

Harnessing Protocolized Adaptation in Dissemination: Successful Implementation and Sustainment of the Veterans Affairs Coordinated-Transitional Care Program in a Non-Veterans Affairs Hospital

Amy J. H. Kind, MD, PhD, *†‡¶ | Maria Brenny-Fitzpatrick, MSN, CNS,[§] Kris Leahy-Gross, MSN, RN,[§]
Jacquelyn Mirr, BS, *¶ | Elizabeth Chapman, MD, * Brooke Frey, BBA,[§] and Beth Houlahan, MSN, RN[§]

The Department of Veterans Affairs (VA) Coordinated-Transitional Care (C-TraC) program is a low-cost transitional care program that uses hospital-based nurse case managers, inpatient team integration, and in-depth posthospital telephone contacts to support high-risk patients and their caregivers as they transition from hospital to community. The low-cost, primarily telephone-based C-TraC program reduced 30-day rehospitalizations by one-third, leading to significant cost savings at one VA hospital. Non-VA hospitals have expressed interest in launching C-TraC, but non-VA hospitals differ in important ways from VA hospitals, particularly in terms of context, culture, and resources. The objective of this project was to adapt C-TraC to the specific context of one non-VA setting using a modified Replicating Effective Programs (REP) implementation theory model and to test the feasibility of this protocolized implementation approach. The modified REP model uses a mentored phased-based implementation with intensive preimplementation activities and harnesses key local stakeholders to adapt processes and goals to local context. Using this protocolized implementation approach, an adapted C-TraC protocol was created and launched at the non-VA hospital in July 2013. In its first 16 months, C-TraC successfully enrolled 1,247 individuals with 3.2 full-time nurse case managers, achieving good fidelity for core protocol steps. C-TraC participants experienced a 30-day rehospitalization rate of 10.8%, compared with 16.6% for a contemporary comparison

group of similar individuals for whom C-TraC was not available ($n = 1,307$) ($P < .001$). The new C-TraC program continues in operation. Use of a modified REP model to guide protocolized adaptation to local context resulted in a C-TraC program that was feasible and sustained in a real-world non-VA setting. A modified REP implementation framework may be an appropriate foundational step for other clinical programs seeking to harness protocolized adaptation in mentored dissemination activities. *J Am Geriatr Soc* 64:409–416, 2016.

Key words: transitional care; rehospitalization; implementation science; dissemination; nursing

The Department of Veterans Affairs (VA) Coordinated-Transitional Care (C-TraC) program is a low-cost transitional care program that uses hospital-based nurse case managers, inpatient team integration, and in-depth posthospital telephone contacts to support high-risk patients and their caregivers as they transition from hospital to community.¹ The goals of C-TraC include empowering individuals and their caregivers in medication management, medical follow-up, and when and whom to contact if problems arise.^{1–5} C-TraC was specifically designed to complement evidence-based home-visit transitional care programs^{2,3,5} by offering a similar, but telephone-based, protocolized, transitional care option for people who refuse home visits, are not ill enough or live too far away to qualify for home visit–based transitional care, or who cannot access such programs because they are in low-resource healthcare settings.¹ Pilot testing at the VA hospital in Madison, Wisconsin, demonstrated that C-TraC reduced 30-day rehospitalizations by one-third,

From the *Geriatrics Division, Department of Medicine, School of Medicine and Public Health; [†]School of Nursing; [‡]School of Pharmacy; [§]University of Wisconsin Hospitals and Clinics; and [¶]Department of Veterans Affairs, Geriatric Research Education and Clinical Center, William S Middleton Hospital Madison, Madison, Wisconsin.

Address correspondence to Dr. Amy J. H. Kind, William S. Middleton VA Hospital—GRECC, 2500 Overlook Terrace, Madison, WI 53705.
E-mail: ajk@medicine.wisc.edu

DOI: 10.1111/jgs.13935

leading to a net savings of more than \$1,200 per enrollee. The VA program has enrolled more than 2,000 veterans since 2010, with only eight refusals, and has been disseminated to other VA hospitals.

Importance of Adapting to Local Culture and Context to Achieve Sustainability

Non-VA hospitals have expressed interest in launching their own C-TraC programs, but non-VA hospitals differ in important ways from VA hospitals, particularly in terms of context, culture, and resources. For their new system to value newly disseminated clinical programs and ultimately to sustain them, the programs must be sensitive to that new system's preexisting context, culture, and resources and to local programmatic goals.⁶⁻⁸ Local leadership is less likely to see externally defined, nonadaptable programs that are not sensitive to the local context, culture, and goals of a new system as successful, and the programs are less likely to be sustained after initial dissemination.⁸ Each new setting may differ markedly,⁶ so if a program is to be widely disseminated, this adaptation process should be protocolized and achieve a balance of local adaptation and core intervention fidelity.⁶⁻⁹

It was not clear whether this balance could be feasibly accomplished in a C-TraC dissemination, but the Replicating Effective Programs (REP) Implementation Theory model held promise as a pathway toward this goal.

