Effectiveness of Post-Discharge Contacts on Health Care Utilization and Patient Satisfaction

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PREFACE

The VA Evidence Synthesis Program (ESP) was established in 2007 to conduct timely, rigorous, and independent systematic reviews to support VA clinicians, program leadership, and policymakers improve the health of Veterans. ESP reviews have been used to develop evidence-informed clinical policies, practice guidelines, and performance measures; to guide implementation of programs and services that improve Veterans' health and wellbeing; and to set the direction of research to close important evidence gaps. Four ESP Centers are located across the US. Centers are led by recognized experts in evidence synthesis, often with roles as practicing VA clinicians. The Coordinating Center, located in Portland, Oregon, manages program operations, ensures methodological consistency and quality of products, engages with stakeholders, and addresses urgent evidence synthesis needs.

Nominations of review topics are solicited several times each year and submitted via the ESP website. Topics are selected based on the availability of relevant evidence and the likelihood that a review on the topic would be feasible and have broad utility across the VA system. If selected, topics are refined with input from Operational Partners (below), ESP staff, and additional subject matter experts. Draft ESP reviews undergo external peer review to ensure they are methodologically sound, unbiased, and include all important evidence on the topic. Peer reviewers must disclose any relevant financial or non-financial conflicts of interest. In seeking broad expertise and perspectives during review development, conflicting viewpoints are common and often result in productive scientific discourse that improves the relevance and rigor of the review. The ESP works to balance divergent views and to manage or mitigate potential conflicts of interest.

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Operational Partners

Operational partners are system-level stakeholders who help ensure relevance of the review topic to the VA, contribute to the development of and approve final project scope and timeframe for completion, provide feedback on the draft report, and provide consultation on strategies for dissemination of the report to the field and relevant groups.

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Technical Expert Panel

To ensure scientifically relevant work, the technical expert panel (TEP) guides topic refinement; provides input on key questions and eligibility criteria, advising on substantive issues or possibly overlooked areas of research; assures VA relevance; and provides feedback on work in progress. TEP members included:

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Disclosures

This report was prepared by the Evidence Synthesis Program Center located at the **Durham VA Medical Center,** directed by Jennifer M. Gierisch, PhD, MPH, and Karen M. Goldstein, MD, MSPH and funded by the Department of Veterans Affairs, Veterans Health Administration, Health Systems Research.

The findings and conclusions in this document are those of the author(s) who are responsible for its contents and do not necessarily represent the views of the Department of Veterans Affairs or the United States government. Therefore, no statement in this article should be construed as an official position of the Department of Veterans Affairs. The final research questions, methodology, and/or conclusions may not necessarily represent the views of contributing operational and content experts. No investigators have affiliations or financial involvement (*eg*, employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties) that conflict with material presented in the report.

Main Report

Evidence Synthesis Program

TABLE OF CONTENTS

ABBREVIATIONS TABLE

AVR	Aortic valve replacement
CCI	Charlson Comorbidity Index
CI	Confidence interval
CMS	Centers for Medicare and Medicaid Services
COE	Certainty of evidence
COPD	Chronic obstructive pulmonary disorder
ED	Emergency department
EPOC	Effective Practice and Organisation of Care
GRADE	Grading of Recommendations Assessment, Development and Evaluation
KQ	Key question
NR	Not reported
OECD	Organization for Economic Cooperation and Development
OR	Odds ratio
PCM	Pharmacist case manager
PDC	Post-discharge contact
PI	Prediction interval
RCT	Randomized controlled trial
ROB	Risk of bias
TCM	Transitional care management
TEP	Technical expert panel
VHA	Veterans Health Administration

BACKGROUND

The time following hospital discharge is recognized as a vulnerable period for patients and is associated with increased morbidity, high incidence of adverse events, and unplanned health care utilizations.[1,2] Hospital readmissions in the United States remain a common occurrence in the period immediately following a hospital stay. Fingar et al[3] found that 14% of hospital discharges were readmitted within 30 days and 5% of hospital discharges were readmitted within a week. Other studies show even higher 30-day readmissions rates of 22%, with 8.5% of these readmissions identified as avoidable.[4] Overall, costs for these readmissions are substantial for health systems and payers, with more than $52.4 billion spent annually caring for patients readmitted within 30 days of discharge for a previously treated diagnosis.[5] Emergency department (ED) visits also are a common occurrence post-hospitalization, with about 1 in 5 patients using the ED in the 30 days following a hospital discharge.[6]

Over the past decade, there has been an increased focus on transitional care from hospital to home. Procedures to improve pre-discharge planning from hospitals have resulted in small but meaningful reductions in hospital readmissions.[7] Yet, once back at home, patients may experience uncertainty about how to best care for themselves despite pre-discharge efforts, leading to complications and unplanned health care use. These post-discharge complications commonly stem from poor patient and health care team communication of unresolved problems, lack of patient education regarding medications and treatments, limited monitoring of medication adherence, and delayed monitoring of patient status soon after discharge.[1] Patients who experience post-discharge complications are at high risk of hospital readmission, an undesired and costly outcome for both patients and health care systems.[8]

In 2012, the Affordable Care Act led to the establishment of the Hospital Readmissions Program from the Centers for Medicare and Medicaid Services (CMS), which created penalties for hospitals with higher 30-day readmission rates for 6 core populations: patients with acute myocardial infarction, congestive heart failure, chronic obstructive pulmonary disease, pneumonia, coronary artery bypass graft, and total hip or knee replacements.[9] In 2013, CMS subsequently expanded outpatient billing opportunities with new transitional care management (TCM) billing codes to promote timely outpatient follow-up with primary care and, subsequently, to improve outcomes.[9] Criteria for TCM billing included a face-to-face visit within 7-14 days and communication (direct contact, telephone, or electronic) with patients and/or their caregiver within 2 business days of hospital discharge.[10]

In an effort to reduce hospital readmissions, lower health care costs, and improve patient satisfaction, various multifaceted care models have been developed to improve pre- and post-discharge transitional care, and the Agency for Healthcare Research and Quality recommended implementation of a discharge process toolkit with the majority of steps focusing on pre-discharge planning based on Project RED (Re-Engineered Discharge).[8,11,12] These multistep programs are designed to optimize the transition process by standardizing core functions of pre-discharge practices such as medication review, patient and caregiver education, coordination of post-discharge care, and education about self-management.[8] Although some of these models have included a post-discharge component, there is limited information available to assess the direct impact of post-discharge patient contacts that include similar core functions of medication review, symptom monitoring, and coordination of medical or social services in the first week after leaving the hospital on key patient and health system outcomes.

