



Transitions of Care from Hospital to Home: An Overview of Systematic Reviews and Recommendations for Improving Transitional Care in the Veterans Health Administration

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PREFACE

Quality Enhancement Research Initiative's (QUERI) Evidence-based Synthesis Program (ESP) was established to provide timely and accurate syntheses of targeted healthcare topics of particular importance to Veterans Affairs (VA) clinicians, managers and policymakers as they work to improve the health and healthcare of Veterans. The ESP disseminates these reports throughout the VA, and some evidence syntheses inform the clinical guidelines of large professional organizations.

QUERI provides funding for four ESP Centers and each Center has an active university affiliation. The ESP Centers generate evidence syntheses on important clinical practice topics, and these reports help:

- develop clinical policies informed by evidence;
- guide the implementation of effective services to improve patient outcomes and to support VA clinical practice guidelines and performance measures; and
- set the direction for future research to address gaps in clinical knowledge.

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EVIDENCE REPORT

BACKGROUND

The hospital-to-home transition marks an abrupt shift from intensive, provider-driven care to self-managed care, and, often, from one set of inpatient providers to an entirely different set of outpatient providers. After hospital discharge, patients in both VA and non-VA settings are uncertain how to manage their health care.¹⁻³ They are also at increased risk for adverse events,⁴⁻⁶ and for hospital readmissions which are common and costly.⁵⁻⁹ About one in 5 older Medicare beneficiaries is readmitted within 30 days of hospital discharge at an annual estimated cost of \$17 billion. Similarly, 15-20% of Veterans hospitalized with higher-risk conditions such as congestive heart failure (CHF), chronic obstructive pulmonary disease, or myocardial infarction are readmitted within 30 days, while nearly one-quarter of those with chronic mental illness experiences a 30 day readmission.¹⁰ In 2011, the total cost of 30 day readmissions to the Veterans Health Administration (VHA) was \$1.2 billion.¹⁰

Transitional care has been defined as “a set of actions designed to ensure the coordination and continuity of healthcare as patients transfer between different locations or different levels of care within the same location.”⁷ Early studies showed that nurse-led transitional care interventions beginning in the hospital and continuing after discharge had the potential to reduce the rate of hospital readmissions.^{2,11} Given the promise of these early interventions and several subsequent Center for Medicaid and Medicare Service (CMS) policy initiatives designed to help promote uptake of transitional care quality improvements,^{12,13} transitional care intervention studies have proliferated in recent years.

Currently, like many health systems, the VHA must decide how to approach care transitions. In 2010, VHA began a nationwide effort to implement a version of the medical home model of care, called Patient Aligned Care Teams (PACT), in which care coordination is a key principle.¹⁴ The VHA has also instituted a goal to have PACT nurse care managers call most patients within 2 business days of hospital discharge. There is no other broadly adopted approach to transitional care in VA settings. Further transitional care efforts might require additional investment in transitional care, but the benefits of such interventions in VA settings and for Veteran populations are not well understood.

Transitional care interventions are complex and often involve multiple components. The potential success or failure of these complex health systems interventions may depend on the nature of the interventions themselves, the settings in which they were implemented, and/or the populations included. This report aims to broadly summarize the effects of transitional care interventions in different patient populations and settings, as well as the effects of particular types of transitional care interventions on readmission rates and mortality. We also identify key themes about implementing transitional care interventions that have emerged across the literature, and provide some practical recommendations to improve care transitions in VHA and guide future research.

METHODS

We conducted a review of published systematic reviews. “Transitional care” is a loose, broadly defined term that can be applied to many different types of interventions and has been studied in many different patient populations. We use the term “intervention type” to refer to single- or multicomponent interventions that used a similar approach or bundle of care processes (*eg*, telemonitoring, hospital-at-home), or addressed a similar aspect or key process of the care transition (*eg*, medication reconciliation). Patient populations are defined according to clinical condition (*eg*, CHF) or demographic characteristics (*eg*, geriatric). There are numerous characteristics that further distinguish interventions from one another. “Intervention characteristics” refer to any of the following (derived from an existing taxonomy)¹⁵: transition type (hospital to home, hospital to nursing facility), intervention target (patient, caregiver), key processes (education, personal health record), key personnel involved (nurse, social worker), method of contact (phone, home visits), and intensity and complexity.

From an initial review of the literature, we recognized that most systematic reviews typically either examined different transitional care intervention types in a given patient population, or examined a given intervention type in a variety of patient populations. We identified categories of patient populations and intervention types to help guide our literature search, study selection, and synthesis (Appendix A, Tables 1 and 2). The intervention type and patient population categories were developed iteratively with input from a panel of content experts, a “horizon scan” of the literature, and with input from our study team. The search strategy is presented in Appendix B.

We focused on reviews that reported hospital readmissions as an outcome, regardless of whether it was the primary outcome. However, we summarized other outcomes reported by each review.

