
Care Coordination Models and Tools: A Systematic Review and Key Informant Interviews

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PREFACE

The VA Evidence Synthesis Program (ESP) was established in 2007 to provide timely and accurate syntheses of targeted health care topics of importance to clinicians, managers, and policymakers as they work to improve the health and health care of Veterans. These reports help:

- Develop clinical policies informed by evidence;
- Implement 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.

The program is comprised of 4 ESP Centers across the US and a Coordinating Center located in Portland, Oregon. Center Directors are VA clinicians and recognized leaders in the field of evidence synthesis with close ties to the AHRQ Evidence-based Practice Center Program and Cochrane Collaboration. The Coordinating Center was created to manage program operations, ensure methodological consistency and quality of products, and interface with stakeholders. To ensure responsiveness to the needs of decision-makers, the program is governed by a Steering Committee comprised of health system leadership and researchers. The program solicits nominations for review topics several times a year via the [program website](#).

Comments on this evidence report are welcome and can be sent to Nicole Floyd, Deputy Director, ESP Coordinating Center at Nicole.Floyd@va.gov.

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This topic was developed in response to a nomination from the Office of Nursing Services and the Office of Care Management and Social Work Services to support the Coordinated Care and Integrated Case Management (CC&ICM) Initiative. The scope was further developed with input from the topic nominators (*ie*, Operational Partners), the ESP Coordinating Center, the review team, and the technical expert panel (TEP).

In designing the study questions and methodology at the outset of this report, the ESP consulted several technical and content experts. Broad expertise and perspectives were sought. Divergent and conflicting opinions are common and perceived as healthy scientific discourse that results in a thoughtful, relevant systematic review. Therefore, in the end, study questions, design, methodologic approaches, and/or conclusions do not necessarily represent the views of individual technical and content experts.

The authors gratefully acknowledge the following individuals for their contributions to this project:

Operational Partners

Operational partners are system-level stakeholders who have requested the report to inform decision-making. They recommend Technical Expert Panel (TEP) participants; assure VA relevance; help develop and approve final project scope and timeframe for completion; provide feedback on draft report; and provide consultation on strategies for dissemination of the report to field and relevant groups.

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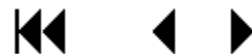
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Technical Expert Panel (TEP)

To ensure robust, scientifically relevant work, the 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 are listed below:



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Peer Reviewers

The Coordinating Center sought input from external peer reviewers to review the draft report and provide feedback on the objectives, scope, methods used, perception of bias, and omitted evidence. Peer reviewers must disclose any relevant financial or non-financial conflicts of interest. Because of their unique clinical or content expertise, individuals with potential conflicts may be retained. The Coordinating Center and the ESP Center work to balance, manage, or mitigate any potential nonfinancial conflicts of interest identified.

EXECUTIVE SUMMARY

INTRODUCTION

Complexity of health care services and care fragmentation contribute to adverse health outcomes and poor patient experiences of care. Over the past 20 years, there has been substantial interest in care coordination interventions, particularly to reduce utilization of acute care services. Care coordination models usually involve systematic strategies that aim to improve continuity and bridge transitions of care. Often, this takes the form of care or case management, in which a designated person or team helps patients manage their medical care and navigate interactions with the health care system(s). It remains unclear whether care coordination interventions can sufficiently address gaps in care and improve patient outcomes.

The VA Care Coordination and Integrated Case Management (CC&ICM) initiative was launched in 2016, as a collaboration between the VA Offices of Care Management and Social Work, and Nursing Services. The main goals of this initiative are to standardize and integrate care coordination services across all VA facilities and points of care for Veterans. To assist the CC&ICM initiative, the VA ESP was asked to review evidence on implementation and outcomes of various care coordination models.

We summarize evidence from eligible systematic reviews (SR) on key characteristics and effectiveness of care coordination interventions for diverse adult populations at high risk for adverse outcomes. Additionally, we present results from primary research studies of effective interventions (*ie*, those able to reduce hospitalizations and/or emergency department [ED] visits) regarding tools and approaches to assess patient trust and care team integration, and to improve communication between patients and providers. To better understand which results may be most applicable to VA, we also provide information about the settings in which effective care coordination models were implemented. Finally, we present results from key informant interviews to address remaining gaps in the published literature, particularly with regard to tools and approaches used by various interventions.

