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## Systematic Review of Ambulatory Transitional Care Management (TCM) Visits on Hospital 30-Day Readmission Rates

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Systematic review of ambulatory transitional care management (TCM) visits on hospital 30-day  
readmission rates

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## Abstract

### Purpose:

To reduce readmission rates and prevent adverse outcomes after discharge, hospitals have begun implementing “transitional care” initiatives. This systematic review identifies research on the particular set of services now reimbursable by Medicare (“transitional care management”, TCM) and evaluates the studies for program effectiveness.

### Methods:

Results of three databases were screened for peer reviewed journal articles published between January 2004-2015 that report on readmissions of adults in the US healthcare system under the Medicare TCM bundle. ClinicalTrials.gov was queried for funded studies.

### Results:

Of 969 identified studies, 77 met inclusion criteria for relevance to transitional care and appropriateness of population and setting. Of these, only three articles incorporated all required elements for TCM service. Although two were program improvement designs and none were randomized control studies, each report reduced readmission rates.

### Conclusions:

Evidence for TCM effectiveness is limited. Additional study of TCM implementation and programmatic support for TCM is warranted.

*Keywords: Transitional care; Systematic review, 30-day readmission, chronic disease*

## INTRODUCTION

### *Background*

From 2007 to 2011, 19% of patients were readmitted within 30 days of a hospital discharge,<sup>1</sup> with costs estimated at \$15 billion.<sup>2</sup> After tying Medicare reimbursement of hospitals to their readmission rate under a provision of Section 3025 of the Affordable Care Act (ACA), claims data are being closely monitored for a reduction in these rates, and hospitals are working on multiple fronts to address the issues that lead to patient rehospitalizations.<sup>3</sup> These efforts are especially challenging since many of these patients have multiple co-morbidities that result in complications and readmissions that are unrelated to the original admitting condition,<sup>4,5</sup> and therefore are not well addressed by a disease-specific care model.<sup>6,7</sup> Indeed, almost a third of the US population is now living with two or more of the nation's most deadly chronic conditions, such as diabetes, hypertension, heart disease, or cancer.<sup>8</sup> These patients have high-complexity medical decision-making and medication needs, and incur costly acute events and hospitalizations<sup>9</sup> that are exacerbated by a compromised quality of life<sup>10</sup> and, quite often, depression.<sup>11</sup>

The Agency for Healthcare Research and Quality (AHRQ) has led the call for progress in addressing modifiable behavioral factors that could affect outcomes and specifically, readmissions. The AHRQ identifies conditions such as chronic pain and cardiovascular disease as ones that are predominantly met in the primary care setting and for which significant treatment limitations occur in the area of care integration and within vulnerable populations.<sup>12</sup> Establishing a continuum of care that will address the needs of these patients and the ensuing problem of readmissions requires solutions that reach across and encompass the entire health

system to identified areas of disconnect.<sup>13-15</sup> For example, Medicare payment patterns reveal a failure by over 50% of readmitted patients to visit a physician's office between the time of discharge and rehospitalization.<sup>16</sup> This is especially concerning for older adults, as research shows they are twice as likely to incur post-discharge problems when their primary care providers were unaware of their hospitalization.<sup>17</sup> Care transitions, or handoffs, among care providers present additional system-associated challenges including high rates of medication reconciliation error,<sup>18,19</sup> and problems inherent in the transfer of medical information and/or in the patient and caregiver's knowledge and skills in handling medical information.<sup>20</sup> Failure to implement a successful model to address these modifiable risk factors and prevent patient readmission also carries a penalty to the hospital, since readmission penalties were enacted in fiscal year 2013 and now can total as much as 3% of inpatient claims, based on adjusted readmission rates.<sup>21</sup>

### *Transitional Care Management*

Initiatives termed “transitional care interventions” have been developed to provide what Naylor, et al. defined as “a broad range of time-limited services” aimed at “the safe and timely transfer of patients from one level of care to another or from one type of setting to another” (p. 747).<sup>22</sup> In an initial 2011 review, the authors point to the diversity of transitional care interventions that had been undertaken, while noting the lack of sufficient program description that would be necessary to establish the relative efficacy of the individual interventions.<sup>3</sup> Similar limitations were still noted in more recent systematic reviews,<sup>23-25</sup> and thus no clear set of intervention components had been established to define a successful transitional care

intervention. Moreover, while the Institute of Medicine (IOM) has called for studies that compare the effectiveness of comprehensive care coordination programs with usual care in managing patients with chronic disease,<sup>26</sup> previous reviews have noted that observational designs are currently the predominant basis of evidence.<sup>23</sup>

