i>	<i>Attendee</i>
<i>Woody Levin</i>	<i>Health informatics</i>	<i>Health Information Specialist</i>	<i>West Haven, CT</i>	<i>Panelist Panel#3</i>
<i>Julie Lowery</i>	<i>Wound Care (R&amp;D)</i>	<i>Researcher</i>	<i>Ann Arbor, MI</i>	<i>Mail Review</i>
<i>Ken Maffett</i>	<i>Clinical Manager</i>	<i>VISN 19</i>	<i>Denver, CO</i>	<i>Attendee</i>
<i>Jason Mask</i>	<i>Social Worker</i>	<i>SCI</i>	<i>Hines</i>	<i>Mail Reviewer</i>
<i>Linda McIver</i>	<i>Scientific Review Board</i>	<i>HSR&amp;D</i>	<i>Washington DC</i>	<i>Attendee</i>
<i>Marlis Meyer</i>	<i>Homecare</i>	<i>Director VISN 6 e-Care Service Line</i>	<i>Lake City, FL</i>	<i>Panelist Panel#1</i>
<i>Carter Melcher</i>	<i>Clinical Manager</i>	<i>VISN 7</i>	<i>Duleth, Georgia</i>	<i>Attendee</i>
<i>Mike Miller</i>	<i>Homecare</i>	<i>Chief Medical Officer</i>	<i>Boston, MA</i>	<i>Panelist Panel#1</i>
<i>Maria Mullins</i>	<i>Homecare</i>	<i>Chief Medical Officer</i>	<i>Bay Pines, FL</i>	<i>Not attending</i>

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<i>Paul Nichol</i>	<i>Physician</i>	<i>ACOS Ambulatory Care</i>	<i>Seattle, WA</i>	<i>Mail Reviewer</i>
<i>John Peters</i>	<i>Telemedicine</i>	<i>Program Analyst</i>	<i>Washington DC</i>	<i>Attendee</i>
<i>Ginger Price</i>	<i>CIO, BEST</i>	<i>Executive Asst</i>	<i>Martinsburg Operations Center</i>	<i>Attendee</i>
<i>Pamela Reeves</i>	<i>Clinical Manager</i>	<i>VISN 11</i>	<i>Ann Arbor MI</i>	<i>Attendee</i>
<i>Jamie Robbins</i>	<i>Clinical Manager</i>	<i>VISN 18</i>	<i>Mesa, AZ</i>	<i>Not Confirmed</i>
<i>Pat Ryan</i>	<i>Homecare</i>	<i>Clinical Program Director</i>	<i>Bay Pines, FL</i>	<i>Panelist Panel#2</i>
<i>Avi Sadan</i>	<i>CIO's Office</i>	<i>Functional Analyst</i>	<i>Silver Spring, MD</i>	<i>Invited</i>
<i>Nina Sinham</i>	<i>Clinical Manager</i>	<i>VISN 5</i>	<i>Baltimore, ND</i>	<i>Attendee</i>
<i>Mark Shelhorse</i>	<i>Clinical Manager</i>	<i>VISN 6</i>	<i>Durham, NC</i>	<i>Attendee</i>
<i>Mark Stanton</i>	<i>Primary &amp; Ambulatory Care</i>	<i>Chief Consultant</i>	<i>Washington DC</i>	<i>Attendee</i>
<i>Thomas Craig</i>	<i>Office of Quality &amp; Performance</i>	<i>Office of Quality &amp; Performance</i>	<i>Washington DC</i>	<i>Not Confirmed</i>
<i>Noel Eldridge</i>	<i>Office of Patient Safety</i>	<i>Executive Assistant</i>	<i>VACO</i>	<i>Attendee</i>
<i>Walt Townsend</i>	<i>Homecare</i>	<i>Health Systems Specialist</i>	<i>Tampa, FL</i>	<i>Not Confirmed</i>
<i>William Van Stone</i>	<i>Mental Health SHG</i>		<i>Washington DC</i>	<i>Attendee</i>
<i>Donna Vogel</i>	<i>Homecare</i>	<i>Director Case Management</i>	<i>West Haven, CT</i>	<i>Panelist Panel#4</i>
<i>Bonnie Wakefield</i>	<i>Homecare</i>	<i>Associate Chief Nursing Research</i>	<i>Iowa City, Iowa</i>	<i>Panelist Panel#2</i>
<i>Peter Woodbridge</i>	<i>Physician</i>	<i>Patient Care Services</i>	<i>Indianapolis, IN</i>	<i>Attendee</i>
<i>Ruth Weinstock</i>	<i>Physician</i>	<i>Syracuse NY</i>		<i>Panelist Panel#1</i>