The Veterans Health Administration (VHA) is the largest integrated health system in the nation, serving over 9 million Veterans at 1,321 health care facilities.[13] Veterans seeking care through the

VHA experience a broad variety of medical and psychiatric illnesses that lead to hospital admissions. Currently, there is no standard post-discharge practice for Veteran patients transitioning back home from VHA hospitals. The VHA requires that primary care Patient Aligned Care Teams (PACTs) contact patients 2 days after a hospital discharge and 7 days post-discharge for mental health teams; however, there is variability in implementation across the VHA health care system. To assist the VHA in standardizing post-discharge follow-up contacts, the VHA Office of Primary Care requested this review to assess the impact of post-discharge patient contacts on emergency care use, hospital readmission rates, and patient satisfaction to ensure that effective transitional care is provided to Veterans seeking care through the VHA.

METHODS

REGISTRATION AND REVIEW

A preregistered protocol for this review can be found on the PROSPERO international prospective register of systematic reviews (CRD42023465675). A draft version of this report was reviewed by external peer reviewers; their comments and author responses are located in the Appendix.

KEY QUESTIONS AND ELIGIBILITY CRITERIA

The following key questions were developed with key VHA operational partners:

Key Question 1a	Among adults with acute medical hospital admissions, what are the effects of post-discharge contacts on hospital readmission, emergency care use, and patient satisfaction?
Key Question 1b	Do the effects of post-discharge contacts for acute medical hospital admissions vary by intervention characteristics (*ie*, mode, clinical staff initiating contact, timing, assessments used during contact, content)?
Key Question 2a	Among adults with acute psychiatric hospital admissions, what are the effects of post-discharge contacts on hospital readmission, emergency care use, and patient satisfaction?
Key Question 2b	Do the effects of post-discharge contacts for acute psychiatric hospital admissions vary by intervention characteristics (*ie*, mode, clinical staff initiating contact, timing, assessments used during contact)?

Study eligibility criteria are shown in the table below.

	Eligibility Criteria	
	Inclusion	**Exclusion**
Population	KQ1: Adults (≥18 years of age) with an acute medical hospital admission KQ2: Adults (≥18 years of age) with acute psychiatric hospital admission If populations comprise children and adults and do not include an adult-only subgroup, studies will be included if they have 80% or more adults in the included sample.	• Elective hospitalization • Obstetric and gynecological hospitalizations • Discharge from the emergency department (ED) • Discharge from a post-hospitalization inpatient rehabilitation facility, skilled nursing facility, or long-term acute care
Intervention	Post-discharge contact (PDC) is defined as a bidirectional contact (*eg*, telephone, video, secure messaging system) from a nonspecialist clinical service provider to an adult discharged from inpatient medical or psychiatric hospital that occurs up to 7 days from discharge from a hospitalization and prior to resumption of longitudinal primary care. A PDC intervention is intended to improve the post-acute transition from hospital to home and include at least 1 of the following components: medication review; coordination of medical or	Interventions defined primarily as: • Longitudinal care management (*ie*, routine care within the 7-day window) • Interventions where the majority of the post-discharge contacts occur outside of the 7-day window • Telemonitoring • Passive monitoring • Health coaching for lifestyle modification

Eligibility Criteria		
	Inclusion	**Exclusion**
	social services; symptom monitoring; or psychoeducation.	• Programs designed to provide multidisciplinary and longitudinal transitional care that exceeds past 7 days post-discharge from hospital • Provider-to-provider communications or consultations beyond the initial transfer of information from a patient-initiated contact • Physician-led communications • General health education
Comparator	KQ1, KQ2: • Usual care/standard of care, waitlist control • Other active comparator (*eg*, in-person care)	KQ1, KQ2: • No controls
Outcomes	KQ1, KQ2: • 30-day hospital readmission • 30-day emergency care use • Patient satisfaction	Any outcomes not listed
Setting	Initiated in the inpatient or outpatient setting, if the intent is to provide a post-discharge check-in prior to resumption of longitudinal primary care and there is at least 1 contact made after the patient is discharged	• Any medical setting where the intent is to provide longitudinal management of chronic medical conditions • Primary care for regular care
Study Design	KQ1, KQ2: • Randomized trials • Nonrandomized trials • Controlled before-after studies • Interrupted time-series studies or repeated-measures studies that must have more than one measurement before and after intervention implementation	KQ1, KQ2: • Not a clinical study (*eg,* editorial, non-systematic reviews, letter to the editor) • Systematic reviews • Uncontrolled clinical study • Qualitative studies • Prospective and retrospective observational studies • Clinical guidelines • Measurement or validation studies
Countries	OECD[a]	Non-OECD
Years	Article published after 2011[b]	Article published before 2012
Publication Types	Full publication in a peer-reviewed journal	• Letters, editorials, reviews, dissertations, meeting abstracts, protocols without results • Publications in predatory journals[c]

Notes. [a] Organization for Economic Cooperation and Development countries are Australia, Austria, Belgium, Canada, Chile, Colombia, Costa Rica, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, and United States.

[b] We constrained our review to studies published after 2011 to account for national policy changes that promoted post-discharge contacts as part of the Patient Protection and Affordable Care Act (ACA). Also, in 2013 Medicare approved procedure codes for transitional care management services consisting of a communication with the patient or caregiver within 2 business days of hospital discharge. We backdated our search 2 years from this date to capture any foundational literature that informed this policy change.
[c] There is no single way to identify all predatory journals as this is a rapidly evolving industry. Thus, we used the best available guidance to scrutinize potential problematic studies such as pay-to-publish models, lack of rigorous peer-review, rapid publishing timelines, lack of impact factor information, being identified as a potential problematic journal by the field, and expert librarian consultation.