Beginning in 2013, Medicare reimbursement for specific ambulatory (outpatient) clinic services (including: post-discharge communication, follow-up scheduling, education, and adherence assessment) known as transitional care management (TCM) was initiated as a means of facilitating services for patients after being discharged from a hospital, or another eligible facility, with high-complexity medical decision making needs. Table 1 and associated references<sup>27,28</sup> describe the specific current procedural terminology (CPT) coding requirements that were adopted in 2013. These outpatient and billable TCM visits are the focus of this review, as other hospital-initiated interventions, such as the E. Coleman's Care Transitions Intervention<sup>20,29</sup> and the National Society of Hospital Medicine's BOOST (Better Outcomes for Older adults through Safe Transitions) model<sup>30</sup> are already well described in the literature. Also, as these models are hospital-initiated, they would not apply to other, outpatient or clinic settings where these TCM billing codes are most likely to be used, and given provisions that the codes be used by a single health care professional once per beneficiary during the TCM period. This review was conducted to assess the status of research that utilize TCM as a distinct intervention in the ambulatory setting, summarize the findings and evaluate the evidence for establishing TCM effectiveness, and offer strategies to help improve this evidence base.

## METHODS



*Search Strategy and Article Selection*

This systematic review used the IOM's standards for systematic reviews<sup>31</sup> to evaluate the evidence for transitional care interventions provided as an outpatient service for adults in the US healthcare system. We searched MEDLINE, the Cochrane Library (The Cochrane Central Register of Controlled Trials Database), and the CINAHL Database from January 1, 2004 to January 1, 2015 for peer-reviewed publications. We searched ClinicalTrials.gov for ongoing and completed trials related to the key questions. We manually searched reference lists from relevant reviews and eligible studies, and evaluated the citation index of background articles using MEDLINE for any relevant citations that our searches may have missed. With the assistance of a professional medical librarian, we used relevant Medical Subject Headings (MeSH) terms and text words including and related to TCM and to patient discharge or readmission (search strategies shown in Table 2).

Other than the exclusion of non-English articles, editorials, letters and/or practice guidelines, and review articles, we did not further restrict our search with additional limits, preferring instead to individually evaluate abstracts according to inclusion and exclusion criteria guided by the PICOTS (populations, interventions, comparators, outcomes, timing, settings) framework.<sup>32</sup> The PICOTS typology is considered a "vital part" of systematic reviews according to methods guidelines published by the AHRQ.<sup>33</sup> PICOTS makes the context for evaluating the applicability of a review clear and explicit, by defining the limits of the literature search selections. As applied here, these limits include: *Population* = Adults (ages 18 years or older). *Interventions* = transitional care interventions. All interventions aimed at reducing readmissions were included in the first screening set. Studies were excluded at the second stage of review if

they failed to follow all aspects of the required procedures to qualify under the CPT-coded criterion for a TCM visit. *Comparators* = Usual care, routine care, or standard care. *Outcomes* = Readmission rates. Other outcomes (e.g., mortality, quality of life, functional status change) were included at the first stage of review. *Timing* = Readmission within 30 days. *Time Period* = Last 10 years (studies published after 2004). *Setting* = Hospital Interventions occurring before discharge or initiated as an outpatient following the index hospitalization or during the transition from inpatient to outpatient care. Excluded were all other settings; specifically, TCM within a skilled nursing facility, rehabilitation center, psychiatric facility or surgical setting. Except for the surgical discharge, each of these exclusionary settings is accepted for reimbursement for TCM services; however we purposed to limit our search to TCM in the ambulatory setting. These excluded settings were perceived by our team as less likely to result in a home discharge, and/or result in timely follow-up with a primary care team.

## RESULTS

### *Search Results*

Search strategy results with reasons for exclusion are listed in Figure 1. The search initially yielded 1,031 records, of which 969 were of the appropriate record type. Excluded were articles that were: commentary (n= 21), a review article (n= 9), or a protocol or program description, survey of patient/staff experience of a care program, or cost-analytics description (n=22). The abstracts from another 10 identified articles were not yet available or inaccessible, and could not be properly evaluated. Of the qualifying articles, 892 were further excluded at this stage of the review, primarily because the intervention would not qualify as transitional care (n=800).

The majority of the articles excluded at this stage concerned the issues and difficulties that underlie high levels of readmission; articles of this type described patterns or predictors (e.g. patient characteristics) of emergency department (ED) use, or describe patient needs and discharge experiences but did not examine a particular care model. Others described care services that were home-based or not furnished from one of the discharge settings covered by CMS (e.g., emergency department or trauma center, substance treatment centers, prisons). The remaining 77 articles met inclusion criteria for appropriateness of the population and setting, and all contained relevant aspects of a transitional care intervention in stage 1 of the review process (see Appendix for citations: Excluded Transitional Care Literature).