## **APPENDIX 2**

### **Suggested Clinical Outcome Measures for Home-Telehealth**

1. Waiting times
2. Panel size
3. Number of scheduled visits
4. Number of unscheduled visits
5. Clinic capacity
6. Bed days of care
7. Emergency room use
8. Ambulance use
9. Travel costs
10. Disease specific
  - a. Blood pressure – hypertension
  - b. EPRP
11. Functional status
  - a. SF 36
  - b. quality of life
  - c. pain
12. Patient satisfaction
13. Provider satisfaction
14. Provider resistance
15. Medication management
16. Medication compliance
17. Adverse events
18. Panel size
  - a. primary care provider
  - b. care coordinator
19. Care giver outcomes
20. Equity – access by populations
21. Nursing home care – alternatives
22. Assisted living in home (VHA Long-Term Care Group)
23. End of life care (should encourage home-telehealth in this area)

**APPENDIX 3**

<b>Community Care Coordination Service</b>		
<b>Score Card</b>		
	<b><u>Performance Measures</u></b>	<b><u>Performance Measures</u></b>
<b>UR Measures (Pre / Post)</b>		<b>Clinical Measures</b>
Hospital Admissions		Functional Status (SF36V)
BDOC		significant changes in composite scores
NHCU Admissions		(1) physical composite *
BDOC		(2) mental health composite *
Clinic Visits		GAF
ER Visits		A1C
Rx		B/P
		VA Choice
<b>PI Measures</b>		<b>Business Measures</b>
Provider Satisfaction		Patient VERA Classification
HTM Med Compliance		Change in Complex FY00 vs 01
		Total Allocation
Pneumonia		% of Complex patients as of 01
		Cost per patient
Patient Satisfaction *		Overall cost benefit
Employee Satisfaction *		
		<b>Efficiency Measures</b>
		Panel Size
		Program Workload
		% of Population Using Technology

## GLOSSARY

<b>HBPC</b>	<b>Home based primary care</b>
<b>VISN</b>	<b>Veterans integrated service unit</b>
<b>QUERY</b>	<b>Quality enhancement research initiative</b>
<b>CIO</b>	<b>Chief information officer</b>
<b>HIPAA</b>	<b>Health insurance portability and accountability act</b>
<b>LTC</b>	<b>Long term care</b>
<b>VERA</b>	<b>Veterans equitable resource allocation model</b>
<b>VISTA</b>	<b>VHA's information systems technology architecture</b>
<b>RWJ</b>	<b>Robert Wood Johnson</b>
<b>DSS</b>	<b>Decision support system</b>
<b>SHG</b>	<b>Strategic health care group</b>
<b>WAN</b>	<b>Wide area network</b>
<b>LAN</b>	<b>Local area network</b>
<b>EPRP</b>	<b>External peer review program</b>
<b>VHA</b>	<b>Veterans health administration</b>
<b>JCAHO</b>	<b>Joint commission on the accreditation of health care organizations</b>
<b>HL7</b>	<b>Health Level 7 protocol</b>
<b>RPC Broker</b>	<b>Remote procedure call broker</b>
<b>SQLI</b>	<b>System query language interface</b>
<b>XML</b>	<b>Extended markup language</b>
<b>CPT</b>	<b>Current procedural terminology</b>
<b>SF36V</b>	<b>Short form 36V</b>
<b>SF12</b>	<b>Short form 12</b>
<b>ADL</b>	<b>Activities of daily living</b>
<b>ARC</b>	<b>Allocation resource center</b>
<b>RVU</b>	<b>Relative value units</b>
<b>A1C</b>	<b>Hemoglobin A1C</b>
<b>CPRS</b>	<b>Computerized patient record system</b>
<b>COPD</b>	<b>Chronic obstructive pulmonary disease</b>
<b>CHF</b>	<b>Congestive heart failure</b>

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<sup>25</sup> Minutes from the meeting between JCAHO representatives, the VHA Telemedicine Strategic Healthcare Group, VHA Credentialing and Privileging staff, and VISN 20 in Vancouver, WA, January 2001.