Within each patient population or intervention type of interest, we first identified reviews that fulfilled key quality criteria: 1) clearly reported their search strategy, 2) reported inclusion and exclusion criteria, and 3) conducted an appraisal of the internal validity of the included trials.^{16,17} If there was more than one review within each category fulfilling these criteria, we prioritized the most recent review and, if there were several recent reviews meeting quality criteria, we prioritized those with the broadest scope. We discussed the ultimate choice of review as a group and resolved any disagreements through consensus.

Because of its relevance to the current VA practice environment, we also reviewed medical home literature to examine the effects of transitional care activities within the context of the medical home (see search strategy, Appendix B).

From each review we abstracted search dates, inclusion criteria, patient population characteristics, readmission and mortality outcomes, other clinical and utilization outcomes, and any data that would inform intervention implementation (*ie*, characteristics of the setting or the intervention that modified the effect of the intervention). We also developed brief narrative summaries of findings for each patient population or intervention type. These narratives were compiled into a single document and reviewed independently by each of the authors of this report, who then compiled a brief list of key themes in the evidence as well as recommendations for stakeholders based on their interpretation of the narratives.

Policy implications were informed by interpretation of the evidence in the context of clinical and research experience of different members of the study team, which includes: experience with implementation and evaluation of transitional care interventions (DLK, HE), readmissions policy research (DLK, SJ, HE, DK), medical home implementation and evaluation in VA (DLK), administrative leadership (DK, HE), inpatient clinical practice in VA (DLK, DK, JC, KR) and non-VA settings (HE), outpatient clinical practice in VA (DLK) and non-VA settings (HE), and policy development at federal and state levels (SJ).

RESULTS

We reviewed 807 titles and abstracts from the electronic search, and identified an additional 94 from reviewing reference lists and performing manual searches for recently published and unpublished or ongoing studies (Appendix C, Figure 1). Eighty-one systematic reviews met our inclusion criteria and, of these, we selected 17 that were the most recent and broadly scoped.

We selected a representative review for 7 patient populations and 10 intervention types. The effects of transitional care interventions on hospital readmissions and mortality are summarized in Tables 1 and 2 (Appendix A). The effects of interventions on other clinical and utilization outcomes are summarized in Tables 3 and 4 (Appendix A), along with any information from the reviews relevant to implementation considerations (setting or intervention characteristics). All reviews used reproducible systematic searches, specified inclusion and exclusion criteria, and assessed the quality of included studies (most using established criteria – see Tables 1 and 2). Almost none of the reviews, however, rated the strength of the overall body of evidence.

WHAT TRANSITIONAL CARE INTERVENTION CHARACTERISTICS ARE ASSOCIATED WITH REDUCTIONS IN READMISSION RATES?

Overall, it is very difficult to identify specific intervention characteristics that are necessary for successful care transitions. There is some consistency among different patient populations and different settings that successful interventions are more comprehensive, touch on more aspects of the care transition, extend beyond the hospital stay, and are flexible enough to respond to individual patient needs. However, the strength of evidence supporting these overarching conclusions should be considered low because these are indirect, post-hoc comparisons across literature that includes many different intervention types, studied in varied populations and clinical settings, and implemented in different ways. We found very little comparative effectiveness data.

Transitions of care taxonomies

Two reviews developed detailed taxonomies to guide their analysis of the literature.^{15,18} One review examined transitional care interventions in patients with stroke or MI, and explicitly set out to define the key characteristics of interventions and to determine whether outcome effects were modified by intervention, patient, or system characteristics.¹⁵ Their taxonomy specifies a number of intervention characteristics including: 1) transition type (hospital to home, nursing facility to home), 2) intervention target (patient, caregiver, or provider), 3) key processes (education, counseling, *etc*), 4) key personnel involved, 5) method of contact, 6) intensity and complexity, and 7) outcomes targeted.

Despite the development of a detailed taxonomy and a large number of fair- and good-quality trials, the authors were unable to draw firm conclusions about which intervention characteristics are associated with benefit, and how population and health system setting characteristics might modify effects. They cited inconsistency in intervention and usual care definitions, lack of statistical power, variation in study endpoints, methodologic shortcomings of some studies, and limited generalizability (most studies were single-site and non-US) as key limitations to the body of evidence.

A more recent review developed a similar type of taxonomy. The authors also systematically characterized intervention intensity by creating a “comprehensive support” variable which was based on number of patient interactions, number of personnel involved, number of intervention components, and the ability of the intervention to address self-management needs. A meta-regression including 42 trials, the vast majority of which included general medical patients or patients with CHF and were considered to be methodologically sound, found interventions were overall associated with reductions in readmissions (pooled RR 0.82, 95%CI 0.73-0.91). They found the observed benefits were mostly contributed by interventions with the most comprehensive support (RR readmission in the 7 studies with highest comprehensive support scores compared to 15 studies with the lowest scores, 0.63, 95% CI 0.43-0.91). They also found that the observed benefit was mainly limited to studies published before 2002 (RR readmission of studies published in 2002 or after, 1.47, 95% CI 1.10-1.96). They speculate that, over the last decade, usual care has improved, making it more difficult to demonstrate the incremental benefit of transitional care interventions.