The REP Implementation Theory Model

Originally developed by the Centers for Disease Control and Prevention (CDC) as a strategy for closing the gap between research and community practice, the REP model has been applied widely since its development in 1996.⁹ The REP model recognizes that operationalization of an intervention's core features may vary from one setting to another (because each setting varies) but that the intent of each core step must remain the same to achieve a desired result. The REP model has been used extensively in the dissemination of community-level human immunodeficiency virus treatment interventions by the CDC, with its effectiveness proven in a national randomized controlled trial.^{10,11} Although REP is well proven in population-level (macro level) dissemination efforts, many theorize that its framework would be highly suitable to use in the dissemination of health systems interventions at the micro level.⁹

Health systems are remarkably diverse entities. Each health system is unique in terms of general culture and context, but each also contains a diverse array of micro-level contexts (e.g., hospitals→units→teams), which may themselves be diverse in terms of resources, goals, and culture. Although it has been successfully applied at the population level,^{9,12,13} to the knowledge of the authors of the current study, REP has not been used to guide health system intervention adaptation at the hospital or smaller micro level. It was theorized that the REP model could be modified to allow for protocolized program adaptation to local micro-level health system context in a C-TraC dissemination.

Disseminating C-TraC

An opportunity to test this theory arose when the VA C-TraC leadership team was approached to launch C-TraC at the University of Wisconsin Hospitals and Clinics (UWHC), a large tertiary care academic hospital with an expansive geographic referral region. The goal was to adapt the VA C-TraC program to the specific micro-level context of UWHC by using a modified REP model and to test the feasibility of this protocolized implementation approach. Successful adaptation was defined as one that maintained the fidelity of the intervention's core steps yet allowed for enough programmatic evolution for the implementation to fit local context, meet locally defined goals, and ultimately achieve sustainability.

METHODS

Local Context: The Decision to Launch C-TraC at UWHC

The UWHC is a 592-bed academic hospital in Madison, Wisconsin. More than half of its inpatients reside beyond the reach of a home visit—some hundreds of miles away. To improve transitional care quality and decrease rehospitalizations, UWHC piloted an evidence-based home-visit transitional care program in 2012 for high-risk medical inpatients. However, much lower than expected enrollment, due to two main factors (many patients lived too far away to be eligible for the home-visit based program, and approximately half of patients who lived closer refused to allow clinical staff to enter their homes), threatened the program's viability.

The UWHC Senior Vice President of Patient Care Services—Chief Nursing Officer and the UWHC Director of Transitional Care Programs became aware of the C-TraC program¹ and decided that these enrollment challenges could potentially be overcome using C-TraC. They approached the VA C-TraC team to mentor a pilot C-TraC launch on inpatient medicine services at UWHC. UWHC financed the full program.

Given the multiple differences in clinical culture and context between the VA and UWHC, including models of inpatient rounding, electronic medical record interconnectivity, and typical assignment and association of primary care providers within and outside the systems, intervention adaptation was needed before any implementation. A modified REP model was harnessed to meet this need.

Applying the Modified REP Model

A pilot implementation protocol was created for C-TraC adaptation based upon the original REP model and on practical modifications derived from the VA C-TraC leadership team's real-world experience with application of the REP in two regional VA C-TraC disseminations (Figure 1). This modified REP protocol included simple modifications (outlined below) to enable practical application to the hospital micro level and to the specific question of transitional care. The protocol harnesses four key phases: preconditions, preimplementation, implementation, and maintenance and evolution.