SEARCHING AND SCREENING

To identify articles relevant to the key questions, a research librarian searched MEDLINE via Ovid, Embase via Elsevier, and CINAHL Complete via EBSCO from 2012 to May 25, 2023, using terms for *patient discharge, phone* or *video, follow-up, readmissions,* and *ED use* (see Appendix for complete search strategies). Editorials, case reports, letters, comments, and conference abstracts were excluded. Additional citations were identified from hand-searching reference lists and consultation with content experts. English-language titles, abstracts, and full-text articles were independently reviewed by 2 investigators, and disagreements were resolved by consensus.

DATA ABSTRACTION AND RISK OF BIAS ASSESSMENT

Data from published reports were abstracted into Covidence by 1 reviewer and over-read by a second reviewer. Disagreements were resolved by consensus or by obtaining a third reviewer's opinion when consensus could not be reached. Data elements included descriptors to assess applicability, quality elements, intervention details, and outcomes (see Appendix for risk of bias [ROB] ratings).

Key characteristics abstracted included participant descriptors (*eg*, age, sex, race, diagnosis), intervention characteristics (*eg*, timing, dose, content, interventionist), comparator, and outcomes. To better characterize interventions, and in keeping with emerging standards in systematic reviews with intervention complexity,[14,15] we mapped each included study to a common set of core functions[16] (*ie*, purpose of the change process) of post-discharge interventions: medication review, symptom monitoring, and coordination of social or health services.

We used an adapted Cochrane ROBINS-I tool[17] to assess risk of bias for nonrandomized studies that compare health effects of 2 or more interventions. The ROBINS-I includes domains for (1) confounding, (2) participant selection, (3) intervention classification, (4) deviations from intended interventions, (5) missing data, (6) outcome measurement, and (7) selective outcome reporting. Overall ROB judgments included low ROB, serious ROB, critical ROB, and no information. For randomized trials, we adapted the Cochrane ROB-2 tool.[18] This tool includes the following domains: (1) bias arising from the randomization process, (2) bias due to deviations from intended interventions, (3) bias due to missing outcome data, (4) bias in measurement of the outcome, (5) bias in selection of the reported result and has overall ROB as low, some concerns, or high ROB.

SYNTHESIS

We summarized the primary literature using relevant data abstracted from the eligible studies. Summary tables described the key study characteristics of the primary studies: study design, patient demographics, and details of the intervention and comparator. We then determined the feasibility of completing a quantitative synthesis (*ie*, meta-analysis) to estimate summary effects.

For meta-analyses, feasibility depends on the volume of relevant literature, conceptual homogeneity of the studies (*eg*, interventions used, outcomes assessed), and completeness of results reporting. We aggregated outcomes when there were at least 3 studies with the same outcome, based on the rationale that 1 or 2 studies do not provide adequate evidence for summary effects. Dichotomous outcomes were combined using odds ratio and random-effects models as appropriate. We used the Knapp-Hartung approach to adjust the standard errors of the estimated coefficients. We evaluated for statistical heterogeneity using visual inspection and used 95% prediction intervals (PIs). Meta-analyses were conducted using the *metafor*[19] package for R (R Foundation for Statistical Computing, Vienna, Austria). If meta-analyses were feasible, we considered subgroup analysis or meta-regression to explore quantitative or qualitative interactions of pre-specified potential effect modifiers deemed important by VA operational partners (*eg*, clinical staff initiating the contact, intervention content, timing of intervention). As results were consistent across studies, we do not report the findings of these subgroup analyses in keeping with current best approaches in evidence synthesis.

When quantitative synthesis was not feasible, we analyzed the data narratively. We gave more weight to the evidence from higher quality studies with more precise estimates of effect (*ie*, lower ROB). A narrative synthesis focused on documenting and identifying potential reasons for inconsistency in treatment effects across studies by evaluating differences in the study population, intervention, comparator, and outcome definitions.[2]