METHODS

To guide scope refinement and protocol development, we selected the framework for Care Coordination in Chronic and Complex Disease Management. This framework focuses on characteristics, processes, and interactions within and between health care teams. We adapted this framework in 2 areas: 1) specification that team roles include who contacted patients (and in what manner); and 2) reorganization of outcomes by patients (*eg*, patient experience, quality of life, and survival), health care teams (*eg*, work satisfaction and burnout), and health systems (*eg*, acute care utilization and costs). While health care utilization and costs may be measured at the patient level (*eg*, number of admissions or ED visits per person), we considered such outcomes to be oriented towards the priorities of the health care system.

Applying this framework and in accordance with the priorities of our VA partners, we defined effective care coordination interventions as those that reduced hospitalizations and/or ED visits. We sought information about the key characteristics of effective interventions, such as multidisciplinary teams (vs primarily single case manager), and home visits (vs telephone contacts and/or outpatient visits). To support ongoing implementation and evaluation of care

coordination programs in the VA, we also searched for evidence on tools and approaches that addressed patient trust, team integration, and patient-provider communication. Finally, to support interpretation of the evidence with regard to applicability, we sought information on the characteristics of health care systems and communities where effective interventions had been implemented.

Key Questions

For community-dwelling adults with a variety of ambulatory care sensitive conditions and/or at higher risk of having repeat hospitalization or ED visits:

KQ1—What are the key characteristics of care coordination models (of varying types) that aim to reduce hospitalization or ED visits?

KQ2—What is the effect of implementing these care coordination models on hospitalizations, ED visits, and patient experience (*eg*, Consumer Assessment of Healthcare Providers and Systems)?

KQ3—What are the characteristics of settings in which effective models have been implemented?

KQ4—Among effective models, which approaches/tools have been used to:

- a) Measure patient trust or working alliance?
- b) Measure team integration?
- c) Improve communication between patients and providers?

To address these KQ, we first focused on identifying eligible SR on care coordination models. In order to address likely gaps in results from SR, particularly with regard to KQ 3 and 4, we also examined primary research studies of effective interventions and conducted key informant interviews with those who implemented interventions.

Search Strategy

We searched for English-language systematic reviews, from inception until September 2019, in MEDLINE, CINAHL, Embase, Cochrane Database of Systematic Reviews, Agency for Healthcare Research and Quality Evidence-based Practice Center reports, and VA ESP reports. We also identified relevant primary research studies included by reviews and conducted a search for randomized controlled trials (RCT) in MEDLINE and Embase, from 2018 until February 2020.

Study Selection

Using prespecified inclusion and exclusion criteria, SR search results were evaluated and excluded with the consensus of 2 reviewers. Eligible populations of interest included community-dwelling adults with a range of ambulatory care sensitive conditions (*eg*, heart failure and chronic lung disease) and/or at higher risk for acute care episodes. If a review focused exclusively on interventions for a single health condition, it was excluded. Eligible interventions covered different care coordination models, such as care or case management and home-based primary care. We required that eligible reviews reported inclusion of hospitalizations and/or ED

visits as outcomes of interest in objectives or results. At full-text review, 2 individuals separately determined inclusion and then resolved any conflicts through discussion. When consensus could not be reached, disagreements were discussed with a third reviewer.

From each eligible SR, we identified all included primary studies and 2 individuals evaluated them for potential relevance to KQ3 and 4. In addition to above criteria for SR, we also applied the following: conducted in US, and RCT or quasi-experimental observational studies (*eg*, comparative control cohort or interrupted time series). We also screened and reviewed results from an additional search of RCT published 2018 until February 2020. Two reviewers applied the same criteria used to evaluate SR, along with the additional requirement for RCT conducted in US.

Quality Rating & Data Abstraction

We assessed the quality of eligible SR using criteria adapted from AMSTAR 2 and rated overall quality as high, medium, or low. We abstracted data from reviews on: target population(s); dates of search queries; and number and characteristic of included primary studies (location, setting and study design). Additionally, from high- and medium-quality SR, we abstracted detailed results on: characteristics of care coordination model; pooled effects (or qualitative summaries) for hospitalizations, ED visits, and/or patient experience; characteristics of settings; and tools and approaches used to measure patient trust or working alliance, assess health care team integration, and/or improve communication between patients and providers.