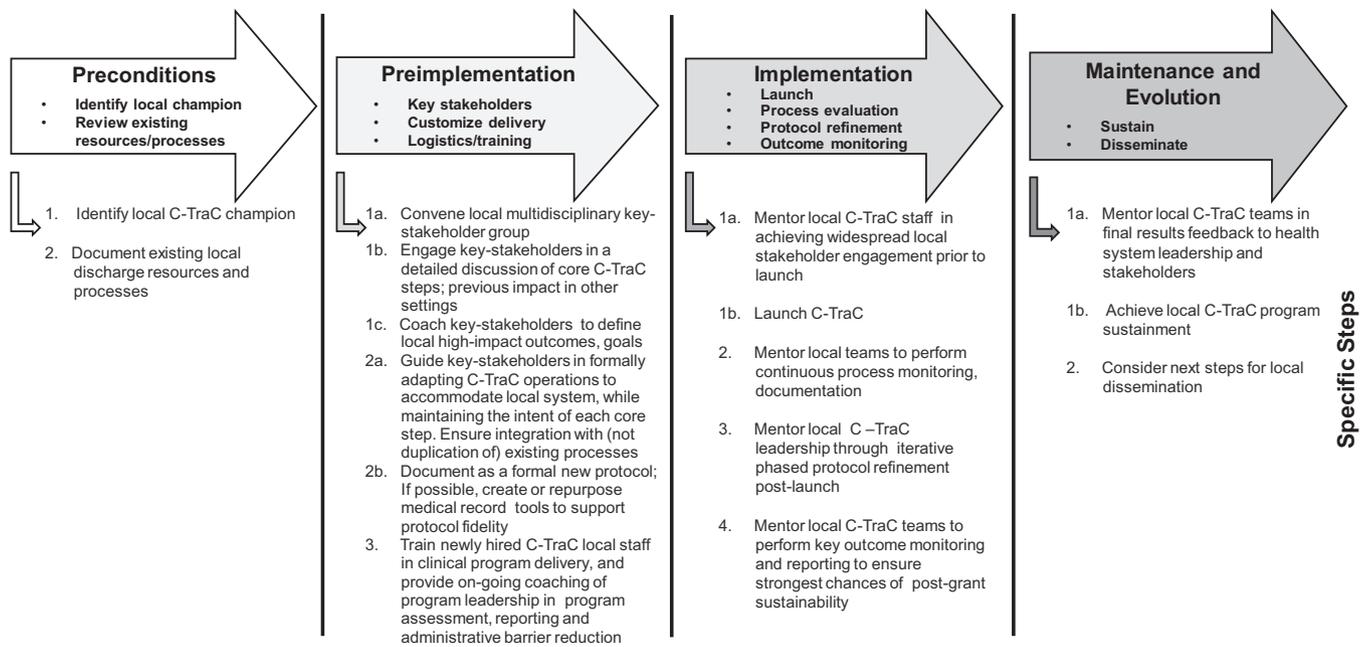


Figure 1. Modified Replicating Effective Programs (REP) implementation model³ used for mentoring in Coordinated-Transitional Care (C-TraC). Adapted from the Centers for Disease Control and Prevention REP Implementation Theory Model.

Preconditions

Preconditions in the modified REP model are preexisting characteristics of the targeted health system and micro-level context that are fundamental to a new intervention and merit careful consideration. This phase involves two primary tasks: identification of a local programmatic champion(s) who is well connected within the target system and who has the skills and position to become the primary local advocate and director for the program and a detailed review of existing resources and processes related to the new intervention. Institutional leaders are ideally engaged at this step as well.

In the original REP model for macro-level dissemination, researchers determine need and chose an intervention to implement, but in this micro-level implementation, UWHC leadership had already independently accomplished these tasks. In the VA C-TraC leadership team’s experience with micro-level implementation, it is typical for definition of need and choice of specific intervention to lie primarily with system leadership, not with an external research group.

In the specific case of C-TraC, the UWHC Chief Nursing Officer and the Director of Transitional Care Programs were identified as local programmatic champions. Local discharge resources and processes and any existing related programs within the system were noted. The C-TraC implementation mentoring team (the director (AJHK, a geriatrician) and nurse mentor of the VA C-TraC program) initially documented these in partnership with the local champions and later validated (or revised) them in discussions with key local stakeholders.

Preimplementation

Preimplementation in the modified REP model is a preparation phase in which wider local stakeholder buy-in is

achieved to facilitate programmatic adaptation to local culture and context while maintaining core step fidelity, ultimately readying for initial local program launch. This phase involves three primary tasks.

Critical Stakeholders

The first task is convening of a local, multidisciplinary key stakeholder group. Key stakeholders, in this case, are individuals from within the local system with all groups potentially impacted by the new program/intervention being represented, with the new program or intervention being represented potentially affecting all groups. The local champion helps identify key stakeholders. For example, the UWHC C-TraC key-stakeholder group included the UWHC Chief Executive Officer and aforementioned UWHC C-TraC champions and had representatives from the UWHC executive team, inpatient nurse managers and physicians, outpatient primary care providers, and UWHC patients. The implementation mentoring team then guides this group through a series of sessions in which the key stakeholders validate and refine the “preexisting related health system processes” list created during the precondition step, are engaged in a detailed discussion of the core target intervention (e.g., C-TraC) steps and its previous effect in other settings,¹ and are coached to clearly and specifically define what outcomes and goals would be indicative of local success for a new program. Locally defined goals for the UWHC C-TraC program included mitigating confusion regarding the discharge plan, identifying and correcting medication discrepancies, and reducing readmissions.

Customizing Delivery

The second task of preimplementation involves customizing delivery of the intervention protocol to ensure adapta-

tion to the local health system and micro-level context. To accomplish this customization, the implementation mentor team guides the local key-stakeholder group in formally adapting each core step of the intervention protocol while ensuring that the intent of each step is maintained. (A full and detailed description of the original C-TraC protocol has been published previously¹ and can also be found at <http://www.hipxchange.org/C-TraC>.) The mentoring team also works with the key stakeholders to ensure that the resulting adaptation is fully integrated with, and not duplicative of, preexisting related health system processes. Some core steps may need more adaptation than others depending upon local health system characteristics or the particular micro-level context being considered. For example, when the C-TraC protocol¹ was formally adapted for UWHC (Figure 2), Core Step 2 required a change in operationalization because multidisciplinary discharge rounds were not held on all hospital services. The intent of this core step was to achieve C-TraC nurse integration with the inpatient team, so the key-stakeholder group identified other ways that this core step's intent could be realized (e.g., integration with unit rounds, regular check-ins with the team). In addition, because UWHC inpatient pharmacists review the discharge medication list in detail with the patient on discharge day, the UWHC C-TraC adaptation omitted this specific task in Core Step 3 (the inpatient visit). Other tasks included in Core Step 3 were maintained, including establishing rapport, scheduling a 48-hour postdischarge telephone call, and ensuring that the individual and family knew how and when to contact their C-TraC nurse directly. A complete medication reconciliation was still conducted in Core Step 4 (the 48-hour post-discharge telephone call). The other core steps involving direct communication with individuals and caregivers required no changes. This customization and adaptation process resulted in a full and highly detailed protocol that could be harnessed for initial C-TraC launch at UWHC. This protocol was then used to construct electronic medical record–based templates that directly reflected the new