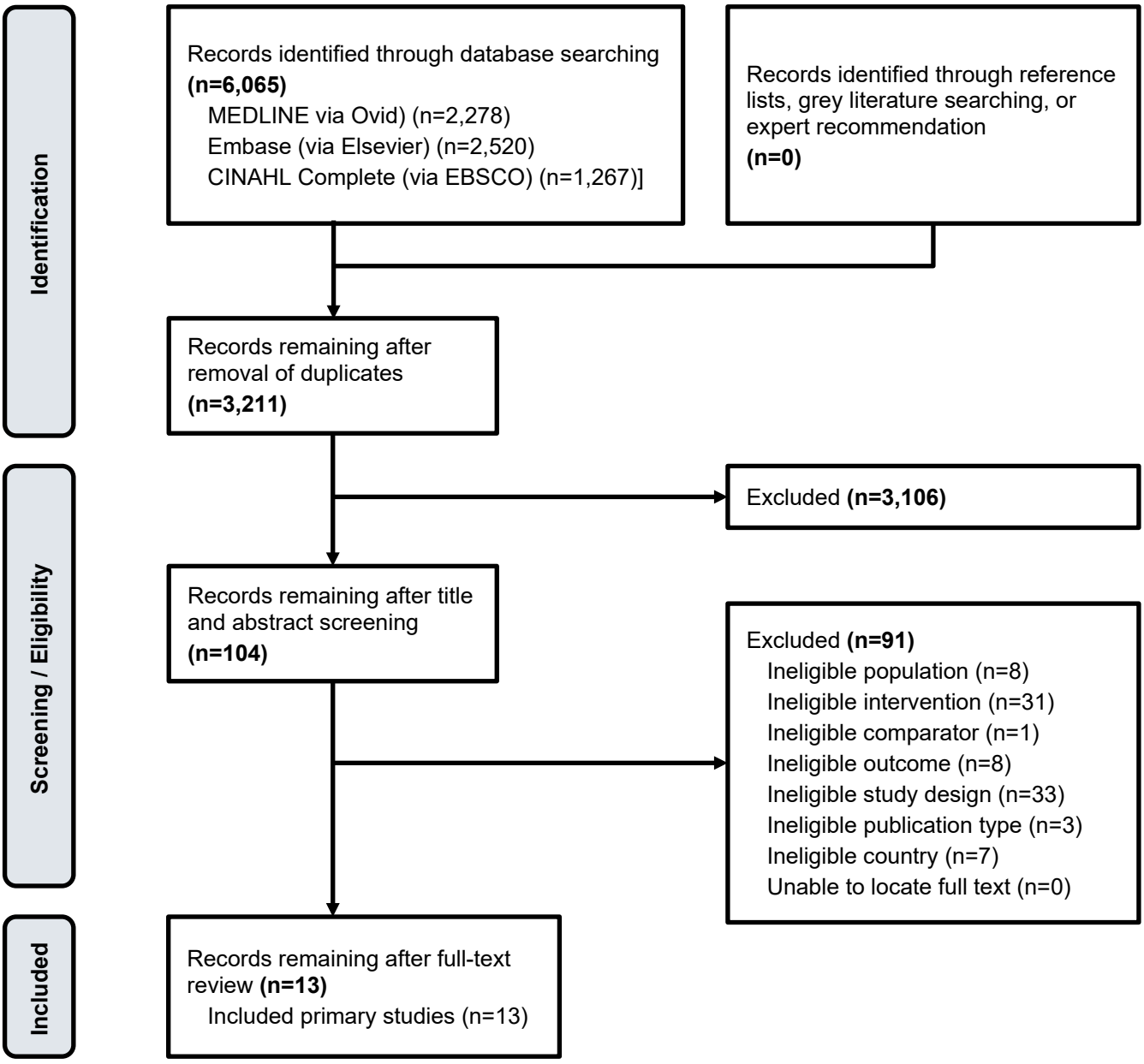
Strength of Evidence

The strength of evidence was assessed using the approach described by Grading of Recommendations Assessment, Development and Evaluation (GRADE).[20] We limited GRADE ratings to those outcomes identified by the stakeholders and TEP as critical to decision-making. In brief, the GRADE approach required assessment of four domains: risk of bias, consistency, directness, and precision. Additional domains used when appropriate were coherence, dose-response association, impact of plausible residual confounders, strength of association (magnitude of effect), and publication bias. These domains were considered qualitatively, and a summary rating was assigned after discussion by 2 investigators (JMG, AMG) as high, moderate, low, or very low strength of evidence. In some cases, high, moderate, low, or very low ratings were impossible or imprudent to make. In these situations, a grade of insufficient was assigned.

RESULTS

LITERATURE FLOW DIAGRAM

The literature flow diagram summarizes the results of the study selection process. A full list of excluded studies is provided in the Appendix.



OVERVIEW OF INCLUDED STUDIES

Our search identified 104 potentially relevant articles after deduplication and title and abstract screening. Of these, 13 primary studies (in 13 publications) met eligibility criteria.[21-33] Characteristics of included studies are shown in Table 1. None of the identified studies were relevant to KQ2. One study was a cluster-randomized trial, 10 were randomized trials, 1 was a nonrandomized trial, and 1 was an interrupted time-series. Six studies were conducted in the USA, 5 in Europe, 1 in New Zealand, and 1 in Canada. No studies were conducted among VHA populations. Ten studies employed medication review, 9 used coordination of care, and 7 included symptom monitoring. Eleven studies reported hospitalization outcomes, 7 reported ED utilization, 4 reported composite outcomes of unplanned health care use, and 4 reported on patient satisfaction. The median sample size of included studies was 311 (range: 25-3,054). Eight studies focused on patient populations at elevated medical risk.[21,23-27,29,32] We did not identify any studies that focused on patients discharged from an acute psychiatric hospitalization.

KEY QUESTION 1: EFFECTS OF POST-DISCHARGE CONTACTS AMONG ADULTS WITH ACUTE MEDICAL HOSPITALIZATIONS

Key Findings

- We identified 13 studies that assessed the impact of PDC interventions on outcomes of interest. None of the studies focused on populations with an acute psychiatric hospitalization. Most (N = 11) studies were randomized trials, with only 1 rated as high ROB.
    - All but 1 PDC intervention used telephone-delivered PDC; most (N = 11) PDC approaches consisted of a single contact conducted in the first 3 days after hospital discharge.
    - The most common component of PDC was medication review; only 3 studies included all 3 hypothesized core PDC functional components.
- In a meta-analysis, PDC interventions within the 7 days after hospitalization were not associated with a reduction in 30-day hospital readmissions or ED utilization when compared with usual care. Certainty of evidence supporting this conclusion was considered moderate, based primarily on the consistency of results across randomized studies.
- Only 4 studies assessed the impact of PDC on patient satisfaction, and only 1 small study reported higher patient satisfaction among patients exposed to post-discharge contacts.
- Exploration of subgroup differences by intervention characteristics also demonstrated no differential impact on PDC effectiveness on 30-day hospital readmissions or ED use.

General Characteristics

Of the 13 unique studies we included, 11[21,23-27,29-33] evaluated the effect of PDC interventions on 30-day hospital readmissions; 7[21,24,25,29-31,33] on 30-day ED use; 4[21,24,25,30] on a composite outcome of ED use, readmissions, or unplanned office visits; and 4[22,27,28,33] on patient satisfaction with care (Appendix). Eleven studies were randomized trials[21-28,31-33] (of which 1[31] was a cluster-randomized trial),[31] with 1[28] rated as high ROB and 3 [21,24,33] rated as low ROB. We also identified 2 eligible nonrandomized designs: 1[30] nonrandomized trial and 1[29] interrupted time-series study; both were rated as serious ROB. Common quality concerns among the RCTs included (1) bias due to deviations from

the intended PDC interventions; (2) missing outcome data; and (3) bias from potential selective reporting of results. Among the 2 nonrandomized designs, common sources of bias were (1) influence of potential unaccounted confounders; (2) deviations from intended interventions; (3) missing data; and (4) issues with outcomes measurement. (See Appendix for details on ROB rating for each included study.)