The effects of different intervention types

An Agency for Healthcare Research and Quality (AHRQ) review in patients with CHF categorized interventions into one of 6 types: home-visiting programs, structured telephone support, telemonitoring, outpatient clinic-based (which included multidisciplinary CHF clinics, primarily educational, and other).¹⁹ This review found interventions with multidisciplinary HF clinic visits or home visits reduced both all-cause readmissions and mortality, with NNTs below 10 for readmission and 18-33 for mortality (for MDS-HF clinic and home visiting programs, respectively). Structured telephone support interventions produced a similar mortality benefit but did not reduce all-cause readmissions. The authors of this CHF review found that, across intervention types, the key processes of care that seemed to be associated with reduced readmissions included: self-management education delivered in person, early post-discharge contact, a point of post-discharge contact, and the ability to individually tailor the intervention.

One review of patients with stroke or myocardial infarction described 5 intervention types: 1) hospital-based discharge preparation, 2) hospital-based patient and family education, 3) community-based patient and family education, 4) community-based models of support interventions, and 5) chronic disease management models of care.²⁰ They found moderate-strength evidence that early supported discharge of stroke patients (short hospital stay followed by intensive home care with a multidisciplinary team) shortened length of stay without adversely impacting readmissions or mortality. Specialty care after an MI was associated with reduced mortality, but the strength of evidence was low (largely from one VA observational study).

Tables 2 and 4 summarize reviews focused on specific intervention types (Appendix A). Several show promise in reducing readmissions and/or mortality.²¹⁻²³ Many of the more successful interventions, in reality, touched on numerous aspects of the care transition and took place across settings. For example, according to a Cochrane review updated in 2013, there is moderate-strength evidence that structured and individually tailored discharge planning reduces readmissions within 90 days, and hospital length of stay.²¹ However, the discharge planning interventions were likely complex and included numerous care processes, with substantial variation among studies in the exact combination of care processes used. In 9 of the interventions, a nurse “advocate” helped with discharge planning activities and care coordination. Twelve of the interventions included post-discharge follow-up.

By contrast, a review of COPD patients found 5 trials of interventions that began after hospital discharge and did not include many care processes – such as provider continuity, ensuring post-discharge follow-up, and patient-centered discharge education – that have been part of interventions that were successful in other populations. The interventions did not consistently reduce readmissions or mortality.²⁴

Kwan et al examined peri-discharge medication reconciliation interventions.²³ They found one intervention that reduced clinically significant adverse drug events (ADE) and post-discharge utilization, but this intervention included additional care processes such as post-discharge follow-up.²⁵ They otherwise found that interventions focused largely on medication reconciliation found many clinically significant unintended discrepancies (median proportion of patients with at least one discrepancy, 45%), but little evidence that these focused interventions impacted utilization or reduced ADE.

Home visits

It is unclear whether home visits are a necessary component of transitional care interventions. A meta-analysis of trials including general medicine or CHF patients did not find that the setting of care delivery influenced outcomes; however, all but one of the most comprehensive interventions included home visits in their model.¹⁸ On the other hand, the CHF review discussed above found evidence in support of interventions that did and did not include a home visit component.¹⁹ They found insufficient evidence directly comparing interventions with and without home visits.

Hospital-at-home interventions were associated with reductions in readmissions and mortality across 61 trials, among which medical populations were best studied.²² Specific components of the included interventions were not well-described, and periods of observation for outcomes were not specified. Interventions were associated with greater patient and caregiver satisfaction in the vast majority of studies reporting such outcomes. The interventions examined in this review were largely designed to substitute home care for part or all of a hospitalization, though the degree of “admission substitution” did not appear to be associated with differences in effects. Of note, similar to the Leppin review, they found that much of the observed benefit was found in studies published before 2003.²²

Telephone-based and telemonitoring interventions

One review focused on post-discharge remote monitoring, mostly with telephone, in patients with CHF.^{26,27} Similar to the 2014 AHRQ CHF review referenced above, there were 2 types of telephone interventions described: structured telephone support and telemonitoring. Structured telephone support (STS) interventions typically included periodic scripted telephone calls from nurses to review symptoms, interval physiologic data such as weight, and self-management skills. Telemonitoring interventions, on the other hand, focused on remote monitoring of physiologic data and, typically, further phone contact was only triggered by abnormal vital signs or weights. STS interventions reduced long-term (≥ 6 month), but not short-term (2-3 month) heart failure readmissions, and were associated with reduced long-term mortality.^{19,27} Though one review noted a trend towards reduced mortality with telemonitoring interventions, both reviews noted the substantial methodologic shortcomings of this literature and the inconsistency of results across studies. The AHRQ review found insufficient evidence (one methodologically flawed trial) of the comparative effectiveness of STS and telemonitoring interventions.

