Transformational Coaching: Effect on Process of Care Outcomes and Determinants of Uptake

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PREFACE

The VA Evidence Synthesis Program (ESP) was established in 2007 to provide timely and accurate syntheses of targeted healthcare topics of importance to clinicians, managers, and policymakers as they work to improve the health and healthcare 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 three 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 by the Office of Veteran Access to Care, for the purpose of informing leadership, program offices, networks, and facilities on how to best measure the value of transformational coaching activities. 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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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.

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INTRODUCTION

High-quality health care is a priority for patients and clinicians alike. Quality improvement (QI) is a framework that guides health system actions to improve the delivery of high-quality health care. Quality improvement activities seek to promote high-quality health care by applying innovations, rapid-cycle testing, and spreading best practices that produce meaningful improvements. However, conducting QI activities in an effective and accurate manner may be challenging for health care teams with competing demands. Health care teams often need dedicated support to incorporate QI activities into busy clinical practices. One method for providing support around QI activities is through longitudinal coaching from an expert trained in QI and related methods (*eg*, Lean, Six Sigma, system redesign). Within the VA, transformational coaching is one commonly used strategy for the provision of longitudinal, expert support to clinical teams seeking to engage in QI processes.

Transformational coaching is a team-centered approach to support an interdisciplinary health care delivery team in pursuit of catalyzing and building capacity for sustained change and enabling improvement. Transformational coaches provide support by assisting with goal setting and attainment, connecting teams to system-level resources for change, and improving efficiency and team dynamics around improvement processes. The coach is not part of the particular health care practice or team receiving the coaching, but can be from the larger health care system in which the team or practice sits. The coach role is agnostic to the clinical content area and does not require topical expertise. Since 2012, the VA has employed transformational coaches to advance numerous national collaboratives (*eg*, Patient Aligned Care Team [PACT] Collaborative, Transitioning Levels of Care Collaborative).

This report seeks to support future development of transformational coaching by addressing several knowledge gaps: (1) how the impacts of transformational coaching-like interventions have been measured; (2) what the effect of coaching is on practice- or clinical team-level behaviors (or process outcomes); and (3) what the barriers and facilitators are to the uptake of transformational coaching. In recognition that transformational coaching is not explicitly defined outside of the VA nor studied in the peer-reviewed literature, we used a broad search strategy to identify interventions that shared the essential ingredients that must be maintained to ensure fidelity to the transformational coaching intervention as defined within the VA. Specifically, we incorporated related concepts from the fields of QI, improvement science, and implementation science, which themselves employ overlapping terms and methods pertaining to the support of clinical teams and practices in the uptake and improvement of evidence-based clinical processes.

The Key Questions for this review were:

KQ 1a: What outcomes have been used to assess the effects of transformational coaching across practice, provider, and patient levels?

KQ 1b: What are the effects of transformational coaching for team-based health care improvement and practice change efforts on process outcomes, specifically:

- Adoption of targeted process of care activities (*eg*, more appropriate documentation of screening)
- Quality improvement process goal attainment (*eg*, the number of quality improvement projects reaching completion)
- Team member knowledge
- Team member self-efficacy

KQ 2: What are the identified barriers and facilitators that impact the uptake of transformational coaching in a large health care system such as the VA?

METHODS

We developed and followed a standard protocol for this review in collaboration with our operational partners and a Technical Expert Panel (PROSPERO registration number CRD42020165069).

To guide review activities, we established a definition of transformational coaching in collaboration with our operational partners through a series of communications and iterative revisions. The final definition of transformational coaching for this review is as follows:

> *Transformational coaching is a team-centered approach wherein an external, clinical content-agnostic individual (ie, the coach) supports an interdisciplinary health care delivery team within the context of a longitudinal, proactive relationship in pursuit of catalyzing and/or building capacity for sustained change and improvement processes through providing support such as assisting with goal setting, goal attainment, connection to system-level resources for change, and/or improving efficiency and team dynamics around change/improvement processes.*

DATA SOURCES AND SEARCHES

We conducted 2 primary literature searches for this review, a search for KQ 1 (1a and 1b) and a second search for KQ 2. For each, we searched MEDLINE® (via Ovid®), Embase (via Elsevier), and CINAHL Complete (via EBSCO) from inception through October 7, 2019. As there is no MeSH term for transformational coaching, and there are multiple terms for similar interventions, we identified the most commonly used terms and pseudonyms for a person (or persons) who potentially shared the essential ingredients based on our operationalized definition of transformational coaching (*eg*, practice facilitator, outreach visitor, QI coach). We also conducted hand searches of references from selected high-quality systematic reviews and exemplar studies identified during the topic development process and by our stakeholders and/or technical expert panel. The reproducible search strategies for each key question are in an appendix.

STUDY SELECTION

All studies identified in our searches were screened independently by 2 investigators according to *a priori* established eligibility criteria. Citations classified for inclusion by at least 1 investigator were reviewed at full text. At the full-text level, 2 investigators were required to agree on inclusion or reason for exclusion. All articles meeting eligibility criteria at this level were included for data abstraction.

For KQ 1b we included a broad set of comparative studies meeting Cochrane Effective Practice and Organisation of Care (EPOC) study design criteria, which included relevant process of care outcomes (*eg*, QI process goal attainment, adoption of targeted process of care activities), and team member knowledge or self-efficacy. In addition, included studies needed to share the essential ingredients of transformational coaching as established in the definition of transformational coaching developed with our operational partners for this review. The effect of a coaching-like intervention had to be specified in analysis separately from other major interventions (*eg*, not co-delivered with another major intervention such as a longitudinal learning collaborative). The outcomes used to assess transformational coaching (KQ 1a) were drawn from included publications identified in the KQ 1b search.

For KQ 2, we included qualitative studies of coaching-like interventions or qualitative components of mixed-methods studies that collected primary qualitative data from individuals involved in a coaching-like intervention (*eg*, the coach or members of the interdisciplinary team receiving the coaching). Our eligibility criteria also allowed for surveys or observational studies that provided quantitative measurement of uptake of coaching by a health care team. Studies were eligible if they had other major co-intervention components so long as the primary purpose of the study was to evaluate factors that either created barriers to or facilitated the uptake of coaching.

DATA ABSTRACTION AND QUALITY ASSESSMENT

For KQ 1a and 1b, key data elements (*eg*, intervention details, outcomes, quality assessment elements) were abstracted into a customized DistillerSR (Evidence Partners Inc., Manotick, ON, Canada) database by 1 reviewer and reviewed for accuracy and completeness by a second reviewer. Multiple reports from a single study were treated as a single data point, prioritizing results based on the most complete and appropriately analyzed data. Key features relevant to applicability included the match between the sample and target populations *(eg*, age, large health care system). For quality assessment of articles included for KQ 1, we used the Cochrane EPOC risk of bias (ROB) tool. We assigned a summary ROB score (low, unclear, high) to individual studies, based on the impact of sources of bias on the results of the study.