The predominant modality of delivery for these PDC interventions was telephone ($N = 10$[21,23-27,29-31,33]); 1[32] study employed videoconferencing. Studies varied in timing of PDC (range: 24 hours to 7 days post-discharge) with most ($N = 9$) initiating contact in the first 3 days post-discharge. Personnel involved in the PDC interventions included pharmacists,[24-26,28,30] nurses,[22,26,27,29,32,33] and non-clinical staff (*ie*, study coordinators,[21,23] patient navigators[31]). Four studies used more than 1 type of personnel.[21,23,24,26]

Most PDC interventions ($N = 10$[21-23,25-28,30,31,33]) consisted of a single telephone contact, with 2[23,27] studies having additional patient-driven contact with a hotline. One[29] study had 2 direct telephone contacts on the first and third day post-discharge, and 1[32] study used daily videoconference contacts for a range of 5 to 9 days. Many studies also had extensive pre-discharge components consisting of enhanced interactions with a pharmacist for medication counseling or discharge planning counseling with hospital providers. Eight interventions reported using a structured protocol with a mix of assessments conducted during the contact.[21,23,25-27,31-33] Core functional components of the contacts varied; the most common component across interventions was some type of medication review process ($N = 10$[21,22,24-30,33]). The second most common component was coordination of services ($N = 9$[24,26-33]). Only 3 interventions stated that the contacts included all 3[24,26,29] core functional components of the PDC (*ie*, medication review, coordination of services, symptom monitoring). All interventions used usual care as the comparator, with 1[26] study operationalizing usual care as an in-person appointment with a patient's usual primary care provider. Additional details of these interventions are in the Appendix.

For KQ1, we present detailed results ordered by major outcomes. Details on study characteristics are in the Appendix.

Table 1. Evidence Profile

Number of Studies	13 unique studies (13 articles)
Key Question	KQ1 (*N* = 13); KQ2 (*N* = 0)
Study Designs	Cluster-randomized trial (*N* = 1), randomized trial (*N* = 10), nonrandomized trial (*N* = 1), interrupted time-series (*N* = 1)
Countries	USA (*N* = 6), Europe (*N* = 5), New Zealand (*N* = 1), Canada (*N* = 1)
Intervention Categories	Medication review (*N* = 10), coordination of care (*N* = 9), monitoring (*N* = 7)
Outcome Categories[a]	Hospitalization (*N* = 11), ED use (*N* = 7), composite health care utilization (*N* = 4), patient satisfaction (*N* = 4)
ROBINS I Risk of Bias	Low (*N* = 0), moderate (*N* = 0), serious (*N* = 2), critical (*N* = 0)
ROB 2 Risk of Bias	Low (*N* = 3), some concerns (*N* = 7), high (*N* = 1)

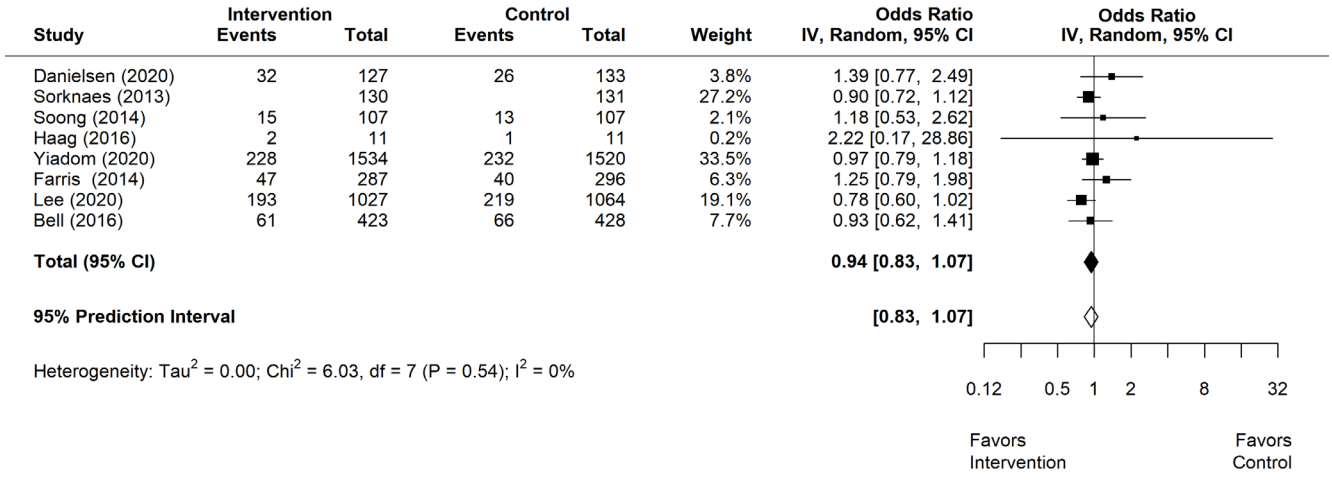
Notes. [a] Eight studies reported more than 1 outcome type.

KQ1a: Effects of PDC on Hospital Readmission, Emergency Care Use, and Patient Satisfaction

Hospital Readmission

Eleven studies measured all-cause hospital readmissions at about 30 days (range: 28-30 days).[21,23-27,29-33] Individually, none of the 11 PDC interventions led to significant reductions in 30-day readmission rates relative to usual care. Although PDC interventions and personnel involved varied, 8[21,23-26,31-33] of the 9 randomized trials were deemed to have sufficient conceptual homogeneity and provided enough information to perform meta-analysis. Pooled analysis of 7,336 patients demonstrated no significant impact of PDC on 30-day hospital readmissions (OR = 0.94, 95% CI [0.83,1.07]). As shown in Figure 1, effect estimates were generally consistent across studies (95% prediction interval [PI] [0.83, 1.07]).