Two reviews examined the effects of post-discharge follow-up calls. An older Cochrane review from 2006 focused on calls performed by hospital-based personnel.²⁸ Though 33 studies including 5,110 patients were included in this review, there was inconclusive evidence of the effectiveness of these interventions, largely because of the low methodologic quality of most included studies. A more recent review included 3 studies of calls delivered by primary care personnel.²⁹ The authors of this review similarly concluded there was insufficient evidence of the effects of post discharge calls on utilization, though they did find that the interventions were associated with higher rates of primary care engagement.

Do the effects of transitional care interventions vary depending on the setting in which they are implemented?

Theoretically, the design of an intervention and its effects might depend on factors such as the presence of a shared electronic medical record, access to community resources, integration of primary and hospital care, and the presence of a medical home. However, we found no evidence directly examining whether intervention effectiveness depends on the health system context within which they are implemented. Moreover, the transitional care literature generally has provided only scant descriptions of the health system context of the interventions.

VA studies

From the reviews included in our report, we identified 9 studies conducted in VA settings summarized in Table 5 (Appendix A). Overall, there is no clear pattern of effect differences between studies conducted in VA and non-VA settings, but there are relatively few studies. Of note, 2 studies examining the effects of increasing primary care access were conducted in VA settings – both actually found an increased risk of readmissions.^{30,31}

Transitions of care and the patient-centered medical home

A recent review for AHRQ included 31 studies of PCMH interventions, most of which included care coordination activities – most commonly, hospital-to-home transitional care coordination.³² The authors found moderate-strength evidence that PCMH interventions were associated with higher patient-reported levels of care coordination. They found low-strength evidence that PCMH interventions lowered emergency room use, though it is unclear which components of the PCMH mediated this effect. On the other hand, they found low-strength evidence that PCMH had no effect on hospital admissions (readmissions were not reported separately).

How does the choice of patient population targeted influence the effects of transitional care interventions?

The relative importance of careful patient selection, as compared to intervening on an unselected group of patients, is unclear. Many studies in these reviews used inclusion criteria which selected patients who were at high risk for readmission because of older age, significant medical comorbidity, and/or a history of high utilization. However, few reviews explicitly examined variation of intervention effects based on patient criteria. One review found studies that did and did not use high-risk patient selection criteria had similar results.²³ A meta-regression of trials including general medical or CHF populations did not find significantly different effects between studies without age restrictions and those which included only patients over 65 years of age (interaction $p = 0.24$).¹⁸ Similarly, a review of hospital-at-home studies did not find a clear difference in effects among studies in patients younger than 70, 70-73, and older than 74 years.²²

While many studies identified high-risk populations based on simple inclusion criteria, almost no studies explicitly used multivariable readmission risk prediction tools to identify high-risk patients for inclusion. We found one review with one trial comparing the effects of risk-prioritized post-discharge telephone calls to unprioritized calls.³³ Groups were randomized and matched on key demographic and comorbidity characteristics. The call structure and health care team were the same in both groups, but calls in the intervention group were delivered first to the sickest patients as defined by an electronic utilization prediction tool. Calls in the intervention group were delivered sooner. There were significantly fewer readmissions in the intervention group over 30 days.

Some of the reviews also speculated that focusing on specific groups of patients allowed disease-specific customization of interventions and supported expertise development. For example, one review found that interventions in acute myocardial infarction patients which focused on effective use of disease-specific medications were associated with a mortality benefit, though this was largely driven by one study.³⁴ Another review examining comprehensive geriatric assessment interventions found that gains in the combined outcome of mortality and functional decline were only associated with interventions delivered in a geriatric ward setting.³⁵ The authors speculate that the multidisciplinary team of providers developed more expertise and facility with the patient population.

We found inconsistent results among reviews examining interventions focused on specific populations. There were several types of interventions that improved readmissions and/or mortality in CHF patients.¹⁹ Multidisciplinary post-discharge heart failure clinics were associated with reduction in readmissions, while primary care based follow-up interventions did not improve outcomes. In one review of studies in COPD patients there was no consistent evidence of benefit, and one of the interventions was associated with increased mortality. However, the vast majority of intervention components in these studies took place after hospital discharge so it is unclear if the differences in results between CHF and COPD populations relate to patient population or the interventions themselves. There was not enough good-quality literature in mental health or surgical populations to draw firm conclusions.

DISCUSSION

SUMMARY OF FINDINGS

We examined 17 systematic reviews across different patient populations and representing a variety of intervention types in order to provide a broad overview of the care transitions literature. While there have been numerous examples of interventions that have been successful in reducing readmission rates, there were no patient population or intervention categories within which transitional care interventions were uniformly successful.

It is not surprising that there are many sources of heterogeneity in a field as broadly defined as transitional care. Variations in population studied, intervention definition, personnel, outcome definition, and setting make it difficult to identify definitive recommendations in support of a specific intervention type that should be broadly implemented. Nevertheless, there are several important generalizations we drew from the literature.