For KQ 2, we abstracted key study characteristics (*eg*, intervention characteristics, setting, method of data collection) into a customized DistillerSR database by 1 reviewer and verified by a second reviewer. Barriers and facilitators (*ie*, descriptions of elements that impede or foster the uptake of transformational coaching) were abstracted directly into NVivo (QSR International Pty Ltd, Version 12, 2018)—a specialized software suited for textual data gathering and synthesis. For quality assessment of articles included for KQ 2, we applied individual criteria from the Critical Appraisal Skills Programme (CASP) tool, which does not have a summary ROB score.

For mixed/multiple methods studies, we applied the CASP tool to the qualitative portion of the study included.

DATA SYNTHESIS AND ANALYSIS

For KQ 1a, we collected all outcomes reported by studies meeting eligibility criteria for KQ 1b and organized them by the level at which they produced potential changes. Specifically, we grouped them by 2 types of process outcomes: practice level (*eg*, creation of information systems for population) or provider level (*eg*, use of point-of-care decision support for target condition/patients). Other measures targeted clinical outcomes at the patient level (*eg*, improved individual health outcomes). For KQ 1b, we described key study characteristics of the included studies using summary tables. Across included studies, we identified the intervention activities employed by coaches to support interdisciplinary teams and matched them to Expert Recommendations for Implementing Change (ERIC) strategies. ERIC was chosen because it is widely cited and incorporates relevant QI ideas, and because there is a Consolidated Framework for Implementation Research-ERIC matching tool supporting connection to the conceptual framework used in KQ 2. Given the conceptual heterogeneity in process of care outcomes assessed, the measure used to assess a given outcome, and the selection and dosing of coaching strategies employed, we did not calculate summary effects (*ie*, meta-analysis). Rather, we described the specified outcomes narratively.

Due to the large number of studies that measured adoption of targeted process of care activities, we grouped these outcomes by the complexity of actions required to deliver the specific process of care activity. Within these groupings, we prioritized lower ROB studies when possible. To support meta-synthesis across the included studies, we employed a vote-counting method based on direction of effect. Following this approach, we categorized the intervention effect as harmful or beneficial based on the direction of effect without consideration for magnitude or statistical significance. Outcomes for which a given study did not provide information from which to determine direction of effect were omitted. We calculated the overall proportion of beneficial findings and obtained the exact 95% confidence interval (CI) for the true proportion of beneficial findings. We employed an exact binomial probability test to provide the p value testing hypothesis that the intervention was truly ineffective (*ie*, the probability of observed or more extreme proportion if in fact the proportion of beneficial studies is truly 0.5). Exact CIs and p values were calculated using “binom.test” function in the R statistical package. The certainty of evidence for KQ 1b was assessed using Grading of Recommendations Assessment, Development and Evaluation (GRADE). For KQ 1b, we described all outcomes (process and clinical) from studies meeting KQ 1b eligibility criteria using summary tables organized by the level of outcome measured (*ie*, practice, provider, patient).

For KQ 2, we used a modified “best-fit framework” synthesis approach. In accordance with this approach, we identified an existing model—in this case the Consolidated Framework for Implementation Research (CFIR)—upon which to guide abstraction and analysis of textual data. We ultimately supplemented the CFIR for this review with constructs from the socioecological framework in order to better fit the identified data. Pairs from a subteam of investigators dedicated to the analysis of KQ 2 initially coded all included articles for barriers and facilitators to the uptake of transformational coaching. We then coded identified barriers and facilitators across established CFIR domains (*ie*, context, transformational coaching intervention characteristics, team/individual characteristics, QI project/process, and patient) followed by

CFIR subdomain constructs (*eg*, external policies and incentives, relative advantage). To ensure rigor and validity, the KQ 2 subteam of investigators met regularly to achieve consensus on coding and for identification of themes. The overall approach to using CFIR was vetted in consultation with the originator of CFIR, who was a member of our TEP. The qualitative team used NVivo software to support first- and second-level coding and analysis. We applied certainty of evidence ratings to findings using the Confidence in the Evidence from Reviews of Qualitative research (GRADE-CERQual) on CFIR constructs prioritized by the key VA operations stakeholders.

RESULTS

SUMMARY OF RESULTS FOR KEY QUESTIONS

KQ 1a and KQ 1b

We identified 1,753 citations, of which 99 were reviewed at the full-text stage. We identified 19 cluster-randomized trials (CRTs) that addressed the effects of transformational coaching on process of care outcomes of interest; all but 1 trial was conducted within the primary care setting, and 1 study was conducted in the VA. Terms used for the transformational coach role included practice facilitator, practice outreach facilitation, practice coach, nurse facilitator, nurse prevention facilitator, and outreach visitor. Interventions varied in duration from 6 months to 36 months. Coaches employed varied combinations of 13 distinct implementation strategies. Studies reported a median of 5.73 implementation strategies (range 3 to 9) delivered by the coach-like role. The 3 most commonly used coach-delivered implementation strategies were to develop a formal implementation plan (18/19 studies), audit and provide feedback (17/19), and develop/distribute educational materials (14/19). The least-used strategies were organizing clinician team meetings (3/19) and developing stakeholder interrelationships (2/19). Interventions typically targeted multiple simultaneous process of care activities requiring disparate clinical behaviors (*eg*, ordering a lab test, complicated patient counseling) but which were usually linked by a common goal (*eg*, improving management and outcomes for a specific disease).

KQ 1a

Five studies included outcomes at the practice level with measures addressing care delivery style, practice organization, culture, practice management, number of QI projects initiated, and QI objectives met. Sixteen studies included measures at the provider level. Measures at the provider level generally included guideline-concordant actions taken by providers during the delivery of disease-specific or prevention-related care delivery. Six studies created composite measures of groups of guideline-concordant actions as the outcome of interest. No studies measured team member satisfaction with the coaching experience, team member knowledge, or team member self-efficacy. Outcomes measures at the patient level were almost exclusively related to clinical outcomes (*eg*, achieving target blood pressure). One study measured patient self-reported satisfaction with diabetes treatment.