Figure 1. Effects of PDC Interventions in First 7 Days on 30-Day Hospital Readmission (RCTs Only)

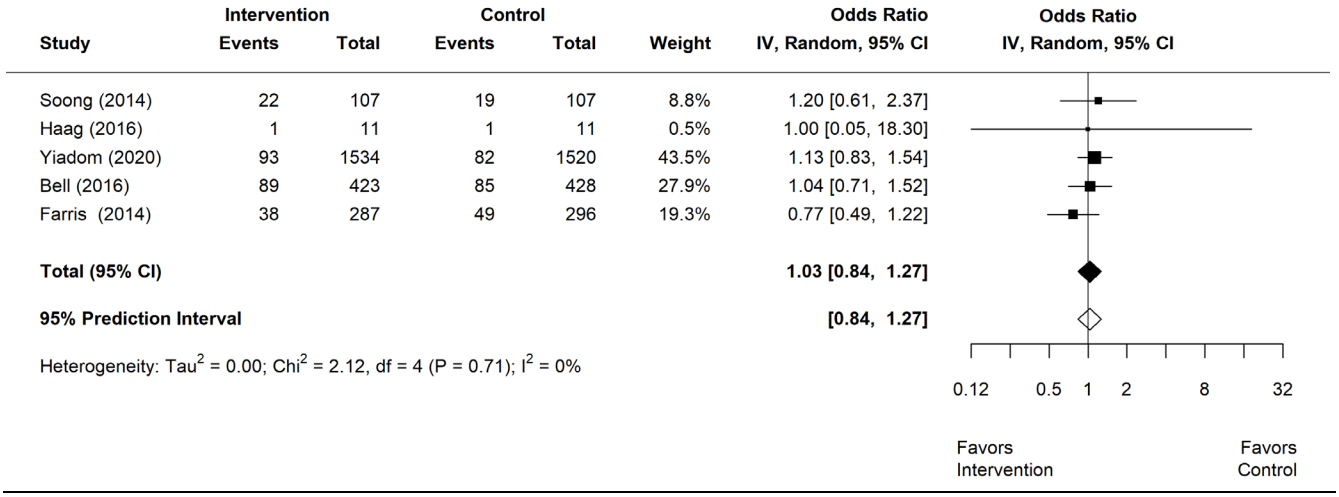


These results are corroborated by the results of the nonrandomized trial and interrupted time-series studies that were not included in the meta-analysis.[29,30] These studies also found no significant impact of PDC on 30-day readmissions. Similarly, 2 studies that also looked at disease-specific readmissions did not identify a reduction in readmissions for the studied conditions.[26,32] The small randomized trial ($N = 57$[27]) excluded from the pooled analysis reported greater 30-day hospitalizations in the PDC group compared to usual care ($p = 0.026$), though a point estimate and number of readmissions in each group were not provided. Only 1 study performed sub-analyses and found no significant associations for sex or age.[26] Detailed results of all studies are in the Appendix.

Emergency Care Use

Seven studies measured all-cause ED use at approximately 30 days since discharge from index hospitalization.[21,24,25,29-31,33] Five[21,24,25,31,33] studies were randomized trials (1[33] of which was a cluster-randomized trial), 1[29] was an interrupted time-series, and 1[30] was a nonrandomized trial. Individually, no included study showed a significant reduction in 30-day ED use relative to usual care control. Based on the meta-analysis of the 5 RCTs encompassing 3,054 patients, there was no difference in the odds of 30-day ED utilization (OR = 1.03, 95% CI [0.84, 1.27]; 95% PI [0.84, 1.27]) (Figure 2). There was no evidence of statistical heterogeneity across these studies.

Figure 2. Effects of PDC Interventions in First 7 Days on 30-Day ED Use (RCTs Only)



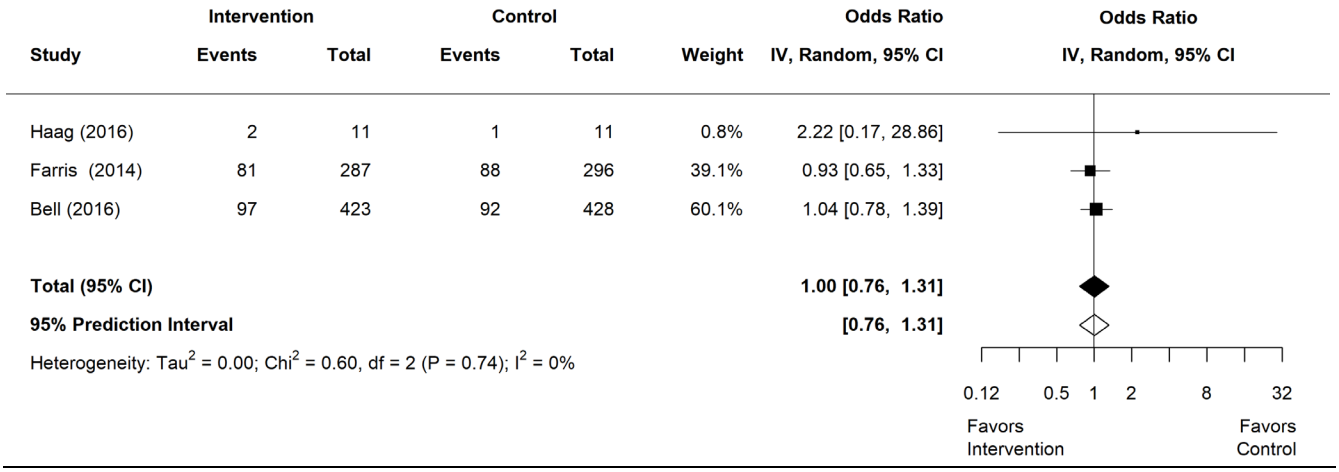
The interrupted time-series trial and the nonrandomized trial also do not show a significant difference in 30-day ED utilization with PDC interventions when compared to usual care. One[24] study also assessed ED utilization at 90 days with no significant difference in ED utilization with PDC interventions compared to usual care. None of the studies included subgroup analysis on any variable. Details of results by each included study are in the Appendix.

Composite Measures of Health Care Utilization

Four studies measured a composite outcome of 30-day unplanned health care utilizations (*eg*, 30-day hospital readmissions plus ED use or unscheduled office visit). Three[21,24,25] were randomized trials and 1[30] was a nonrandomized trial.