protocol, reinforced fidelity of each core step, and allowed for collection of critical process measures and outcomes that local stakeholders identified as important.

The stakeholder group and the UWHC C-TraC leadership decided that eligibility criteria for the UWHC C-TraC program would remain identical to those used in the original VA C-TraC pilot.¹ Therefore, individuals eligible for UWHC C-TraC had to be hospitalized at UWHC and be discharged to a noninstitutional community setting with one or more of the following: cognitive impairment, aged 65 and older and living alone, or at least one previous hospitalization in the last year. Individuals who were receiving intensive, ongoing, longitudinal outpatient case management (e.g., for transplantation) were excluded.

Hiring, Training, Coaching

In this last task of preimplementation, clinical program staff are hired and trained, and program leadership is coached in program assessment, reporting, and administrative barrier reduction. The implementation mentoring team leads each of these activities, coaching local leadership on characteristics of ideal candidates for C-TraC nurse hire and customizing training for those new hires as needed.¹⁴ Two experienced full-time UWHC registered nurse case managers (RNs) were initially dedicated to the new C-TraC program, but this was increased to three full-time nurses at the 9-month point because of strongly positive initial results. Each was trained using a combination of didactics and practice-based learning over an intensive 1-week apprenticeship and through weekly 1-hour mentoring team meetings during the subsequent 4 months. UWHC C-TraC program staff continued to meet daily to discuss challenges and operations.

The time needed to accomplish preimplementation activities with local key stakeholders varied based upon how easy or difficult it was to obtain participation and majority consensus and how widely the target system varies from the original. In the UWHC C-TraC

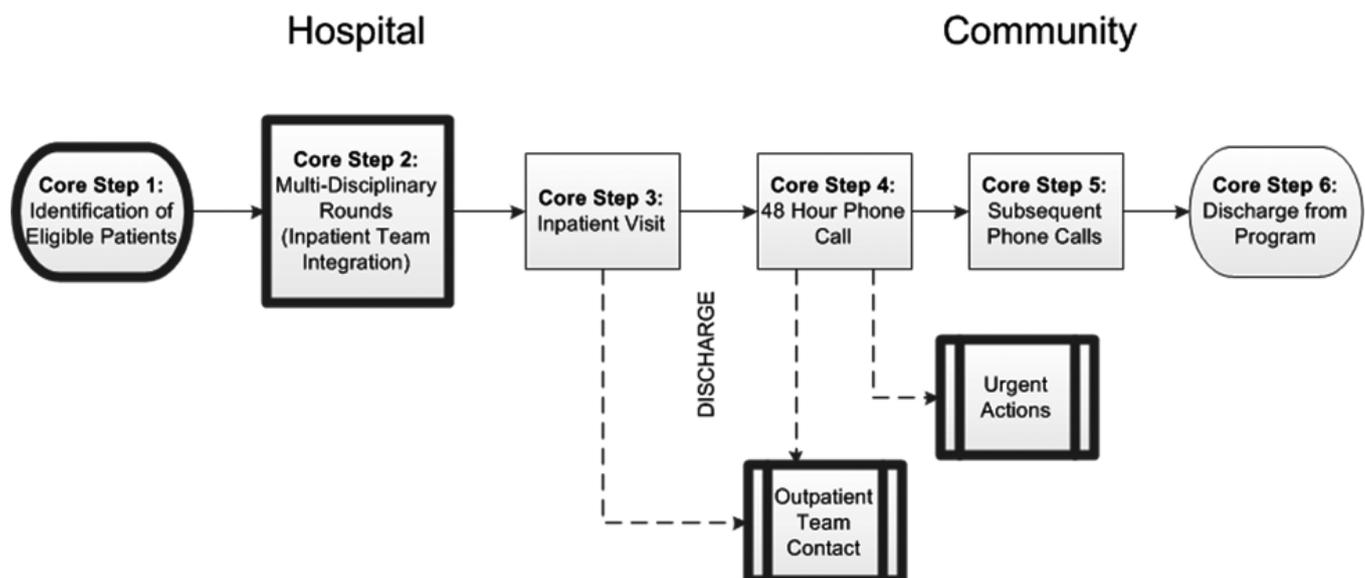


Figure 2. Coordinated-Transitional Care core steps. Dark boxes are highly sensitive to context and may need system-specific adaptations.

preimplementation, it took 3 months to accomplish all critical tasks. Preimplementation for C-TraC launches in systems more similar to the initial VA C-TraC pilot hospital have required less time. However, regardless of how long it takes, this is time well invested because strong preimplementation allows for smoother implementation with fewer unexpected barriers that could threaten sustainability.