KQ 1b

We organized the adoption of targeted process of care activities according to the complexity of the specific behavior required by the relevant QI activity. Specifically, we used the following 8

categories: composite outcomes of multiple clinical processes of care, organizational processes of care, documentation, medication prescription, counseling, provider exams and procedures, lab tests, and vital signs. Heterogeneity, primarily of outcome measurement, precluded pooled assessment of the effect of coaching across or within any of these categories.

Of the 7 trials that assessed composite process of care outcomes, 6 were low or unclear ROB and 1 was high ROB. Five trials favored the intervention (83%; 95% CI 36% to 99%). The probability of observing 83% of trials with a beneficial effect if coaching interventions are truly ineffective is p=0.22. For organizational process of care outcomes, 4 of 5 trials (including the 2 low ROB studies) favored the coaching interventions (80%; 95% CI 28% to 99%; p >0.99). Of the 4 studies (2 unclear and 2 high ROB) that assessed the effect of coaching on appropriate documentation, 3 included outcomes that favored the interventions (75%; 95% CI 0.19 to 99%; p=0.625). Three of 4 studies (1 unclear and 2 high ROB) studying the effect of coaching on appropriate medication prescription contributed to analysis. Two included at least 1 outcome that favored the coaching intervention (66%; 95% CI 9% to 99%; p >0.99). The 2 trials (both low ROB) that assessed the effect of coaching on counseling provision favored the intervention (100%; 95% CI 16% to 100%). Four trials assessed provision of appropriate exams or procedures, and 3 included at least 1 outcome that favored the interventions (75%; 95% CI 19% to 99%). Of the 5 trials that assessed the effect of coaching on ordering of labs or vitals, all included at least some outcomes that favored the intervention (100%; 95% CI 48% to 100%; p=0.0625).

Two trials measured the effect of coaching on QI process goal attainment. One unclear ROB study found a significant increase in the number of QI projects per practice in the intervention versus the comparator arms with a mean of 3.9 QI projects per practice versus 2.6 (p<0.001). In a high ROB trial, there was no significant difference between the intervention and control practices in the percentage of mean QI indicators at or above target (p>0.2). No studies directly addressed self-efficacy of team members related to QI method skills or a specific QI project activity. No trials addressed the effect of transformational coaching or similar roles on team member knowledge.

KQ 2

We identified 1,867 citations, of which 172 were reviewed at the full-text stage. We included 16 qualitative (including 1 survey with open-ended questions) and mixed-methods studies that addressed the barriers and facilitators to the implementation of coaching-like interventions. Two of the studies evaluated facilitators and barriers of an intervention included in KQ 1. Five of the 16 studies were mixed or multi-method in design and 1 was a survey study. The focus of the interventions included cardiovascular health, electronic health record use, chronic disease management, and improvement of general QI capacity. Data were collected from coaches, teams, and practice leadership.

Overall, we found that the interdependent nature of transformational coaching activities requires that the coach see both the big-picture context and small details of a given team and QI project in order to overcome barriers and maximize facilitators. Specifically, coaches were sometimes able to overcome team-level barriers to successfully engaging with their QI project (*eg*, lack of knowledge/skills/support/resources). For example, some teams struggled to obtain data to measure the outcomes of QI projects, and the coach worked with them to obtain the data or find

workarounds. In this way, adaptability is an essential characteristic of coaching, as the coach often needs to modify the approach and/or QI project to fit the context and needs of the team. In addition to adapting their own behavior, coaches may also offer the team different choices in QI projects to allow some customization. Uptake of coaching was more successful when teams had the knowledge, skills, engagement level, and resources to apply learned coaching strategies to successfully conduct their QI project. Interpersonal relationships were also critical; the ability to foster relationships within and outside the team was cited as an important aspect of coaching. Finally, working with the team to set expectations of both the QI project and the coaching process is a key for success.

For findings under prioritized CFIR domains, we also assessed the certainty of evidence. Under the CFIR construct of external policy and incentives, there was very low certainty of evidence that it was a barrier when external policies did not align with QI project objectives. In addition, we found low certainty of evidence that unanticipated challenges from outside the practice could derail a team's focus on coaching and QI activities (*eg*, the H1N1 influenza outbreak). There was 1 facilitator at this level for which there was low certainty of evidence. Specifically, it was helpful when government guidelines aligned with QI project–targeted activities.

Under the CFIR domain of intervention characteristics, there were findings under the prioritized constructs of relative advantage and cost. First, with relative advantage, a barrier to the implementation of coaching was the lack of engagement at the practice level (moderate certainty of evidence), which was exemplified by practices not prioritizing QI project activities and the need to "push" practices along. Relatedly, practices that were engaged with coaching and QI activities facilitated planned coaching activities (moderate to high certainty of evidence). Active engagement was demonstrated by teams having dedicated time and space for coaching activities and the support of practice leadership to make it happen. In turn, coaches were able to provide accountability to engaged teams. Two findings were related to cost. A high workload in coaching was a barrier (moderate certainty of evidence). High workloads typically occurred when coaches needed to do a lot of administrative tasks instead of planned coaching activities, when data problems required extra work, or when coaching tasks changed daily. Investing in the initial and ongoing training of coaches was a facilitator (low certainty of evidence).

Under the CFIR construct of knowledge and beliefs about the intervention (CFIR domain of team and individual characteristics), there were 2 key barriers. First, there was low certainty of evidence that a lack of knowledge among team members regarding the coaching process and QI project details was a barrier. This included limitations in knowledge about technical aspects of electronic medical record systems. In addition, there was very low certainty of evidence that team discomfort or inability to work with QI data was a barrier.

Finally, under the CFIR construct of reflecting and evaluating, there was 1 barrier. Specifically, we found moderate certainty of evidence that obstacles to acquiring and processing QI data impaired team ability to adequately complete and evaluate QI activities.

DISCUSSION

We sought to identify the effect of transformational coaching on process of care outcomes, to understand the ways that coaching has been evaluated, and to clarify the barriers and facilitators to uptake of transformational coaching interventions. To that end, we identified 19 cluster-

randomized trials (CRTs) that addressed the effects of transformational coaching on process of care outcomes of interest; all but 1 trial was conducted within the primary care setting. Across the included studies, 5 studies measured practice-level outcomes, 16 measured provider-level outcomes, and 6 measured patient-level outcomes. Six studies evaluated composite measures of process of care activities. Overall, interventions typically targeted multiple simultaneous process of care activities requiring disparate clinical behaviors (*eg*, ordering a lab test, complicated patient counseling) but which were usually linked by a common goal (*eg*, improving management and outcomes for a specific disease). Across outcomes related to uptake of targeted process of care activities, there was very low to low certainty of evidence that coaching probably has an effect on composite process of care outcomes and ordering of labs and vital signs, and possibly has an effect on changes in organizational process of care and delivery of appropriate counseling. It is uncertain if coaching has an effect on the conduct of specific exams and procedures, and coaching probably does not have an effect on prescription of diagnosis-appropriate medications. Two trials assessed the effect of coaching on team QI process goal attainment. There was low certainty of evidence for an increase in the mean number of QI projects initiated based on 1 CRT (3.9 among intervention practice vs 2.6 comparator practices). We have very low certainty that coaching-like interventions have no effect on the number of indicators at target levels, based on 1 CRT. No studies specifically assessed team member knowledge or self-efficacy after coaching. One trial examined clinician self-confidence in assessment of various lifestyle behaviors as a secondary outcome after a coaching intervention compared to an unspecified control and found mixed results.