Results were consistent with the other 30-day utilization outcomes; individually, these studies showed no impact of PDC on a reduction in 30-day unplanned health care use relative to usual care control. Based on the meta-analysis of the 3 randomized trials encompassing 1,456 patients, there was no significant difference in the odds of 30-day unplanned utilizations (OR = 1.00, 95% CI [0.76, 1.31]; 95% PI [0.76, 1.31]) (Figure 3). Details of these results per study are in the Appendix.

Figure 3. Effects of PDC Interventions in First 7 Days on 30-Day Composite Measures of Health Care Utilization (RCTs Only)



Patient Satisfaction

Four RCTs[22,27,28,33] encompassing 3,397 patients measured some aspects of patient's satisfaction (*eg*, clarity of information, overall satisfaction with post-discharge, patient experience with hospital). Overall patient satisfaction with the discharge process was high across control and PDC groups, with only 1 small study ($N = 60$)[27] reporting a significantly higher patient satisfaction in the PDC group. Details of these results per study are in the Appendix.

KQ1b: Impacts by PDC Intervention Characteristics

We explored PDC intervention factors that may have an impact on the outcomes of interest. We found no statistical evidence that the following factors affected the outcomes:

- Mode of PDC (*ie*, phone vs video)
- Clinical staff initiating the contact (*ie*, pharmacist vs nurse vs non-clinical staff)
- Timing of the contact (*ie*, within 3 days vs within 7 days of hospital discharge)
- Use of structured assessments during contact (*ie*, yes vs no protocolized assessments)
- Content of the contact (*ie*, containing 1 or more of these core PDC functions: medication review, symptom monitoring, coordination of medical or social services during contact).

Both visual inspection and statistical subgroup testing demonstrated no impact of these characteristics. Forest plots of these subgroup analyses are in the Appendix.

Certainty of Evidence

The certainty of evidence (COE) was moderate for randomized studies and very low for nonrandomized studies (Table 2). Nine RCTs were graded as moderate COE for no effect of post-discharge contacts on 30-day hospital readmission. This category was downgraded only for imprecision. The 2 observational studies that reported impacts on hospitalization were downgraded to very low certainty for very serious ROB, given serious indirectness as well as imprecision. The evidence for post-discharge contacts on 30-day ED use was rated as moderate COE for no effect and

downgraded for imprecision. The 2 observational studies reporting ED use were rated as very low certainty. We did not conduct a GRADE evaluation for the composite outcomes of unplanned health care utilization, though the overall patterns of outcomes were similar to those for hospitalization and ED use.

Table 2. Certainty of Evidence

Outcome	Number of Studies	Findings	Certainty of Evidence (Rationale)
Hospitalization	9 RCT (7,402 patients)	OR = 0.94 (95% CI [0.83, 1.07])	**Moderate** (Downgraded for imprecision)
	2 Observational (20,924)	Non-significant results	**Very low** (Downgraded for very serious risk of bias, serious indirectness, and imprecision)
Emergency Department Use	5 RCT (4,724 patients)	OR = 1.03 (95% CI [0.84, 1.27])	**Moderate** (Downgraded for imprecision)
	2 Observational (20,924)	Non-significant results	**Very low** (Downgraded for very serious risk of bias, serious indirectness, and imprecision)

Abbreviations. RCT=randomized controlled trial; OR=odds ratio.

KEY QUESTION 2: EFFECTS OF POST-DISCHARGE CONTACTS AMONG ADULTS WITH ACUTE PSYCHIATRIC HOSPITALIZATIONS

We identified no eligible studies that addressed KQ2a or KQ2b.

DISCUSSION

The transition from hospital to home is a vulnerable period for patients, with many experiencing a variety of health-related problems in the period directly following a hospital discharge. Follow-up contacts to patients in the week after hospital discharge has been widely used as a strategy to mitigate transition-related issues. Our systematic review identified 13 relevant studies that assessed the impact of post-discharge contacts (PDCs) with adult patients after an acute hospitalization. Most included studies were randomized trials ($N = 11$), with only 1 rated as high risk of bias. More than half of studies ($N = 8$) focused on populations at elevated medical risk (*eg*, 65 years of age and older, chronic obstructive pulmonary disease [COPD], heart failure). None of the included studies focused on populations with an acute psychiatric hospitalization. All but 1 study used telephone to deliver the PDC intervention, and most ($N = 11$) interventions consisted of a single contact conducted in the first 3 days after hospital discharge. Based on a modest but consistent body of evidence, post-discharge follow-up contacts delivered in the first 7 days after leaving the hospital likely have no impact on 30-day hospital readmissions (moderate COE; randomized trials), 30-day ED use (moderate COE; randomized trials), or patient satisfaction with care.

There are several considerations for interpreting our findings on the lack of impact of PDC interventions, which may also guide future research on the topic. First, discharge planning that occurs during inpatient care is a routine procedure in most health systems.[34,35] These discharge planning procedures vary but generally include medication review and counseling, patient and/or family caregiver education, and coordinating care with community healthcare providers.[35] In the studies included in our review, about half describe some type of pre-discharge planning protocol. It is likely that similar pre-discharge procedures occurred in some fashion in most studies, as this has grown to be the standard of care and is highlighted in the AHRQ Project RED toolkit.[11,36] In fact, the vast majority of discharge planning steps in the Project RED toolkit are designated as pre-discharge tasks. Thus, the addition of a single post-discharge contact would be a minor component of a broader discharge planning intervention with little potential to have an isolated impact on hospital readmission or ED use.

Second, while most studies reported having a standard protocol for PDC interventions, virtually none of the included studies rigorously assessed whether patients actually received a post-discharge contact (*ie*, intervention adherence) or whether the post-discharge contact delivered the call according to the protocol (*ie*, intervention fidelity). Factors related to intervention implementation like adherence and fidelity can impact intervention effectiveness. One large, low risk of bias randomized study included in this review did report implementation information and also conducted a post hoc analysis of patients who were reached versus not reached for their telephone-delivered post-discharge contact.[33] Higher rates of hospital readmissions were observed among the patients who were not reached for their post-discharge call.