Implementation

Implementation in the modified REP model occurs with actual local program launch, maintaining continuous process and fidelity monitoring to guide rapid-cycle iterative protocol refinement during the postlaunch period. This phase involves four primary tasks: achieving widespread front-line stakeholder engagement and launching the adapted program; performing continuous process monitoring to understand core step fidelity and implementation barriers, if any; using continuous monitoring data, performing rapid-cycle iterative-phased protocol refinement (plan, do, study, act cycles) to ensure program feasibility and fidelity; and performing real-time monitoring of outcomes that local key stakeholders have identified as important. Any protocol refinements made during this period are immediately and clearly documented in the formal protocol and discussed with the full implementation team to ensure transparency and understanding. Any necessary updates to the electronic medical record templates should also be completed at this time.

In the UWHC C-TraC implementation, each of these four tasks was achieved. Before launch, the local C-TraC champion and members of the key-stakeholder group addressed all nursing, physician, and other front-line inpatient and outpatient staff to introduce C-TraC and its goals and planned operations and to ask for feedback. When possible, these sessions were performed in small-group or individual settings and were discipline concordant (e.g., nurses presented to nurses). The UWHC C-TraC program was launched July 2013 on two inpatient medical services and quickly expanded to cover four total medical services. Only minor protocol alterations were necessary after launch and primarily centered on how to best achieve C-TraC integration with the inpatient teams, because multidisciplinary rounding practices varied between services.

Maintenance and Evolution

The final phase of the modified REP model is maintenance and evolution, during which program results are compiled and reported to leadership and other relevant stakeholders, and if the program is deemed successful, local sustainment is achieved and next steps for dissemination are considered. In this final step, which began approximately 12 months after launch, the implementation mentoring team worked closely with the UWHC C-TraC team to help design and support results feedback to local health system leaders and stakeholder groups. This included mentorship in data presentation, messaging and resource sustainability requests, and advice on potential next steps for local dissemination. A cornerstone of this phase of mentorship was advice on the production of a locally targeted

financial case for program growth and sustainability. Although the implementation mentoring team assisted in the creation of materials and strategy, UWHC C-TraC leadership served as the primary champions and presenters of this information to local health system leaders. Once sustainability was achieved, the new UWHC C-TraC program reached full independence.

Assessment

Program evaluation for the UWHC C-TraC launch focused on two primary areas—core step fidelity and locally targeted outcomes. Core step fidelity measures, extracted directly from the electronic medical record templates, included indicators for each core step's occurrence for each enrolled individual and for critical content items included within the initial posthospital telephone call (Core Step 4). Outcomes data included medication discrepancies identified and rectified during the 48- to 72-hour postdischarge telephone call and the presence of any acute care rehospitalization within 30 days at UWHC. Information on medication discrepancies was collected in the electronic medical record templates. The UWHC Business Planning and Analysis Department, an analytics branch independent of the UWHC C-TraC team and the C-TraC implementation mentoring team, extracted information on rehospitalization directly from UWHC internal administrative data. Information on these program metrics, enrollment numbers, patient characteristics, and staff work-time data was compiled for the first 16 months of UWHC C-TraC operation (July 2013 through October 2014). These data were compiled separately for individuals enrolled in C-TraC on acute-care status and those on observation status because UWHC compiles 30-day rehospitalization data only for those on acute-care status. A contemporaneous comparison group ($n = 1,307$) was drawn from UWHC acute-care medical patients who would have met C-TraC criteria but did not receive C-TraC because the program was not offered on their hospital medical service. The Business Planning and Analysis Department also administratively extracted information on rehospitalization for this comparison group using methods identical to those noted above. Differences in rehospitalization frequencies between the intervention and contemporaneous comparison group were assessed using the chi-square test. The University of Wisconsin institutional review board designated this project as exempt from review.

RESULTS

Enrollment

In its first 16 months of operation, UWHC C-TraC successfully enrolled 1,247 individuals (964 acute care, 283 observation status), with enrollment capacity increasing monthly because of sequential improvements in operational efficiency and the addition of new nursing staff at the 9-month point. In the first month of operation, 8.5 individuals were enrolled per C-TraC nurse, but this increased to the expected target volume of 35 to 45 individuals per nurse per month by the third month of operation. During the 16-month assessment period, 61 patients (~5%) actively refused to participate when approached during the

in-hospital visit. The two most common reason patients gave C-TraC nurses for active refusal were that they felt they did not need the service and that they had enough resources already in place. Another 129 individuals (~10%) did not engage in the program. These individuals did not answer their posthospital telephone call despite multiple attempts or were rehospitalized within 48 hours of discharge before engaging in the posthospital call. Although these refusal rates were higher than those observed for the VA C-TraC program (<1%), they were much lower than those noted for the prior UWHC home visit–based transitional care program. Characteristics of individuals who enrolled in the program are listed in Table 1.