- 1) Interventions that address more components of the care transition are probably better than those that address fewer.
- 2) Successful interventions tended to include the means to assess and respond to individual peri-discharge needs.
- 3) There is very little data supporting the effectiveness of interventions isolated to either the pre- or post-discharge settings. Successful interventions which were largely implemented in one setting still often included components (such as home visits, a single point of contact, and/or telephone calls) that bridged settings. On the other hand, in select populations – such as patients with CHF – there is some evidence supporting post-discharge interventions such as structured telephone support and multidisciplinary CHF clinics.
- 4) It is not clear to what extent and for whom post-discharge home visits are a necessary component of care transitions.
- 5) The vast majority of the care transitions literature has been hospital-focused, with very little literature examining the role of primary care teams during the transitions of care. There is a growing literature examining the effects of medical home interventions, most of which include cross-site care coordination activities; however, the characteristics of successful care transitions within the medical home context have not been well explored.
- 6) Many interventions that have demonstrated a reduction in readmission rates have included patients at high risk for rehospitalization because of underlying comorbidities such as CHF and/or because of additional factors such as prior utilization.
- 7) Interventions designed to address the needs of patients with complex, chronic medical illness have been the best studied. It is unclear whether the success of some interventions studied in these patient populations reflects the content expertise intervention personnel might develop in working with specific patient populations, the higher baseline risk of poor outcomes among these patients, or sensitivity of chronic medical illness to transitional care improvements. However, there are many notable exceptions even among patients with chronic medical illness – for example, we found little evidence of benefit in COPD populations, though many transitional care components were missing from these

studies. There is little good-quality transitional care literature in mental health or surgical populations.

- 8) Reviews that assessed the association between timing of publication and outcome effects, suggest that many of the interventions demonstrating benefit were conducted more than a decade ago.
- 9) In order to allow for better collation of results from trials, development of a standard taxonomy is needed. This taxonomy should include both population descriptors as well as intervention descriptors.

POLICY IMPLICATIONS

Understand the spectrum of care transitions activities and diagnose systems gaps

There are many potential steps in the care transition that, if not sufficiently addressed, could degrade the quality of the care transition. Focusing on just one of these steps – like medication reconciliation – alone is unlikely to yield big changes for a population of patients. The pathways to readmission are likely many, as suggested both by the inability to accurately anticipate which patients will be readmitted,³⁶ and by case review studies characterizing underlying factors contributing to preventable readmissions.³⁰ As discussed above, one of the recurring themes in the literature is that interventions which account for more aspects of the care transition and bridge in- and outpatient sites of care tend to be more successful.

The problems with recommending that a specific intervention be broadly implemented across VA sites include both the lack of evidence supporting such a recommendation and the likelihood that the transitional care gaps are not the same in all VAs, nor for all populations of patients treated at VAs. Moreover, we found at least 2 large reviews which showed that more recently published studies were less likely to have shown an improvement in outcomes, suggesting a need to think critically about broadly implementing resource-intensive interventions in the current health system context.^{18,22}

Rather, we propose institutions use a standardized process for assessing the current state of transitional care. As part of this review, we developed a transitional care map (Appendix C, Figure 2), which diagrams the basic steps that should be considered when targeting areas for improvement. The elements on this map were identified through several means: 1) activities that have consistently been part of successful transitional care interventions, 2) elements that have been part of prior consensus statements, and 3) consensus among our own research team. Ideally, the map should be part of collaborative discussions between hospital and outpatient administrators and clinicians.

It is important to adapt the map to different patient populations. For instance, existing transitional care processes and gaps are likely to be quite different for patients who are established in a VA PACT team and those who do not regularly receive primary care at a VA. It is likely not feasible for each institution to examine its transitional care processes for all patient populations served. Rather, institutions may choose to focus on particular patient populations experiencing poor outcomes (such as high readmission rates), or for whom providers perceive substantial gaps in transitional care.

The map is a menu of many elements that have been part of successful interventions and some (such as outpatient to inpatient communication at the transition into the hospital) that have not been adequately studied but in the group's opinion represent an important opportunity for quality improvement investigation. The map has not been tested empirically and its steps are not necessarily meant to apply to all patients. Rather, it is meant to be used to assess systemic gaps and opportunities for improvement. For instance, we do not know whether and when in-person, post-discharge follow-up is needed for all patients, but the means to systematically and easily secure follow-up proactively for subsets of patients who do require follow-up should be in place.

The map is only meant to serve as a guide for discussing current processes of care and gaps in care. It is important that stakeholders include representatives from across the care continuum and perhaps patient representatives as well. One of the purposes of such discussions is to define a shared understanding of accountability for various aspects of the transitional care map. For example, inpatient and outpatient providers need to understand who is responsible for following tests that are outstanding at the time of discharge. A review of quality improvement methodology is beyond the scope of this review, but there are activities such as process mapping that could be used to operationalize use of this map.³⁷

We anticipate this process would be useful for all institutions regardless of current performance on measures such as readmission rates both because such outcomes may be an imperfect measure of transitional care quality,^{38,39} and because an institution may still identify significant residual gaps for particular patient populations even if it has been not been identified globally as a poor performer.