Next, most of the PDC interventions included in this review were delivered by telephone. Telephone may be an effective modality for some important post-discharge functions (*eg*, patient education, verification of follow-up appointments), but may be less effective for other critical PDC functions like medication review (*eg*, unable to see medication labels) or symptom monitoring (*eg*, visual exam not possible). In the 1 study included in this review that compared telephone to in-person PDC, there was no difference in 30-day hospital readmissions.[26] Yet, adherence to an office visit in the first 7 days after discharge was significantly lower than adherence to telephone-delivered PDC (79% vs 92% respectively). Additionally, while many patients may be likely to engage over telephone, other patients might respond better to alternative modalities like text messaging, email, or electronic health record

smartphone applications. Some patients, such as those experiencing homelessness or severe mental health issues, may not have reliable access to a telephone or have contact information that changes frequently. Last, most studies included in this review focused on patients identified as higher risk based on a variety of factors such as age and medical comorbidities (*eg*, COPD, heart failure). It is likely that these patients may need more intensive approaches in the transition from hospital to home that cannot be delivered in a single-contact approach. In fact, there is evidence from earlier studies published prior to 2011 that more intensive transition care interventions that include multiple contact before and after hospital discharge are effective in reducing 30-day rehospitalization.[37,38]

Limitations

It is important to note limitations of both the identified literature and our approach to conducting this review. In addition to the study limitations described in the previous section, many studies were small (median sample size of 311) and only 1 study reported subgroups by patient characteristics. Additional research that enrolls sufficient numbers of patients from important subgroups (*eg*, by age, race, social support status, health literacy, insurance status) could clarify whether there are patients that are likely to benefit from single-contact approaches versus more intensive post-discharge approaches. We identified no studies that assessed PDC for patients with acute psychiatric hospitalizations, a priority of the nominating operational partners. Also, we identified no studies conducted within the VHA health care system. Findings may be less applicable to the VHA population, where historical care, hospital course, and follow-up plans may be available to the PDC interventionist via the Veteran's comprehensive electronic health record. Last, our definition of PDC did not include interventions that were centered on electronic symptom monitoring only; we required bidirectional communications. Thus, we may have missed some interventions that were focused on remote symptom monitoring.

We constrained our review to studies published after 2011 to align with national policy shifts in the use of PDC in the United States. In date-limiting our search, we likely missed some prior relevant studies. We also limited our eligibility criteria to randomized and EPOC nonrandomized design standards (*ie*, nonrandomized trials, controlled before-after studies, interrupted time-series, or repeated-measures studies), missing observational studies which may contribute useful information. Yet our findings are consistent with prior reviews that included earlier studies and observational and qualitative designs. These reviews generally found no consistent impact of post-discharge follow-up contacts, though these reviews noted the generally weak methodological quality and high statistical heterogeneity of previous studies.[2,39] Our systematic review extends these findings by including higher quality study designs (*ie*, EPOC design standards) and by including an exploration of treatment effectiveness based on key intervention characteristics (*eg*, content, interventionists, timing of intervention) identified by VHA operational partners. Although there were too few studies in each subgroup to allow for firm conclusions, the consistency of effects across groups suggests that these study characteristics have little influence on the effects of PDC.

FUTURE RESEARCH

This comprehensive review of the literature identified several gaps in the current evidence that warrant future investigation, which are described below using the population, intervention, comparator, and outcome (PICO) framework (Table 3).

Table 3. Evidence Gaps

Population	• Patients with psychiatric hospitalizations
	• Sufficiently powered subgroup analyses by key patient populations related to the following:
	  ○ Age
	  ○ Comorbidity (*ie*, older adult patients with multiple chronic conditions)
	  ○ Hospital length of stay
	  ○ Race and ethnicity
	  ○ Family social support
	  ○ Medical and health literacy
	  ○ Higher vs lower risk of readmission based on a combination of factors

Intervention	• Multi-contact approaches • Multimodal approaches (*eg*, digital vs non-digital approaches; automated vs in-person) • Video- and other modality-delivered (*eg*, text) interventions • Integration of family caregiver as needed co-recipient of PDC intervention
Comparator	• Head-to-head comparisons of video vs in-person vs phone modalities • Variable doses of post-discharge contacts (*eg*, 1 contact vs daily contacts; received vs did not receive post-discharge contacts) • Direct comparison of optimal timing of post-discharge interventions • Direct comparison of the additive effects of post-discharge functions (*ie*, medication review, symptom monitoring, coordination of social and health services) • Adjustment for intensity and type of pre-discharge contacts
Outcomes	• Well-specified measures of patient experience with the PDC intervention only • Patient comprehension of discharge plan and adherence to that plan • Intervention fidelity to intended content • Intervention adherence (*ie*, PDC completed) • Process outcomes of what problems were detected and addressed during PDC approaches that may inform future utility of these brief interventions

CONCLUSIONS

Brief post-discharge follow-up calls are widely used in the United States and elsewhere. In the United States, this push toward follow-up contacts after a hospitalization likely is due to national policy changes that promoted post-discharge contacts as part of the Patient Protection and Affordable Care Act (ACA).[40] In 2013, Medicare approved procedure codes for transitional care management services consisting of communication with the patient or caregiver within 2 business days of hospital discharge. Yet our review demonstrated little supporting evidence that such brief, often 1-call follow-ups impacted key health care outcomes of hospital readmissions and ED use at 30 days, or patient satisfaction with care. Our findings should be contextualized further, as there are many unaddressed questions on the utility of post-discharge approaches and limitations of the existing literature included in this systematic review. While our review did not find evidence of significant impacts of brief PDC approaches, health care systems like the VHA should consider the cost effectiveness of these relatively light-touch approaches on costly outcomes such as rebound hospital admissions and ED use. Such considerations of widespread universal brief post-discharge contacts should be balanced with the potential to target investments in more intensive post-discharge approaches focused on patients most likely to benefit from these interventions.

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