Core Step Fidelity

The UWHC C-TraC program operated with a reasonable level of core step fidelity. Program clinical staff identified eligible individuals (Figure 2, Core Step 1) and integrated with inpatient teams (Core Step 2) daily. Eighty-nine percent (1,112/1,247) of enrolled individuals received a protocolized inpatient visit (Core Step 3), more than 95% had an attempted protocolized posthospital telephone call within 48–72 hours, and 65% engaged in that call within 48–72 hours (Core Step 4); the rest of the enrolled individuals engaged in calls outside of the 72-hour timeframe. (Multiple calls were needed to reach these individuals.) These calls averaged 16 minutes in length (range 5–120 minutes) and included a full individual- or caregiver-led medication reconciliation with all medication discrepancies noted and rectified.¹ The C-TraC nurses rectified all medication discrepancies through education and, when necessary, by obtaining new orders from the inpatient or outpatient prescribing provider (according to the nurse's judgment). Caregivers were included in C-TraC transitional care contacts for 29% of individuals. C-TraC nurses noted that the electronic medical record templates designed for each core step helped reinforce protocol fidelity.

UWHC C-TraC Pilot: Outcomes, Business Case

Outcomes for the UWHC C-TraC pilot met stakeholder predefined goals. Twenty-five percent of all patients

Table 1. Characteristics of Participants in the University of Wisconsin Coordinated-Transitional Care Program (N = 1,247)

Characteristic	Value
Age, average	77
White, %	93
Male, %	47
Living Alone, %	43
Medicaid, %	0
Medicare, %	81
Education, %	
<8 years	2
Some high school	5
High school graduate or general educational development	24
Some college	12
College graduate	27
Previous hospitalization during prior 12 months, %	43

(n = 312) had at least one medication discrepancy identified and rectified during the 48- to 72-hour posthospital C-TraC call, with cardiovascular medications being the most commonly discrepant. This was less than the 47% discrepancy rate observed in the original VA C-TraC pilot. The average number of medication discrepancies per patient was 2.4 (range 1–29) (Table 2).

C-TraC intervention participants hospitalized for acute care had lower rates of 30-day rehospitalization than the contemporaneous comparison group of individuals hospitalized for acute care who did not receive C-TraC. Overall, 10.8% (104/964) of C-TraC participants were rehospitalized, compared with 16.6% (217/1,307) of the comparison group ($P < .001$). (UWHC's overall rehospitalization rate for the same time period for all older adults was 12.5% (4,259 readmissions of 34,184 discharges).) This 5.8–percentage point difference in rehospitalization represents a relative risk reduction of 35%; a magnitude of reduction similar to that noted in the original VA C-TraC pilot. When examined according to 4-month time periods, reductions in rehospitalizations were not observed until after the initial 4-month implementation period (Figure 3). No rehospitalization data were available for the observation status groups.

Estimated total up-front investment for this C-TraC pilot was \$300 per person enrolled, which includes all staff, administrative, and implementation costs. The average direct cost for an acute medical or surgical bed day of care at UWHC is \$3,325, and the average rehospitalization length of stay is 5 days. If one were to assume a capitated

Table 2. Medication Discrepancies Identified and Rectified in Coordinated-Transitional Care (C-TraC) Program 48- to 72-Hour Postdischarge Follow-Up Telephone Call (N = 1,247)

Medication Discrepancy Characteristic	Value
Prevalence of medication discrepancies	
Participants with ≥ 1 medication discrepancies, n (%)	312 (25)
Number of medications per participant, average (range)	14 (0–44)
Medication discrepancies in sample, n	592
Number of medication discrepancies identified and rectified per participant with any discrepancy average (range)	2.4 (1–29)
Most-common classes of medications with discrepancies, % of all discrepancies	
Cardiovascular	25
Vitamins and supplements	15
Gastroenterological	14
Analgesic	13
Endocrine or metabolic	7
Pulmonary	4
Most-common specific medications with discrepancies, % of all discrepancies	
Aspirin	4
Acetaminophen	3
Lisinopril	3
Multivitamin	3
Omeprazole	2

One hundred twenty-nine individuals patients enrolled in the C-TraC program but met program discharge criteria before the first follow-up telephone call. The data shown above are for those who received the posthospital telephone call.