From relevant primary research studies on care coordination models, we abstracted data on effectiveness for main outcomes; participant, intervention and setting characteristics; and relevant tools and approaches. Because the primary studies frequently referenced other studies for information on intervention characteristics, we also reviewed these associated studies for relevant data.

Data Synthesis for Systematic Reviews & Relevant Primary Studies

We conducted qualitative syntheses of results from eligible SR and relevant primary studies. We focused on eligible SR to address key characteristics and effectiveness of care coordination models, particularly with regard to reduction of hospitalizations and/or ED visits. We also included strength of evidence determinations by SR, if these were reported. We describe information from relevant primary studies regarding: setting characteristics; and tools and approaches used to measure patient trust or working alliance, assess health care team integration, and/or improve communication between patients and providers. To address remaining gaps, we also abstracted results from associated articles (*eg*, methods papers) for this set of primary studies.

Key Informant Interviews

We conducted semi-structured interviews with research investigators and members of teams who implemented care coordination models, as described in relevant primary studies. We included all relevant interventions, regardless of effectiveness in reducing hospitalizations and/or ED visits. We initially invited 22 individuals by email, and contacted another 3 individuals per recommendations of respondents. We completed interviews with 11 participants.

The main focus of these interviews was to address gaps in the published literature regarding tools and approaches. We also addressed intervention uptake and sustainability, as this information may be particularly useful to our VA stakeholders. Interview guides included questions in each of these areas and were individually adapted using published or online information about the interventions. Interviews lasted about 30 minutes and were audio-recorded. We reviewed contemporaneous notes and audio-recordings to first develop summaries for each care coordination intervention. We then examined summaries for all interviews to provide overall themes.

RESULTS

Overview of Eligible Systematic Reviews

Of 2,324 unique citations for SR, 72 underwent full-text review. We identified 16 eligible SR, 14 of which examined case management or transitional care interventions, and 2 evaluated intensive primary care models (eg, home-based primary care). All SR included a variety of care coordination models within these 2 broad categories. Four SR included only RCT, while the others allowed both RCT and observational studies. Three SR included only US studies, and the remaining SR included studies conducted in several different countries. Seven SR focused specifically on patients at higher risk for acute care utilization (*ie*, high-utilizers), and 1 SR examined interventions for individuals with frailty. Six reviews were high quality, 6 were medium quality, and 4 were low quality. We focused on the 12 medium- and high-quality SR for detailed results. We provide descriptions of results for each KQ in the following text.

KQ1: What Are the Key Characteristics of Care Coordination Models?

All SR provided general descriptions of different components included by interventions, with many providing some information on team composition and frequency of use of certain components (eg, multidisciplinary care plan). Outside of in-person contacts (whether in a clinical setting or at home), the other main form of communication with patients was via telephone. Four SR specifically addressed whether there are key characteristics for care coordination interventions. Among these, 1 used qualitative comparative analysis to examine intervention characteristics of effective case management models, reporting that careful case-finding was necessary but not sufficient; selection of patients needed to be combined with either a high-intensity model (defined by authors using caseload, frequency and types of contact with patients) or a multidisciplinary care plan. Another SR reported that interventions targeting specific risk factors were more likely to be effective. One SR conducted subgroup analyses by intervention duration and different approaches to address frailty, finding no significant differences in effect. The fourth SR examined home-based primary care and found no specific pattern of components that were associated with effective interventions. Additionally, 2 SR sought to determine the key components for care coordination models but were unable to draw conclusions; authors reported challenges due to lack of published information on components and fidelity of intervention implementation.

KQ2: What is the Effect of Implementing Care Coordination Models?

Of 10 SR examining case or care management and/or transitional care interventions, 2 conducted quantitative meta-analyses, while remaining SR used qualitative syntheses. Six SR evaluated effects on hospitalization, with 5 reporting mixed or unclear results and 1 finding lack of

effectiveness. One SR pooled results for transitional care interventions (most involved nurses who called patients and/or made home visits) for diverse patient populations. Using data from 11-35 RCT, this SR found no effect at 1 month (risk difference [RD] -0.03, 95% CI -0.05, 0) but some effects at 3-18 months (RD range -0.05 to -0.11). Another SR conducted meta-analyses to evaluate effects on hospitalization for a diverse set of case management interventions for frail community-dwelling older adults; pooled results from 5 RCT showed that case management did not reduce hospitalizations (odds ratio [OR] 1.13, 95% confidence interval [CI] 0.95, 1.35).