Care transitions and PACT

The value of investing in new transitional care personnel relative to harnessing the potential value of existing infrastructure and personnel is unclear. The pioneering care transitions interventions which had demonstrated reductions in readmissions had largely been patient-level interventions that predated widespread adoption of the medical home model of care, and were not extensively tested in integrated health systems.^{2,11} These interventions were largely constructed around a nurse (the “transitional care nurse”) or nurse practitioner dedicated to key activities to support better transitional care, such as self-management education, communication, information transfer, and follow-up care.

The literature to date has not fully explored care transitions implementation within the context of integrated systems and the medical home model. It is not clear that introducing new roles – such as the transitional care nurse – within VA is a requisite step to improving care transitions. It is important to acknowledge existing systems innovations which may already be accomplishing some of the work done in earlier transitional care interventions. For instance, with some re-engineering of the process, the PACT nurse care manager could serve as a point of contact during the peri-discharge period. Home-based primary care (HBPC), which is already widely used throughout VHA and is associated with a lower risk of hospitalization among higher-risk Veterans, could expand its role and serve as a point of continuity during the hospital-to-home transition.⁴⁰ Finally, many larger VAs have structures in place, such as heart failure specialty clinics, that could identify patients during an admission and arrange close follow-up.

Reach-in, reach-out

The vast majority of the transitional care literature to date is hospital-centered. This is likely, at least in part, because the overwhelming focus of national policy efforts has been on reducing readmissions, and hospitals have been the entities at risk in financial penalization and public reporting initiatives. Consequently, most of the intervention literature examines models of care that essentially extend hospital services beyond hospital walls. However, it is possible that a “reach-in” model of transitions in which PACT personnel engage with patients and inpatient providers and take the “hand-off” prior to discharge would work in the VA PACT setting. Additionally, the PACT model may represent an opportunity to explore improvements in processes of care as patients transition *into* the hospital.

On the other hand, the more traditional transitional care models in which hospital-based personnel connect with inpatients and then follow through with them after discharge may be the right approach for hospitalized Veterans who are either not part of a PACT team, or who typically receive care at a different VA institution.

Consider targeting high-risk populations

Given resource considerations and the lack of strong evidence suggesting benefit of transitional care programs across broad populations, it may make most sense to target more resource-intensive aspects of transitional care to higher-risk populations. There are several ways to do this. One would be to focus on specific patient populations who are generally at higher risk of poor outcomes, such as older patients and CHF patients. Another would be a referral-based system in which the clinical team uses its assessment of patient need to determine which patients to refer on to more intensive transitional care management. Finally, risk assessment using a formal risk scoring tool is yet another approach to identifying high-risk patients.

It is important to distinguish risk assessment from needs assessment. Risk assessment, as we are defining it, simply means assessing the probability that a patient with a given set of characteristics will experience a given outcome (often readmissions in this context). Needs assessment, on the other hand, refers to a patient’s specific needs and can help inform the tailoring of interventions. We consider needs assessment to be an important step for all patients and one that necessarily precedes anticipatory discharge planning. Indeed, as discussed in the results section, there is good evidence that individually tailored discharge planning can help improve outcomes, especially in medical inpatients.²¹

The role of risk assessment tools is less clear. Many readmission risk prediction models have been tested and they have been, at best, only moderately accurate.³⁶ Nevertheless, even models with only modest accuracy may be helpful. We are aware of at least one recent study not included in the reviews that successfully used an EMR-based risk prediction tool to identify CHF patients for inclusion in an intensive transitional care intervention.⁴¹ In addition, there may be some utility in using models to identify low-risk patients for whom intervention would not be necessary.^{42,43}

The incremental benefits of using a formal risk prediction tool compared to clinician gestalt are unclear. The choice may depend on the intended use. Risk prediction models may be useful triage tools when trying to apply scarce resources to a large population of patients. For example, some health systems have used risk prediction scores as a way to prioritize patients for post-

discharge telephone calls. Clinician referral may make more sense when considering patients for interventions – such as hospital-at-home programs or HBPC – that reach a smaller segment of the population and may need to be more nuanced in understanding patient needs and appropriateness of referral.

If a risk assessment tool is implemented in VA, it is important to consider factors such as model complexity, impact on workflow, and application to the population under consideration before broad adoption. Very simple models may perform similarly to more complex models and may be readily implemented – for example, one health system is using a single risk factor (2 or more unplanned admissions in the last year) to identify patients.⁴⁴ Finally, there is no compelling reason that VA needs to consider only readmission risk prediction models. The CAN score was developed and validated in VA populations and has good ability to predict future hospital admissions or mortality.⁴⁵ The incorporation of such a model into the transitional care context is another approach that could be considered, but should be studied further.