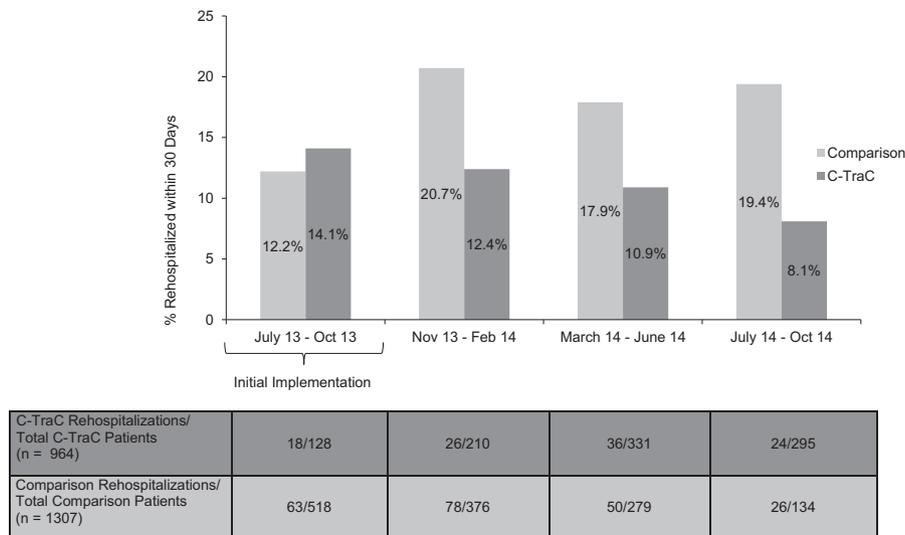


Figure 3. Rehospitalization frequencies for Coordinated-Transitional Care (C-TraC) intervention participants hospitalized for acute care and usual care contemporaneous comparison group at 4-month intervals. The comparison group consisted of contemporaneous hospitalized individuals who met C-TraC program criteria but who did not receive C-TraC because the program was not offered on their hospital medical service.

system, given the observed decrease in rehospitalizations of 5.8 percentage points versus the comparison group, it is estimated that the UWHC C-TraC program avoided 361.6 days in acute care over the first 16 months, leading to an estimated gross savings of \$1,202,420. After accounting for all program costs, this led to an estimated net savings of \$826,337 overall or \$663 per person enrolled over the first 16 months of the program (including the less-efficient early implementation months), but UWHC is not a capitated system; Medicare actually realized most of these theoretical savings. Nonetheless, given the observed drop in rehospitalizations, strong reports of satisfaction, and lower risk of receiving Medicare rehospitalization penalties, the UWHC C-TraC program continues in operation, fully sustained by UWHC. Efficiency continues to improve, and expansion plans are under way.

DISCUSSION

To achieve sustainability, newly disseminated clinical programs must be valued by their new health micro-systems. To be valued, these programs need to be sensitive and adaptable to the new system’s preexisting context, resources, and locally defined goals.⁷⁻⁹ The modified REP model is offered as a promising option to achieve protocolized micro-system adaptation in clinical program dissemination, balancing local adaptation with core intervention fidelity. The modified REP framework has now functioned successfully as an approach for protocolized implementation within this UWHC C-TraC dissemination and in regional VA C-TraC disseminations. To the knowledge of the authors, this is the first publication of a modified REP framework being used to guide protocolized adaptation and implementation of a clinical intervention at a hospital or smaller micro-system level. This work is innovative in that it could potentially serve as a foundation for the spread of other interventions across a large variety of health system sizes, types, and cultures.

The modified REP model is founded upon the CDC’s REP implementation model, which has a strong track record in national macro-level dissemination efforts.⁹ This model fits well as a specific, health system micro-level protocol for achieving the context-specific adoption and implementation steps of most theoretical models of dissemination, including the Practical, Robust Implementation and Sustainability Model.^{7,8} It incorporates basic tenets of dissemination, including consideration of organizational characteristics, needs, and perspectives; staff and patient perspectives and needs; and attention to the implementation process and sustainability infrastructure.⁷ Nonetheless, many other theoretical implementation models are available, and an approach should be chosen based upon a project’s specific implementation needs.

Use of the modified REP model should be considered in light of some limitations arising primarily from the pilot nature of the work presented here. This modified REP model has been used in only a few Midwestern health system C-TraC launches, and it is unclear whether similar results could be realized in other micro-system regions or cultures or with other interventions. Although it is extremely promising and holds strong face validity, the modified REP model should be tested in a more-formal, rigorous, and quantitative implementation trial to better understand its effect and generalizability across a wider array of micro-systems. In addition, the outcomes collected as part of this clinical C-TraC implementation arise from a prospective quality improvement-level program evaluation and lack the rigor of more-stringent assessment modalities. In particular, it was not possible to assess rehospitalization to outside facilities. This may have been particularly important at the UWHC, given the high rate of older adults who were receiving care a long distance from their home. The UWHC C-TraC outcomes are provided here primarily to offer a detailed real-world example of program implementation and the underpinnings of the financial argument made for local sustainment. A National

Institutes of Health–funded C-TraC randomized controlled trial is under way and will provide a more-rigorous assessment of C-TraC's effect.¹⁵

In conclusion, use of a modified REP implementation model to guide protocolized adaptation to a local context resulted in a good-fidelity C-TraC program that was feasible and sustained in a non-VA setting. A modified -REP implementation framework may be an appropriate foundational step for other clinical programs seeking to harness protocolized adaptation in mentored micro-system level dissemination activities.