We identified 16 studies relevant to barriers and facilitators of coaching implementation. Findings support that the interdependent nature of the complex components of the coaching intervention—the role of the coach, the QI project, and the context—requires that the coach see both the big picture and small details to overcome barriers and maximize facilitators. Working with the team to set expectations of both the QI project and the coaching process is a key for success. Coaches must understand the change process required to implement QI, as teams need education on knowledge, skills, engagement, support, and resources to successfully implement QI. Adaptability is an essential characteristic of coaching because the coach will need to modify the approach and/or QI project to fit the context and needs of the team. The coach's ability to work with and obtain data needed for technical support of the team, generating reports, creating workarounds, and providing education related to the data was also identified as a significant facilitator.

The findings from our review are generalizable broadly to coach-led support for team-based QI activities. Identifying effective strategies that accelerate the speed of improvement efforts and boost their impact will play an important role in the VA's ongoing goal of providing high-quality, patient-centered care. As we describe in this report, transformational coaches can play a critical role in facilitating access to and use of data and technical resources for QI activities. To date, transformational coaches have contributed to the uptake of evidence-based practices and QI initiative from the facility level to the national level, including PACT and Transitioning Levels of Care Collaboratives. Most recently, transformational coaches have supported VA efforts to become a high-reliability organization through working with teams seeking to improve local patient-safety practices. Our findings could contribute to organizational decisions about which QI projects and which clinical teams could most benefit from transformational coaching support. Finally, our mapping of outcomes used to measure effectiveness of coaching-like interventions

can inform ongoing conversations about how best to select valid and relevant measures of QI and coaching success.

Limitations of the existing literature include loss of significant data when an entire practice (or cluster) dropped out of a study; inadequate description of both the team members and patients; lack of statistical consideration of clustering; and lack of clearly identified primary outcomes. In addition, there was notable heterogeneity across study intervention core components, outcome measures, and the practice setting in which these studies took place. Limitations of our approach to this review include potentially introducing heterogeneity by including literature from multiple fields of study because transformational coaching is not a term defined in the peer-reviewed literature; loss of relevant information due to exclusion of studies with co-interventions, which prevented isolating of the coaching effect; and the potential impact of framework choice on identification of barriers and facilitators to uptake of transformational coaching.

APPLICABILITY

There was 1 solely VA study; all others were conducted in primary care settings that were generally similar enough to be applicable to primary care QI activities within the VA.

RESEARCH GAPS/FUTURE RESEARCH

We identified multiple gaps in the literature. First, few coaching interventions employed the strategies we identified as being most helpful in combination (*eg*, stakeholder/leadership engagement and technical support). Second, most coaching interventions focused on predetermined QI projects rather than the capacity for QI more generally. Third, all but 1 of the included interventions were conducted in primary care settings, so the effect of coaching in other clinical settings (*eg*, inpatient, subspecialty clinics) is unknown. In addition, there were gaps in the qualitative literature, including primary data collection from all individuals involved with coaching (*eg*, team members, coaches, and peripheral leadership), information on how coaches make strategic decisions, and barrier and facilitators in the context of coaching for general QI capacity development.

CONCLUSIONS

Transformational coaching is a complex intervention that has the potential to support access to and use of data and technical resources for QI activities at the team and practice level. Transformational coaching, and other interventions with similar characteristics (*ie*, facilitation, outreach visitors), may have an effect on certain process of care activities including composite process of care outcomes, ordering of labs and vital signs, and possibly on changes in organizational process of care and delivery of appropriate counseling. Differences among studies in the description and dosing of implementation strategies employed by coaches, as well as outcome measurement, precluded a more definitive estimate of effects. Specific strategies like adapting coaching techniques to team needs and preferences appears to be better received than other strategies. Future research that standardizes and provides more detail about how coaching interventions are used will better support future comparisons and implementation efforts.

ABBREVIATIONS TABLE

ACE-i	Angiotensin converting enzyme inhibitor
AF	Atrial fibrillation
AHRQ	Agency for Healthcare Research and Quality
ARB	Angiotensin receptor blocker
BP	Blood pressure
BMI	Body mass index
CAD	Coronary artery disease
CASP	Critical Appraisal Skills Programme
CDS	Clinical decision support
CERQual	Confidence in the Evidence from Reviews of Qualitative Research
CFIR	Consolidated Framework for Implementation Research
CHD	Coronary heart disease
CHF	Congestive heart failure
CI	Confidence interval
CKD	Chronic kidney disease
COPD	Chronic obstructive pulmonary disease
CPRS	Computerized Patient Record System
CQI	Continuous quality improvement
CRT	Cluster-randomized trial
CVD	Cardiovascular disease
DM	Diabetes mellitus
eGFR	Estimated glomerular filtration rate;
EHR	Electronic health record
EPOC	Effective Practice and Organisation of Care
ERIC	Expert Recommendations for Implementing Change
ESP	Evidence-based Synthesis Program
EUC	Enhanced usual care
GRADE	Grading of Recommendations Assessment, Development and Evaluation
GTO	Get to Outcomes
HbA1c	Glycosylated hemoglobin
HDL	High-density lipoprotein
HL	Hyperlipidemia
HRO	High-reliability organization
HSR&D	Health Services Research & Development
HTN	Hypertension
HUD-VASH	Department of Housing and Urban Development–Veterans Affairs Supportive Housing
ICPC	International classification of primary care
IQR	Interquartile range
IT	Information technology

KQ	Key question
LDL	Low-density lipoprotein
MD	Mean difference
MeSH	Medical Subject Heading
NSAID	Nonsteroidal anti-inflammatory drug
NTCC	National Transformational Coach Captain
OECD	Organization for Economic Co-operation and Development
OR	Odds ratio
PACT	Patient Aligned Care Team
PHT	Primary healthcare team
PICOTS	Population, intervention, comparator, outcome, timing, and setting
QI	Quality improvement
QUERI	Quality Enhancement Research Initiative
RAP	Reflective adaptive process
RCT	Randomized controlled trial
ROB	Risk of bias
SBP	Systolic blood pressure
SE	Standard error
SMD	Standardized mean difference
SPIDER	Sample, phenomenon of interest, design, evaluation, research type
VA	Veterans Affairs
VHA	Veterans Health Administration