In a second phase of review, articles were excluded if the intervention was insufficient to qualify as TCM under the 2013 CPT coding requirements. Articles and trial descriptions were excluded at this stage if they did not offer all components to meet billing standards for TCM methodology (Table 1), including studies that may have included one or more of the requirements for transitional care (phone call or other interactive initial contact, medication reconciliation, and/or a face-to-face follow-up visit within the allotted time frame), but either did not offer all components to meet billing standards for TCM methodology, or did not make a sufficiently clear description of the TCM process to make that determination. The remaining 3 articles<sup>34-36</sup> were carefully vetted in the final stage of review.

### *Evidence for TCM Effectiveness*

The three identified studies (Table 3) that utilized a fully reimbursable TCM approach each reported reduced all-cause hospital re-admissions within the first month following discharge.

These effects varied from modest (a 1.8% reduction),<sup>34</sup> to substantial (approximately 20% reduction).<sup>35,36</sup> It is important to qualify these findings, however, since two (Jackson et al., and Tuso et al.)<sup>34,36</sup> of the three identified studies were institutional improvement designs, and none were randomized trials. The smallest reduction was reported by Tuso et al.<sup>34</sup> based on implementation of TCM in a large hospital system. Importantly, this was a retrospective analysis of care components that were being implemented throughout the study period rather than a before-after design; in fact, they selected this model for broader implementation based on a much greater (10%) reduction observed in one of their affiliated hospitals prior to the system roll out. While also a quality improvement design, the study by Jackson et al.<sup>36</sup> was significant in that it drew from a state-wide patient population across 120 hospitals rather than a regional pool and concentrates on 12-month rather than the first 30-day readmission rates. It also offers a cross-sectional comparison to patients that a nurse manager had not selected for TCM based on risk. To account for potential confounds that could result from this assignment method, the approximately 20% difference reported between TCM and no-TCM patient readmission rates was calculated only after controlling for substantial patient and hospital characteristics. While we feel this was a reasonable approach, we sought to make a more direct comparison across our three identified studies in Table 3, and so calculated their rate of change in 30-day readmissions without this correction (using change scores across 8 patient risk groups at the first 30-day assessment, the only 30-day rate the authors present). This interpretation of their data would indicate a difference closer to 9%. It is also notable that a small percentage of the lowest risk patients in both the Jackson et al. and Tuso et al. studies received what Jackson et al. characterized as “low intensity” services, and not the full suite of TCM services that would

have qualified their study to be included in this review. The authors did not report on differences between patients receiving the lower “intensity” of their services; however this would only have reduced the overall magnitude of the effect of TCM in both of these studies.

The one (White et al.)<sup>35</sup> investigation that was designed to explicitly compare practice groups that did and did not offer TCM reported readmissions from two study groups, which unfortunately were not randomly assigned: Baseline readmissions were 27% and 26.1% in control and intervention groups, respectively. The 30-day readmission rate was then assessed each month throughout a 12-month period. The final rate was maintained in the control group (25.9%), but significantly improved under the conditions of TCM (7.1%).

As reported by one of the identified studies (Jackson et al.),<sup>36</sup> the effectiveness of the TCM intervention is likely to vary by degree of patient risk. Using a “clinical risk group” classification of disease burden and severity (scale developed by 3M),<sup>37</sup> readmission rates within the first 30 days for the highest risk patients showed the greatest amount of change (16% as compared to 4% for low risk patients). The interventional program described by Tuso<sup>34</sup> also incorporated risk for readmission in its determination of which TCM components patients are offered, using LACE scores (a validated measure incorporating length of stay, acute admission through the ED, co-morbidities, and emergency department visits in the past six months).<sup>38</sup> Unfortunately, this report concentrated on the programmatic features of their intervention, and data relevant to the utility of the LACE score in predicting benefit from TCM was limited to the single site that served as the model for their system-wide TCM roll-out. Based on retrospective analysis of patients admitted at this site, the authors conclude that the

observed-to-expected number of cases for the highest risk patients identified by LACE was “much greater” than 1.0 (and was “much lower” than 1.0 in the lowest risk patients).

Finally, while each of the three studies of TCM did well to involve multiple institutions in their assessment, two were a study of large hospital systems, and the third study by White et al. was a smaller quasi-experimental study that featured TCM only in university-based practice groups (inpatients from unaffiliated county and community clinics served as non-randomized control practices). Thus, there may be limited generalizability of these three studies to other patient populations (e.g., a small or medium-sized practice clinic).

## DISCUSSION

### *Quality of Evidence*

Despite several prior reviews and our identification of over 75 identified articles that investigate readmission and other outcomes of both individual and bundled components of transitional care, our analysis of the literature identified only three articles that utilized all of the required elements for TCM service for today’s Medicare billing code. Of these studies, two were quality improvement designs that did not feature adequate comparison conditions. The one study that did offer comparison to a no-TCM control (White et al.)<sup>35</sup> reports the greatest overall difference in 30-day readmission under TCM conditions, but is more limited than the other studies in that TCM was investigated only in the university practice group setting. This study may also be limited in its application to the real-world uptake of TCM, since unlike most prior studies of other transitional care elements, the White et al. analysis did not assess a high-risk elderly

population or use a risk-stratification measure to identify patients to whom providers might focus their resources.