ACKNOWLEDGMENTS

The authors would like to acknowledge Peggy Troller, Hilary Krieger, Matt Lakosky, and Jennifer Hendricks for program support and Laury Jensen for nurse mentoring.

This project was presented as a poster during the American Geriatrics Society Annual Meeting, May 15–18, 2014, Orlando, Florida.

This project was supported by the University of Wisconsin Hospitals and Clinics, National Institute on Aging Beeson Career Development Award K23AG034551 (PI Kind; National Institute on Aging, American Federation for Aging Research, John A. Hartford Foundation, Atlantic Philanthropies, Starr Foundation), National Institute on Aging Grant 2P50AG033514–06, and Madison VA Geriatric Research, Education and Clinical Center (Manuscript #2015–008). Dr. Kind's time was also partially supported by the University of Wisconsin School of Medicine and Public Health from the Wisconsin Partnership Program. Additional support was provided by the Community-Academic Partnerships core of the University of Wisconsin Institute for Clinical and Translational Research, Grant 1UL1RR025011 from the Clinical and Translational Science Award program of the National Center for Research Resources, National Institutes of Health.

Conflict of Interest: Dr. Kind has received institutional grant support from the Department of Veterans Affairs, the National Institutes of Health, National Institute on Aging, and the John Hartford Foundation and serves as a consultant for the State of Maryland. No other coauthors have any conflicts of interest to disclose.

Author Contributions: Kind, Brenny-Fitzpatrick, Houlahan: study concept and design. Kind, Brenny-Fitzpatrick, Leahy-Gross, Mirr, Chapman, Frey: acquisition of subjects and data. Kind, Leahy-Gross, Mirr, Frey: data analysis and interpretation. Kind, Brenny-Fitzpatrick,

Leahy-Gross, Mirr, Chapman, Frey, Houlahan: manuscript preparation.

Sponsor's Role: No funding source or sponsor had a role in the design or conduct of the study; collection, management, analysis, or interpretation of the data; preparation, review, or approval of the manuscript; or decision to submit the manuscript for publication.

REFERENCES

1. Kind AJH, Jensen L, Barczy S et al. Low-cost transitional care with nurse managers making mostly phone contact with patients cut rehospitalization at a VA hospital. *Health Aff* 2012;31:2659–2668.
2. Naylor MD, Brooten DA, Campbell RL et al. Transitional care of older adults hospitalized with heart failure: A randomized, controlled trial. *J Am Geriatr Soc* 2004;52:675–684.
3. Naylor MD, Brooten D, Campbell R et al. Comprehensive discharge planning and home follow-up of hospitalized elders: A randomized clinical trial. *JAMA* 1999;281:613–620.
4. Coleman EA. Falling through the cracks: Challenges and opportunities for improving transitional care for persons with continuous complex care needs. *J Am Geriatr Soc* 2003;51:549–555.
5. Coleman EA, Parry C, Chalmers S et al. The care transitions intervention: Results of a randomized controlled trial. *Arch Intern Med* 2006;166:1822–1828.
6. Moulding NT, Silagy CA, Weller DP. A framework for effective management of change in clinical practice: Dissemination and implementation of clinical practice guidelines. *Qual Health Care* 1999;8:177–183.
7. Feldstein AC, Glasgow RE. A practical, robust implementation and sustainability model (PRISM) for integrating research findings into practice. *Jt Comm J Qual Patient Saf* 2008;34:228–243.
8. Glasgow RE, Lichtenstein E, Marcus AC. Why don't we see more translation of health promotion research to practice? Rethinking the efficacy-to-effectiveness transition. *Am J Public Health* 2003;93:1261–1267.
9. Kilbourne A, Neumann M, Pincus H et al. Implementing evidence-based interventions in health care: Application of the replicating effective programs framework. *Implementation Sci* 2007;2:42.
10. Richardson JL, Milam J, McCutchan A et al. Effect of brief safer-sex counseling by medical providers to HIV-1 seropositive patients: A multi-clinic assessment. *AIDS* 2004;18:1179–1186.
11. Kelly JA, Somlai AM, DiFranceisco WJ et al. Bridging the gap between the science and service of HIV prevention: Transferring effective research-based HIV prevention interventions to community AIDS service providers. *Am J Public Health* 2000;90:1082–1088.
12. Stevens AB, Lancer K, Smith ER et al. Engaging communities in evidence-based interventions for dementia caregivers. *Fam Community Health* 2009;32(Suppl. 1):S83–S92.
13. Goodrich DE, Bowersox NW, Abraham KM et al. Leading from the middle: Replication of a re-engagement program for veterans with mental disorders lost to follow-up care. *Depress Res Treat* 2012;2012:325249.
14. Gilmore-Bykovskiy A, Jensen L, Kind AJ. Development and implementation of the Coordinated-Transitional Care (C-TraC) program. *Fed Pract* 2014;31:30–34.
15. National Institute of Health. Research portfolio online reporting tools, 2014 [on-line]. Available at <http://projectreporter.nih.gov/reporter.cfm> Accessed November 11, 2014.