Seven SR examined effects of case or care management and/or transitional care interventions on ED visits. Two SR indicated that care coordination interventions reduced ED visits, and both provided descriptive information about included studies. One SR stated that 6 included studies reported reductions in ED visits, and the other found that the median rate ratio (of care coordination vs control) was 0.63, with interquartile range of 0.41-0.71. All 5 remaining SR reported unclear or mixed effects on ED visits, including 1 that conducted pooled meta-analyses over various timeframes (1-12 months).

Only 1 SR on case management evaluated effects on patient experience, and using qualitative synthesis found inconsistent results.

Two SR evaluated intensive primary care interventions, and both used qualitative synthesis. One SR focused on home-based primary care, reporting reduced hospitalizations. The other SR addressed several different models and described inconsistent results across studies. The SR on home-based primary care also found that there was improved patient and caregiver satisfaction (low strength of evidence).

KQ3: What Are the Characteristics of Settings in Which Effective Models Have Been Implemented?

Only 2 SR addressed characteristics of settings for interventions; 1 SR on case management stated that all but 1 of 16 included studies were single-site, usually in an urban setting.³³ The other SR sought to address organizational settings for home-based primary care but was unable to find published information.

To further address KQ 3 (and KQ 4), we identified 272 unique primary studies included by eligible SR, and found 18 RCT and 9 observational studies that were relevant. While 78% of relevant observational studies (n=7) reported reductions in hospitalizations and/or ED visits, only 22% of RCT (n=4) demonstrated effectiveness. Additionally, we searched for RCT that were published after the most recent eligible SR. This search resulted in 1048 unique citations, of which 21 underwent full-text review. We identified 2 relevant RCT; both studies reported that interventions were not effective for reducing hospitalizations and/or ED visits.

We categorized the primary studies on effective interventions into transitional care, outpatient care or case management (led by nurse or social worker), or other intensive primary care models. These interventions were implemented in a variety of settings, including rural community hospitals and health systems, academic medical centers (in urban settings), and public hospitals serving largely poor and uninsured populations. There was no clear connection between differences in settings, types of intervention, and various patient populations.

KQ4: What Are the Tools and Approaches Used by Effective Models?

No SR commented on tools and approaches used to measure patient trust or care team integration, or to improve communication between patients and providers. Primary research studies described several approaches to improve patient-provider communications, such as coaching patients on how to ask questions, making lists of key concerns, and role-playing visits with providers. In 2 studies, care coordinators supported communication by attending outpatient visits with patients and their providers. No primary research study described specific tools or measures to assess patient trust or care team integration. For 1 intervention, qualitative methods were used to evaluate patient experiences and relationship with care coordinators.

Key Informant Interviews

We conducted 11 interviews with investigators and other team members who implemented care models described by relevant primary research studies. Several interviewees described using approaches akin to health coaching (although not called that in the published studies) to improve patient communications with providers. None of the interviews provided additional information on specific tools or approaches used to assess patient trust, care team integration, or patient-provider communications. Review of additional intervention materials provided by some interviewees indicated that assessments of patient experience sometimes included factors conceptually related to patient trust (*eg*, perception that care coordinator was knowledgeable and understood patients' needs).

There was variation in the sustainability of care coordination interventions, with some stopping after completion of the research studies. Lack of financial viability was often a key factor in discontinuation. Others were substantially modified and adapted to meet changing health system priorities (*eg*, in targeted patient populations). Implementation teams had variable success in engaging stakeholders such as hospital leadership and front-line providers. Health care utilization and costs were high priority for those in leadership, and improved patient experiences were not usually sufficient for continuing interventions.