Nevertheless, each of the three identified studies offer promise that substantial reductions in readmission can still be found even under conditions where readmission rates are not as high under baseline conditions. In the White et al. study, for example, the authors report a 19.9% reduction in 30-day readmissions from an original rate of 27%, which compares favorably with other published research on care transitions in which a higher baseline rate of all-cause readmission (e.g., over 35%)<sup>39,40</sup> is reported in generally elderly populations. The baseline rates in the Jackson et al. and Tusio et al. studies are even lower (11.13% and 12.8%, respectively). Naylor et. al.'s data on elderly heart failure patients, for example, reported a readmission rate over a 12 month follow-up of 55.4% in the control, as compared 36.4% in the intervention group.<sup>41</sup> The lower rates in the studies reviewed here may be attributed to differences in the enrollment criteria: Unlike the Naylor study, none exclusively assessed a high-risk elderly population. The mean age in White et al.'s TCM patients was 43.8; the Jackson et al. study included only Medicaid-enrolled patients, and was limited to adults under age 65.

### *Implications and Conclusions*

Despite nationwide advances in curbing readmission rates through quality improvement programs and effective interventions that incorporate aspects of transitional care management, gaps remain in knowledge about the effectiveness of the specific set of services that qualify under CPT codes as TCM. Whereas most care transition programs are hospital-based efforts to ensure appropriate linkage to care, TCM ensures that certain post-discharge activities actually occur. No prior review has systematically selected and summarized studies specific to this

billing model, and our review was able to identify and summarize the findings from only three studies that currently meet this criterion. Each of these studies offers evidence to suggest that TCM is an effective suite of services, and is able to demonstrate this even when rates of readmissions are already low. However, based on our comments on the quality of this evidence, we must emphasize that a far broader assessment of TCM outcome effectiveness is warranted and especially new research that could meet the IOM's call to utilize a comparative analysis against programs without TCM practice redesign. The limited scope of these studies makes our review particularly relevant to providers who seek to implement and properly evaluate this quality improvement initiative within their own practice setting.

Our search makes clear that this already understudied TCM approach has not been evaluated using the population, approach, setting, and timing that would make the reported results meaningful to many of the individual providers that would most benefit from a billable TCM strategy. Hospital systems and academic medical centers usually have internal capacity and other varying motivators for performing quality improvement strategies, such as TCM. While it was not the focus of this review, others have commented on the failure of prior studies to describe the institutional context of the health system that promoted a successful transitional care strategy.<sup>23</sup> The effectiveness of TCM across different target settings should be the focus of future research, and should address the scope of challenges and processes that are involved in implementation of TCM processes.

The true value of care transition initiatives is becoming well established in terms of enhanced patient satisfaction and patient equity.<sup>42</sup> Activation of the patient is at the very center of this work, and other evidence of care management effectiveness is beginning to be



shown in improved patient self-management behaviors (e.g., dietary and medication adherence).<sup>25</sup> It is a limitation of this review that we may have missed TCM interventions that may have addressed other measures of quality improvement rather than rate of readmission. Indeed, improvements in quality of life and functional status achieved by the various studied components of transitional care have not yet shown clear clinical significance,<sup>25</sup> and this will be an important aim in future evaluation of the effects of an outpatient-clinic TCM process in improving patient-centered outcomes. This work should also incorporate further demographic and clinical evaluation of the patient, especially as risk assessment promises to add to our understanding of the highest impact groups for TCM service. Also, despite significant effort from prior literature review, it has not been established which of the components of TCM billing may best reduce hospital readmission, either on their own or in sum.<sup>43</sup> However, we maintain that the only way to fully assess TCM effectiveness is to use the approach of looking at only studies that implemented all components, as performed in this review. Single or other bundled components might then be compared against the full suite of services.

The many changes in ACA reform have created a “clash” between medical practice and health policy<sup>44</sup> that has resulted in providers feeling overwhelmed and less open to “new” change.<sup>45</sup> A potential barrier is simply the lack of desire to implement a new clinical process. The decision to support TCM services in a model of care certainly embraces a renewed focus on patient-centered care, and reimbursement by CMS and other insurers should increase the likelihood that clinics will sustain TCM programs. In addition to the call for further study of TCM effectiveness, it is imperative that appropriate resources be allocated to assist clinics as they implement a TCM program. Development of an accessible “how-to” guide or practice-based

toolkit should be an important priority if the TCM model is to meet its intended goal of reducing avoidable hospital readmissions, and addressing the greater needs of the chronically ill.

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Declaration of Conflict of Interest:

None.

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