EVIDENCE REPORT

INTRODUCTION

High-quality health care is a priority for patients and clinicians alike. In 2001, the Institute of Medicine (now the National Academy of Medicine) outlined a strategy to improve the quality of health care in the United States anchored on 6 aims: safety, effectiveness, patient-centeredness, timeliness, efficiency, and equity.[1] The pursuit of these aims is the process of quality improvement (QI), which can be defined as "a framework we use to systematically improve the ways care is delivered to patients."[2] QI is one aspect of the science of improvement, or "an applied science that emphasizes innovation, rapid cycle testing … and spread in order to generate learning about what changes, in which context, produce results."[3] Improvement science offers rigorous approaches to the attainment of high-quality care through clinic-level care delivery process refinement and the uptake of evidence-based practices.[4,5] One approach to promote the pursuit of high-quality health care is the provision of longitudinal, expert support to help individuals and health care teams identify and implement areas of practice change.[6-8] Within the VA, transformational coaching is one commonly used strategy for the provision of longitudinal, expert support to clinical teams seeking to engage in QI processes.

Transformational coaching is a team-centered approach to bolster QI in which an individual (*ie*, the coach) supports an interdisciplinary health care delivery team in their pursuit of achieving sustained change and the improvement of clinical processes. Transformational coaches provide support by assisting with goal setting and attainment, connecting teams to system-level resources for change, and improving efficiency and team dynamics around improvement processes. The coach is not part of the particular health care practice or team receiving the coaching, but can be from the larger health care system in which the team or practice sits. The coach role is agnostic to the clinical content area and does not require topical expertise. The effects of the coaching intervention can be measured at multiple levels including the level of care delivery such as provider behaviors or practice activities and policies (process outcomes) or at the level of patient care (clinical outcomes). Beginning in 2012, the VA utilized transformational coaches in numerous collaboratives to integrate VHA transformational improvement initiatives, including the Patient Aligned Care Team (PACT) Collaborative, Patient Flow Collaborative, Specialty and Surgical Collaborative, and Transitioning Levels of Care Collaborative.[9,10]

Transformational coaching is similar to other approaches that encourage the systematic adoption of high-quality, evidence-based practices. One well-studied approach with overlapping characteristics is facilitation.[11] Facilitation has been defined multiple ways but can generally be thought of as a "process of working with groups to support participatory ways of doing things."[12] Those who provide the facilitation, or facilitators, typically are experts in the process of helping groups make changes and solve problems. Specific organizations and health care systems offer variations on the concept and use of facilitation, with VA QUERI and the Agency for Healthcare Research and Quality (AHRQ) being 2 prime examples.[2,12] VA QUERI defines facilitators as "experts in the process of helping groups make decisions and identify and solve problems,"[12] whereas AHRQ defines practice facilitators as specially trained individuals who work with clinical care practices "to make meaningful changes designed to improve patients' outcomes."[2] Because there are multiple scholarly fields which seek to promote the optimal improvement of clinical care delivery, there are multiple terms used to describe coaching-like processes and

many examples of how these terms have been operationalized. Table 1 defines relevant scholarly fields and describes some examples of clinical care improvement approaches similar to transformational coaching.

Table 1. Clinical Care Improvement Approaches

Scholarly Field	**Definition**
Quality improvement	An applied science that emphasizes innovation, rapid-cycle testing and spread in order to generate learning about what changes and which context produce improvements.[3,5]
Improvement science	Scientific field that uses rigorous approaches to determine which improvement strategies work to achieve safe and effective patient care.[4]
Implementation science	The scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and, hence, to improve the quality and effectiveness of health services.[13]
Term for the Role Supporting Practice Change	**Definition**
Coach	An individual who assists with making behavior changes to improve performance and/or to use evidence-based practice through motivation, encouragement, and positive reinforcement.[14] Examples of coaches as operationalized in studies or practices are listed below.
Transformational coach	Individual who supports an interdisciplinary health care team in pursuit of catalyzing and building capacity for sustained change and improvement processes.
Quality improvement coach	An individual who provides individually tailored technical assistance to support QI projects/QI project teams.[15]
Facilitator	An expert who helps health care groups make decisions and identify and solve problems.[12] Examples of facilitators as operationalized in studies or practices are listed below.
Practice facilitator	Health care professionals who assist primary care clinicians in research and QI projects.[16]
Outreach facilitator	A health care professional with expertise in organizational change management who can lead and support health care providers with change.[17]
Nurse facilitator	Nurses who help clinical teams create plans for change and identify practice leaders for the intervention.[18]
Peer facilitator	A peer (most often the same type of health care professional) from outside a given practice who visits that clinical practice and supports a process of change.[19]

This report seeks to support future development of transformational coaching by addressing the following knowledge gaps. First, little is known about the variety of ways that the effects of transformational coaching have been measured. Second, the effect of coaching specifically on

practice or clinical team-level behaviors (or process outcomes) is unknown. A better understanding of process outcomes could improve the selection of clinical QI projects/teams for the application of transformational coaching. Finally, we seek to explore barriers and facilitators to the uptake of transformational coaching. Experiential evidence suggests that transformational coaching interventions is not embraced equally across clinical settings and teams. Clarity on contributors could improve local fit, increasing intervention impact, and ultimately boost sustainability of transformational coaching in varied health care system settings.

In recognition that transformational coaching is not explicitly defined outside of the VA nor studied in the peer-reviewed literature, we used a broad search strategy to identify interventions that shared the essential ingredients that must be maintained to ensure fidelity to the transformational coaching intervention as defined within the VA. Specifically, we took a holistic approach to identifying evidence for this review drawing from QI, improvement science, and implementation science literatures which themselves employ overlapping terms and methods pertaining to the support of clinical teams and practices in the uptake and improvement of evidence-based clinical processes. While necessarily introducing heterogeneity, this approach offered the depth and richness of the larger spectrum of work seeking to optimize the support provided to health care teams and systems trying to improve the quality of their health care delivery.

The Key Questions (KQs) for this report were:

KQ 1a: What outcomes have been used to assess the effects of transformational coaching across practice, provider, and patient levels?