In terms of key issues for future care coordination interventions, some key informants questioned whether acute care utilization by high-risk populations was truly preventable. For example, 1 interviewee stated, *“Everything that could be possibly going wrong is going wrong...A lot of these people are going to get readmitted no matter what you do.”* There was concern with current readmission metrics and the ability to make substantial changes within a short timeframe: *“30 days doesn't give you sufficient time...especially in elderly patients with many issues.”* Some also suggested that care coordination interventions may work better in those with less severe conditions and/or modifiable factors; an important challenge with such an approach is that the intervention may need to serve a large number of patients before there are appreciable differences in acute care utilization. One individual described it thus: *“You can allocate a lot of resources to extremely high need patients...or you can allocate resources to a larger population and ... have a smaller impact on individual level, but on population level have greater impact...”*

DISCUSSION

Key Findings

To inform the VA CC&ICM initiative, we conducted a multi-stage review of evidence for care coordination models. We identified 16 eligible SR addressing care coordination interventions, and further examined 29 relevant primary research studies. We also conducted 11 key informant interviews with those who have implemented care coordination models. Key findings include:

- 2 SR reported that a key component of effective care coordination models was patient selection criteria focused on specific risk factors and/or needs.
- 1 SR reported that high-intensity models and/or multidisciplinary plans were required for effectiveness (in combination with selection criteria noted above).
- Most SR reported unclear or inconsistent effects of care coordination models in reducing hospitalizations or ED visits.
- Primary studies reporting effective interventions were conducted in a variety of settings, including rural community hospitals, academic medical centers in urban settings, and public hospitals serving largely poor and uninsured populations.
- Approaches to improve patient-provider communication included coaching patients, role-playing, and attending appointments with patients.
- SR, primary studies, and interviews provided little information on specific tools or approaches used to assess patient trust or health care team integration.
- Key informant interviews suggested variation in sustainability of care coordination interventions, with substantial adaptation occurring among many of those that have continued.

Care coordination models were complex and differed along multiple dimensions, thus presenting substantial challenges for SR authors in summarizing and comparing results across studies. Four SR drew conclusions with regard to key intervention characteristics, with 2 highlighting selection criteria, 1 indicating importance of high-intensity (defined by lower caseload and more patient contacts) and multidisciplinary plans, and 2 finding no key characteristics. Several SR seeking to examine key characteristics and/or organizational settings of care coordination models reported difficulty finding sufficient published evidence to address these questions.

Among 11 primary studies demonstrating effective care coordination models, none reported specific tools or approaches for measuring patient trust or health care team integration. Key informant interviews did not provide additional information on these areas. Interventions used a variety of approaches to improve communication between patients and providers, including coaching and role-playing. In some interventions, care coordinators also directly communicated with providers on patients' behalf, including participation at outpatient appointments.

Some interviewees described adaptation of the intervention over time to address evolving priorities for health care organizations. Some also highlighted the difficulty of modifying health

and social factors contributing to need for acute care utilization among many patients in the highest risk category. There were suggestions that there may be more benefit in focusing on patients at somewhat lower risk and improving health care processes for larger groups of patients.

Implications for Policy

It remains unclear whether care coordination interventions should be implemented in particular health care settings and how they may be adapted to improve effectiveness and sustainability. Two SR highlighted the importance of carefully selecting patients for care coordination interventions. The VA CC&ICM initiative has implemented several tools for evaluating Veteran needs and matching the level of care coordination services to those needs. It will be important for VA to evaluate the feasibility of applying these tools more widely, and the effects of implementing such tools on delivery of services and patient outcomes. Additionally, because VA medical centers and clinics are located in a variety of settings, it will be important to understand differences in utility of these tools across large and small sites, and those serving urban and more rural communities.

Understanding what type of services and programs are available at a particular facility may be challenging for Veterans, their caregivers, and VA clinical staff. A key goal of the CC&ICM initiative is to standardize care coordination across VA sites, and this may improve access and use of appropriate services for Veterans. However, the CC&ICM initiative acknowledges the importance of flexibility in adapting care coordination models to accommodate local circumstances. Our interview results also support the importance of local adaptations for uptake and sustainability of care coordination interventions. A potential avenue to achieving more consistency of services while allowing flexibility may be to align services and programs based on program goals and Veteran needs; this information could then be collected in a central hub that Veterans and/or VA staff can use to find appropriate services. Additionally, it may be valuable to provide educational materials as part of the CC&ICM initiative, to guide adaptations. Future evaluation of implementation should consider which adaptations were made and the rationale for these.