Measure outcomes beyond 30 day readmissions

Although poor-quality care transitions can negatively impact patients' experience of care and patient safety,¹⁻⁶ hospital readmissions have been the major focus of transitional care literature and policy discussions. While reduction in preventable readmissions is a laudable goal, there are many uncertainties with this outcome metric including its reliability, its relationship to care quality and mortality, and the proportion of readmissions that are ultimately preventable.^{38,46-48} There are other utilization measures which are often measured, but receive less attention. Emergency room utilization (especially visits that do not lead to a hospitalization) would be useful to examine in the immediate post-discharge period, especially within the context of the medical home, since theoretically some of these may be sensitive to improvements in peri-discharge care coordination. The timing of the readmissions metric likely should differ according to the group seeking to use the information to guide quality improvement. For instance, 7 day readmissions, which may be more reflective of hospital care and discharge planning, might be more relevant to VA hospitals while longer-term readmissions (and total admission rates) might be of more relevance to PACT teams.

Care transitions interventions may improve patient-perceived transitional care quality while having little impact on high-cost utilization.⁴⁹ Nevertheless, improving patient experience of care may be, in and of itself, a substantive rationale for transitional care improvements. Transitions measures such as the Care Transitions Measure (CTM) which examine patient experience and their preparedness should be examined.⁴

Finally, care transitions also have the potential to impact patient safety. The small portion of the transitions literature that has examined patient safety outcomes has mainly focused on medication reconciliation interventions and adverse drug event outcomes. Other outcomes such as falls, iatrogenic complications, delayed test follow-up, and missed diagnoses have not been adequately examined. While such outcomes are difficult to assess on a large scale, systematic chart review approaches such as the Global Trigger Tool could be adapted for use in the care transitions context.⁵⁰

Implementation considerations

It is probably important to think of transitional care improvements at both the patient and system level. Implementing a transitional care program – for example, the Care Transitions Intervention or Project RED – without an explicit systems-learning component could be a missed opportunity to improve sustainability, breadth, and efficiency of systematic transitional care improvements. In many VAs, there may already be personnel and structure poised to identify transitional care gaps and to work on systems improvements to address those gaps. For instance, multidisciplinary inpatient rounds involving medical providers, nursing staff, social workers, physical therapists, and nutritionists could be used as a means for anticipatory discharge planning. It is likely that such multidisciplinary discussion of patient needs will reveal larger systems gaps. Each VA needs the means to not only identify these gaps, but also to feed back the information to local and regional leaders who may be able to effect change. It might be useful to designate an individual or individuals at each institution who could be empowered to gather data about gaps from multidisciplinary team meetings and then report the information to the appropriate leadership.

Quality improvement efforts to improve cross-site communication should explicitly incorporate input from in- and outpatient providers and staff. As an example, a group of hospitalists at our own hospital has taken the initiative to visit area community-based outpatient clinics (CBOCs) and conduct semi-structured interviews to better understand primary care provider views about improving the structure, content, and timing of discharge summaries. They've found differing views among primary care providers about means and timing of admission notification, and the logistics of orchestrating “warm hand-offs”.

Dissemination of needs assessment tools could be used to guide multidisciplinary discharge planning meetings and craft individually-tailored discharge plans. VA should consider piloting the incorporation of these brief assessments and plans into cross-site communication tools such as the post-discharge telephone call template and/or the discharge summary.

Of note, it is important to anticipate some of the potential limitations of using non-VA services, such as community home nursing agencies, to accomplish care transitions since their means of communication with inpatient and outpatient VA providers (given their lack of access to the EMR) is limited and may introduce further discontinuities in care.

Critically assess the current system of post-discharge telephone calls

There is little evidence to support the current VA practice of conducting one-time post-discharge telephone calls in broad, unselected groups of recently discharged patients. We found little evidence from published systematic reviews that simple post-discharge telephone calls improve outcomes. However, for high-risk patients with complex chronic illness and high self-management burden, periodic post-discharge contact with trained nurses may be useful. Structured telephone support interventions conducted by trained nurses have been associated with lower rates of readmissions over the long-term in CHF patients. In these populations such interventions may be a useful adjunct, and may be a more practical means of reaching larger numbers of VA patients who may be more geographically dispersed than home visit-based interventions.

Of note, the C-Trac intervention study, which was conducted in VA, was more recently published and suggested a telephone-based intervention with components bridging in- and outpatient care can improve outcomes.⁵¹ However, there are important differences between this study and the current post-discharge call system. In the C-Trac study, calls were delivered by a nurse care manager who visited with patients in the hospital, rounded with the inpatient teams, provided patients with call times and a list of red flags, and communicated findings to the primary care team. The intervention was perceived as useful by patients, and was associated with an 11% absolute reduction in readmission rates after the intervention was introduced. The intervention included only high-risk patients as defined by the presence of cognitive impairment and/or older age with other comorbidities and prior utilization. Indeed, the baseline readmission rate of this population was quite high at 34%, which is substantially higher than 30 day readmission rates in older VA and non-VA populations with serious chronic illness.^{9,52}

Broad application of post-discharge calls may still prove useful even absent clear evidence that they reduce utilization. It is possible that such calls are viewed favorably by patients and are a useful mechanism for PACT teams to prioritize follow-up care. It is also possible that the resource use issues are relatively small since the calls are made by PACT nurses who, at any one time, may have relatively few post-discharge calls for a panel of patients. These issues need to be explored further in future work.