KQ 1b: What are the effects of transformational coaching for team-based health care improvement and practice change efforts on process outcomes, specifically:

- Adoption of targeted process of care activities (*eg*, more appropriate documentation of screening)
- Quality improvement process goal attainment (*eg*, the number of quality improvement projects reaching completion)
- Team member knowledge
- Team member self-efficacy

KQ 2: What are the identified barriers and facilitators that impact the uptake of transformational coaching in a large health care system such as the VA?

METHODS

We followed a standard protocol for this review developed in collaboration with operational partners and a technical expert panel. The PROSPERO registration number is CRD42020165069. The protocol was developed prior to the conduct of the review, and there were not significant deviations after registration. Each step was pilot-tested to train and calibrate study investigators. We adhered to the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) guidelines.[20]

TOPIC DEVELOPMENT

This topic was requested by the leadership of the National Transformational Coach Captain (NTCC) Program managed by the VHA Office of Veteran Access to Care. Findings from this report will be relevant to the VHA as it seeks to continue the provision of high-quality clinical care to the Veteran population. The results of this project may also be relevant to health care organizations and practices that seek to improve the efficiency and impact of their QI efforts.

Definition and Conceptual Model

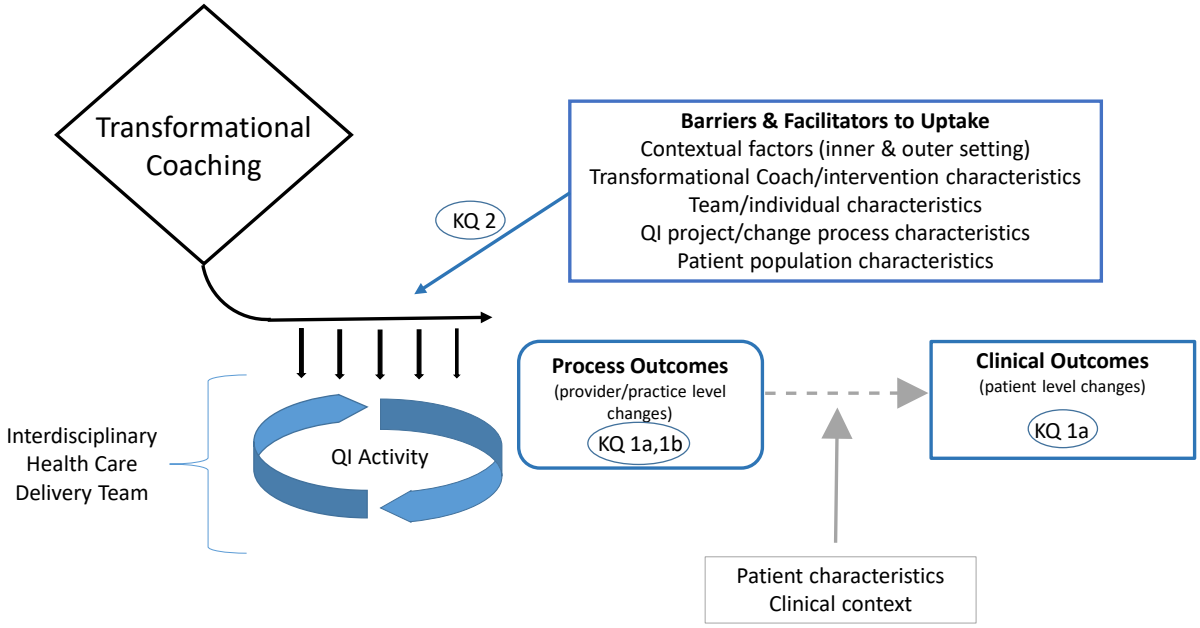
Transformational coaching is not explicitly defined or studied in the wider literature. Thus, for this review we needed to identify those interventions in peer-reviewed publications that shared the essential ingredients of transformational coaching such that would support comparison. So we worked with our operational partner to establish a contextually-relevant definition of transformational coaching through a series of communications and iterative revisions. We adapted our definition from a definition of health coaching by Wolever and colleagues.[21] Specifically, through a series of communications with our operational partner, we elicited both the required and optional conditions by which an intervention would qualify as transformational coaching based on the underlying goal of such an intervention and the core activities of the coach-like role. From these factors, we developed a preliminary definition which was iteratively refined with input from our partners. The final definition for transformational coaching is as follows:

> *Transformational coaching is a team-centered approach wherein an external, clinical content-agnostic individual (ie, the coach) supports an interdisciplinary health care delivery team within the context of a longitudinal, proactive relationship in pursuit of catalyzing and/or building capacity for sustained change and improvement processes through providing support such as assisting with goal setting, goal attainment, connection to system level resources for change, and/or improving efficiency and team dynamics around change/improvement processes.*

For clarity, “external” is used in this definition to mean that the coach is an individual who is not part of the interdisciplinary health care team or unit that is receiving the coaching. However, the coach could be from the larger health care system in which a given team or practice belongs.

We developed a conceptual model to clarify the relationship between the key questions for this report and the larger context of transformational coaching for health care teams working on improving the quality of their delivery of patient care (Figure 1).

Figure 1. Transformational Coaching Conceptual Model



Interdisciplinary health care delivery teams are embedded within larger health systems and work together to change and improve the quality of the care they deliver. As shown in Figure 1, transformational coaching is an intervention that is applied over time through multiple contacts to the health care team (or practice) as the team works on QI projects. The actual QI project that a given team is working on, and which the coach is supporting, could include such activities as increasing adherence to guideline-concordant care recommendations, improving organizational practices, adopting new models of care, or generally increasing team knowledge and use of QI skills.

The effect of transformational coaching can be measured at multiple levels, including at the level of care delivery actions by the health care team (*ie*, process outcomes) or the level of patient outcomes (*ie*, clinical outcomes). In KQ 1a, we mapped all outcomes included in studies that evaluated the effectiveness of transformational coaching at the levels of practice, provider, and patient. In KQ 1b, we examined the effects of transformational coaching on selected process of care outcomes such as provider or health care team actions/behaviors during the course of delivering clinical care (*eg*, ordering of guideline-concordant medications for a given disease or obtaining physical exam measurements at recommended intervals). In KQ 2, we focus on the determinants (*ie*, barriers and facilitators) to the uptake of transformational coaching for support of QI efforts of a given health care delivery team. We use the term "uptake" to mean the early-to-mid-implementation stage activity of adoption or intention to try a treatment or program by providers or organizations.[22]