One SR indicated that a high-intensity (defined using case load and patient contacts) or multidisciplinary care coordination model was more likely to be successful. Our examination of effective primary research studies also found a high number and frequency of patient contacts, often involving home visits. Therefore, it may also be valuable to understand which VA programs or models are most similar to these high-intensity interventions, and consider whether it would be cost-effective to implement more broadly.

Finally, there may be specific patient groups that would benefit more from models that go beyond additional care coordination services (*eg*, by a nurse and/or social worker). For example, VA Primary Care Mental Health Integration is a collocated, collaborative model implemented to improve access to mental health services for Veterans. The VA has also been interested in potentially implementing different models of integrating oncology and palliative care for cancer patients.

Research Gaps/Future Research

Our examination of primary research studies suggested that those with observational quasi-experimental designs were more likely to report reductions in hospitalizations and/or ED visits. Observational studies may have residual confounding and are more likely to be affected by publication bias.

Studies of effective care coordination models did not report standardized tools used to assess patient trust or care team integration. It may be that these interventions relied on informal assessment by study staff or that there was an assumption that these domains would all improve. However, descriptions of these tools and strategies for assessment will support health systems in evaluating their existing services and implementing new care coordination models.

Finally, multiple SR raised concerns about lack of information on intervention implementation, including fidelity and frequency of various components. To improve evaluation and interpretation of the effectiveness of care coordination interventions, future studies should consider application of frameworks and designs with explicit consideration of implementation outcomes (eg, hybrid effectiveness-implementation designs, Consolidated Framework for Implementation Research [CFIR], and Reach, Effectiveness, Adoption, Implementation, and Maintenance [RE-AIM]). Studies using such frameworks should clearly define the “core” set of key components and describe the “adaptable periphery” of elements that can be adjusted to accommodate the local context.

Therefore, we recommend the following for future research:

- Evaluate future care coordination interventions using randomized designs.
- Consider application of standardized tools to assess patient trust or working alliance, health care team integration, and communication between patients and providers.
- Consider study designs that explicitly consider implementation outcomes in future studies of care coordination models.
- Define “core” intervention components and describe local adaptations, particularly in multi-site studies.

Limitations

To address the priorities of our VA partners, this work focused on care coordination models that were effective in reducing hospitalizations and/or ED visits; SR and studies that did not address these outcomes were excluded. While we acknowledge the importance of patient experience outcomes, our discussions with stakeholders and key informant interviews all supported the high priority of acute care utilization for health care system leadership, particularly with regard to sustainability of interventions. We prioritized high- and medium-quality reviews for abstracting detailed results. We relied on SR authors’ determination of overall effectiveness and strength of evidence for care coordination models. Because interventions in countries other than the US may be less relevant for the VA, we limited primary studies to those conducted in the US. It is possible that studies conducted in other countries may have been informative for VA policy, despite very substantial differences in health care financing and delivery. We were able to

complete interviews with less than half of those whom we invited to participate; it is possible that there was unpublished information on tools and approaches that we were unable to identify.

Conclusions

Existing evidence on care coordination models indicates that they have inconsistent effects on reducing hospitalizations and/or ED visits for high-risk community-dwelling adults. It remains unclear whether such interventions should be implemented and how they may be adapted to different health care settings. Implementation of new care coordination services should be carefully evaluated, preferably using randomized designs. Policymakers should also consider whether, for certain patient populations, a larger-scale redesign of care models may be necessary to improve continuity and collaboration.

ABBREVIATIONS TABLE

Abbreviation	Definition
AHRQ	Agency for Healthcare Research and Quality
CC&ICM	Coordinated Care & Integrated Care Management initiative
CFIR	Consolidated Framework for Implementation Research
CI	Confidence interval
ED	Emergency department
ESP	Evidence Synthesis Program
KQ	Key question
MeSH	Medical subject heading
OR	Odds ratio
RCT	Randomized controlled trial
RD	Risk difference
RE-AIM	Reach, Effectiveness, Adoption, Implementation, and Maintenance
SR	Systematic review(s)
TEP	Technical expert panel
US	United States of America
VA	Department of Veterans Affairs