Finally, because post-discharge calls have become a major vehicle for transitional care in VA, it is important to consider telephone access issues. A sizable minority of patients are unreachable after discharge by phone (unpublished data from our own VISN). A given institution should look at its own post-discharge call data, assess what proportion of patients are reached, and identify reasons why some patients are unreachable. It is likely that, due to socioeconomic circumstances, some patients simply do not have access to reliable phone service. It would be important to have a system in place, then, to identify these patients prior to discharge and to have all necessary follow-up appointments secured and communicated to these patients prior to discharge.

FUTURE RESEARCH AND QUALITY IMPROVEMENT WORK

In general, there is an overarching need for better evidence to guide selection and implementation of complex, multicomponent transitional care interventions in different settings. One of the major weaknesses of the transitional care literature is the marked variation in intervention definitions, timing of outcome follow-up, and descriptions of interventions and usual care. As the VHA conducts more research in this field, use of taxonomies (such as the ones described above) to guide study design and description may help standardize reporting. Recently, a large Patient Centered Outcomes Research Institute (PCORI) grant was awarded to better clarify which transitional care intervention components work, for whom, and in which settings based on current experience with care transitions implementation across the country. This should help fill in many of the literature gaps we've identified. In addition to this work, there are a number of more specific areas of investigation that would be relevant to the VHA:

- Readmissions in mental health care populations are very high in the VHA. There is an urgent need to better understand mental health patients' experience as they transition across setting, and to identify the facilitators and barriers to care transitions in this population. Similar work should be done in surgical populations.

- The VHA has an opportunity to think more broadly about the effects of care transitions beyond hospital readmissions. Patient surveys and qualitative work would be helpful in better understanding the types of outcomes that matter to patients.
- Adapt transitional care continuous quality improvement methods used by other initiatives for the VHA setting and populations, incorporating input from personnel across care settings and integrated with local and regional leadership.
- Even within integrated health systems like VHA, there has been relatively little examination of the communication between outpatient and inpatient care teams. There is a need to better understand communication preferences, opportunities, and priorities from both perspectives. Additionally, more work needs to be done to examine ways in which communication from the outpatient care teams to the inpatient care teams early on during a hospital admission could ease subsequent discharge planning (*ie*, through communication of care plans, end-of-life discussions, understanding of preference sensitive decisions).
- There are a number of comparative studies which would be helpful:
 - contrasting approaches to transitional care in VA patients with and without a primary VA-based medical home;
 - comparison of home visit-based and telephone-based interventions;
 - comparison of unselected and risk-prioritized approaches to post-discharge calls;
 - comparison of the use of electronic risk-scoring tools, disease- or age-based criteria, and clinician gestalt to identify high-risk patients for intensive transitional care management interventions; and
 - evaluation of changes in usual care before and after 2002 to help interpret effectiveness of studies when compared to usual care

LIMITATIONS

Our review has a number of important limitations. Our approach to reviewing and summarizing the literature was necessarily broad rather than deep. There are many nuances in the results, internal validity, and generalizability of studies included within these reviews that are not represented in our overview. It was difficult to use established criteria to formally rate the strength of evidence for each of our conclusions, and few of the included reviews reported strength of evidence ratings. As we note in the results, our assessment of the common themes across the different reviews is likely best viewed as being based on low-strength evidence, given the indirect comparisons and the many different factors that varied among the included studies. There was heterogeneity in the outcome timings, making direct comparisons difficult. Interventions that improved short-term readmission may not have had lasting effects, whereas interventions that seemed ineffective in the short term may have longer term benefit. We only included reviews that included readmissions as an outcome as a way to feasibly scope the review and because we suspected that most interventions focused on the hospital to home transition would report this as an outcome. It is certainly possible that there are interventions that span care settings and effect care transitions that focus exclusively on other outcomes (*eg*, there is a body of literature focused on smoking cessation around the time of discharge).⁵³ Furthermore, there are many outpatient-based interventions which are designed to affect emergency room and

hospital utilization that are not captured in our review, but may nevertheless be important to understanding the role of care coordination in the context of the medical home.

We did not systematically update the included reviews' searches and, therefore, there are undoubtedly more recent studies that have been published that are not represented here, though we are not aware of newer studies that would substantively change our summary of findings and policy recommendations. Our recommendations are, in part, based on the evidence but also incorporate our own subjective assessment of the practical implications of the evidence (or lack thereof) and undoubtedly reflect our own clinical, research, and policy experience.

CONCLUSIONS

The literature includes many different types of interventions, studied in varied populations and clinical settings, and implemented in different ways, but there is no commonly used taxonomy describing the various factors. Furthermore, there is very little comparative effectiveness data. It is, therefore, very difficult to identify specific intervention components and characteristics that are necessary for successful care transitions. In general, successful interventions are more comprehensive, touch on more aspects of the care transition, extend beyond the hospital stay, and are flexible enough to respond to individual patient needs. Transitional care interventions have not been well studied within integrated health systems and within the medical home context. Future work should focus on how best to incorporate outpatient teams into transitional care improvement processes.

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