SEARCH STRATEGY

We collaborated with an expert reference librarian to conduct 2 primary literature searches—a search for KQ 1 and a different search for KQ 2. We searched MEDLINE® (via Ovid®), Embase (via Elsevier), and CINAHL Complete (via EBSCO) from inception through October 7, 2019. We found no MeSH term matching the concept of transformational coaching, so we identified

additional free-text terms (*eg*, practice facilitator, change agent, QI coach) to search titles and abstracts (Appendix A). Based on existing systematic reviews and with input from our operational partners and technical expert panel (TEP), we identified the most commonly used terms and pseudonyms for a person (or persons) who potentially shared the essential ingredients based on our operationalized definition of transformational coaching above. We conducted hand-searches of references from selected high-quality systematic reviews and exemplar studies identified during the topic development process and by our stakeholders and/or technical expert panel. Search terms identified (*ie,* improvement advisor, improvement coach) after execution of the literature search were searched independently, and any relevant references were imported into 2 electronic databases (for referencing, EndNote®, Clarivate Analytics, Philadelphia, PA; for data abstraction, DistillerSR; Evidence Partners Inc., Manotick, ON, Canada). Our search strategy for KQ 1 was informed by the Cochrane Effective Practice and Organisation of Care (EPOC) Group.[23] EPOC criteria were developed to capture both randomized and nonrandomized study designs. We adopted a separate series of terms specific to the qualitative literature for KQ 2.

STUDY SELECTION

Studies identified through our primary search were classified independently by 2 investigators for relevance to the KQs based on title and abstract based on our *a priori* established eligibility criteria. All citations classified for inclusion by at least 1 investigator were reviewed at the full-text review level. The citations designated for exclusion by 1 investigator at the title and abstract level underwent screening by a second investigator. If both investigators agreed on exclusion, the study was excluded. All articles meeting eligibility criteria were included for data abstraction. The outcomes used to assess transformational coaching (KQ 1a) were drawn from included publications identified in the KQ 1b search.

Tables 2 and 3 describe the eligibility criteria for this review. We used PICOTS (population, intervention, comparator, outcome, timing, setting) format for KQ 1,[24] and SPIDER (sample, phenomenon of interest, design, evaluation, research type) format for KQ 2.[25] Eligibility criteria also include detailed criteria for eligible study designs and limitations related to language, countries, and publication type.

Table 2. Study Eligibility Criteria for KQ 1

Study Characteristic	Inclusion Criteria	Exclusion Criteria
Population	Established interdisciplinary health care delivery teams (including clinic- or unit-level)	• Individual-level coaching • Coaching with teams, not providing direct patient care • Mixed populations of individual and team participants if <50% are team based • Single profession teams

Study Characteristic	Inclusion Criteria	Exclusion Criteria
Interventions	Must have these 3 transformational coaching features: 1. Clinical content-agnostic (not required to be an expert in the specific clinical topic or intervention that is the focus of the QI project) 2. Coach is external to the target of coaching (*ie*, not a member of the health care delivery team being coached) 3. Aims to catalyze and/or build capacity for sustained change and improvement through activities such as assisting with goal setting, goal attainment, connection to system-level resources for change, and/or improving efficiency and team dynamics around change/improvement processes	• Interventions that do not include all 3 features • Interventions for which the effect of transformational coaching cannot be isolated ○ Interventions that focus on learning collaborative as the main component of the intervention or have a longitudinal learning collaborative component delivered with coaching • Interventions that are focused on generic team dynamics not necessarily around a QI project or QI capacity
Comparators	Any comparator (*eg*, usual care, active comparator)	None
Outcomes	Must have at least 1 of these 4 outcomes: 1. Adoption of targeted process of care activities (*ie*, increased appropriateness of documentation of screening) 2. QI process goal attainment (*ie*, number of QI projects reaching completion) 3. Team member knowledge (defined broadly as the body of information relevant to a specific QI project topic, practice, or general QI skill) 4. Team member self-efficacy (defined as a team member's belief in their capacity to execute a specific behavior targeted by a given QI project, or specific QI behaviors that could be applied in a clinical setting)	Not applicable
Timing	More than 1 coaching interaction	Not applicable
Setting	Any health care system setting	Exclude non-health care settings such as offices within a health care system that do not deliver patient care, business settings, *etc*.

Study Characteristic	Inclusion Criteria	Exclusion Criteria
Study designs[a]	EPOC study designs: • Randomized trials • Nonrandomized trials • Controlled before–after studies • Interrupted time series Study design must allow for the assessment of the isolated effect of a transformational coaching–like intervention (*ie*, co-administered interventions such as learning collaboratives were only allowed if occurred 1 time or were minor components of the intervention)	• Non-EPOC study designs (*eg*, cohort studies, case-control, cross-sectional, case reports) • Self-described pilot studies and/or sample size <0 • Studies with retrospective data collection • Systematic reviews or meta-analyses
Language	Any	
Countries	OECD[b]	Non-OECD
Years	Any	Not applicable
Publication Types	Full publication in a peer-reviewed journal	Letters, editorials, reviews, dissertations, meeting abstracts, protocols without results

[a] See Cochrane EPOC criteria for definitions and details.
[b] OECD = Organization for Economic Co-operation and Development includes Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.
Abbreviations: EPOC=Effective Practice and Organisation of Care; NCOD=National Center for Organization Development; QI=quality improvement

In addition to interventions that isolate the effect of transformational coaching roles, for KQ 2 we allowed inclusion of those studies in which the transformational coaching approach was delivered with a co-intervention such as longitudinal coaching *so long as* the primary purpose of the study was to explore barriers and facilitators of the coach-like role specifically.

Table 3. Study Eligibility Criteria for KQ 2

Study Characteristic	Inclusion Criteria	Exclusion Criteria
Sample	Any member of an interdisciplinary health care delivery team that receives transformational coaching (including clinic- or unit-level)	• Recipients of individual-level coaching • Members of interventions delivered to mixed populations of individual and team participants if less than 50% are team-based
Phenomenon of Interest	Must have these 3 transformational coaching features: 1. Clinical content-agnostic (not required to be an expert in the specific clinical topic or intervention that is the focus of QI project)	• Interventions that do not include all 3 features

Study Characteristic	Inclusion Criteria	Exclusion Criteria
	2. Coach is external to target of coaching (*ie*, not a member of health care delivery team being coached) 3. Aims to catalyze and/or build capacity for sustained change and improvement through activities such as assisting with goal setting, goal attainment, connection to system-level resources for change, and/or improving efficiency and team dynamics around change/improvement processes	
Design	Interviews (individual, dyad, group; semi-structured or structured), focus groups, observations, surveys	
Evaluation	Primary purpose is to evaluate determinants of uptake of transformational coaching by a health care delivery team	Evaluations of determinants of uptake of a specific clinical intervention or QI project that is the focus of transformational coaching
Research Type	Case studies, qualitative, survey, mixed or multiple methods	
Countries	OECD[a]	Non-OECD

[a] OECD = Organization for Economic Co-operation and Development includes Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

DATA ABSTRACTION

For KQ 1a and KQ 1b, data from published reports were abstracted into a customized DistillerSR database 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 was not reached. Data elements include descriptors to assess applicability, quality elements, intervention details, and all measured outcomes. Multiple reports from a single study were treated as a single data point, prioritizing results based on the most complete and appropriately analyzed data. Key features relevant to applicability included the match between the sample and target populations *(eg*, age, large health care system).

For KQ 2, we abstracted key study characteristics into a customized DistillerSR database by 1 reviewer and verified by a second reviewer. These characteristics included intervention characteristics (*eg*, coach training and discipline, delivery modality, key intervention components), setting (*eg*, primary care, emergency room), method of data collection (*eg*, focus groups, individual interviews), and source of data (*eg*, coaches, teams receiving coaching). Barriers and facilitators (*ie*, descriptions of elements that foster or impede the uptake of coaching) were abstracted directly into NVivo, a specialized software suited for textual data gathering and synthesis.

For details of study characteristics, see Appendix B. For details of implementation strategies, see Appendix C. Appendix D lists excluded studies and the reason for exclusion.

QUALITY ASSESSMENT

For both KQ 1 and KQ 2, quality assessment was done by 2 investigators, and discrepant findings were resolved via discussion or, when needed, by arbitration with a third investigator.

For KQ 1, we used the Cochrane EPOC risk of bias (ROB) tool.[23] These criteria are adequacy of randomization and allocation concealment; comparability of groups at baseline; blinding; completeness of follow-up and differential loss to follow-up; whether incomplete data were addressed appropriately; validity of outcome measures; protection against contamination; selective outcomes reporting; and conflict of interest. We assigned a summary ROB score (low, moderate, or high) to individual studies.

For KQ 2 qualitative studies, we used the Critical Appraisal Skills Programme (CASP) tool.[26] These criteria address the appropriateness of the qualitative approach using the following broad areas of assessment: validity of study results (clarity of aims, appropriate methodology/design/data collection), nature of the results (ethical consideration, rigorous data analysis, clarity of findings), and how helpful the results will be (local value). There is no summary ROB score for this measure at the individual study level. For mixed/multiple methods studies for which we only considered the qualitative portion, we applied the CASP tool to the portion of the study included.

DATA SYNTHESIS

Note that for clarity during the rest of the report, we refer to *transformational coaching* and *coaching* for all studies meeting our eligibility criteria even if the primary study used a different term or label for the intervention or interventionist (*eg*, practice facilitator, outreach visitor). In our study characteristics tables (Appendix B), we include the term used by the primary study authors for the intervention/interventionist. In Table 4, we show the various terms for the coach-like role across studies included for each KQ. In addition, we refer to the transformational coach, or simply coach, as the individual (or role sometimes filled by multiple individuals) delivering the intervention components, and transformational coaching or coaching intervention as the overall intervention in which multiple strategies are used to support interdisciplinary teams in the conduct of QI activities.

Table 4. Terms Used for Transformational Coach-like Role in Included Studies by Key Question

KQ 1a, KQ 1b	KQ 2
Practice facilitator	Practice facilitator
Outreach facilitator	Peer facilitator
Technical assistant	Quality improvement advisor
Nurse facilitator	Quality improvement coach
Outreach visitor	Coach
	External facilitator
	Nurse facilitator

KQ 1a

We collected all outcomes reported by studies meeting eligibility criteria for KQ 1b and organized them by the level at which they produced potential changes.[2] Specifically, we grouped them by 2 types of process outcomes: either practice-level outcomes (*eg*, improved capacity of practice to transform care, creation of information systems for population) or provider-level outcomes (*eg*, use of point-of-care decision support for target condition/patients, prescription of guideline concordant medications). Other measures targeted clinical outcomes at the patient level (*eg*, improved individual health outcomes, improved patient experiences).

KQ 1b

We summarized the primary literature using relevant data abstracted from the eligible studies. Summary tables describe the key study characteristics of the primary studies, which include study design, health care team composition and setting, intervention characteristics (*eg*, number of interactions, modality of interactions), interventionist characteristics (*eg*, discipline, training), and details of the comparator. Across each included study, we identified the intervention activities employed by coaches to support interdisciplinary teams and matched them to established implementation strategies based on Expert Recommendations for Implementing Change (ERIC).[27] Of note, we considered several implementation strategy taxonomies (*eg*, Michie's behavioral wheel,[28] ERIC, and others) for this step. Ultimately, we selected ERIC because it is widely cited, incorporates relevant QI ideas, and because there is a Consolidated Framework for Implementation Research (CFIR)-ERIC matching tool[29] supporting connection to the conceptual framework used in KQ 2. We identified outcomes across the included studies that fit into the KQ-specified outcomes of adoption of process of care activities, QI process goal attainment, team self-efficacy, and team knowledge. For adoption of process of care activities, we grouped outcomes by the complexity of the actions required to enact. For example, process outcomes that required a simple action on the part of the provider (*ie*, ordering a lab) were grouped together, while those requiring more complex interactions (*ie*, behavioral counseling with the patient) were grouped separately. We also grouped the multicomponent outcomes into a separate group (*ie*, completing a collection of patient care steps for those with diabetes). Next, we grouped outcomes by ROB status and similar intervention duration when possible (*eg*, 6 months, 12 months, or more).

Due to heterogeneity of outcome type (*eg*, pre-post percentages of achieving a process of care target vs a discrete scale of process of care adherence), outcome measure (*eg*, optimized prevention care measured as correctly administered processes of care minus inappropriate care delivery vs delivery of a specific prevention activity), and intervention duration, we determined that conducting a quantitative synthesis (*ie*, meta-analysis) to estimate summary effects was not appropriate. Instead, we employed a vote-counting method based on direction of effect.[30,31] In this approach, the null hypothesis is that there is no relationship between the specific intervention and the outcome; thus we would expect there to be equal amounts of harmful/no effect and beneficial findings (50:50) across the studies. For each relevant outcome within a given subgroup, we categorized the intervention effect as harmful/no effect or beneficial based on the direction of effect without consideration for the magnitude or statistical significance. Data from studies were omitted from this analysis when there was insufficient information to determine the direction of effect. We calculated the proportion of beneficial findings, obtained the exact 95% confidence interval (CI) for the true proportion of beneficial findings, and employed an exact

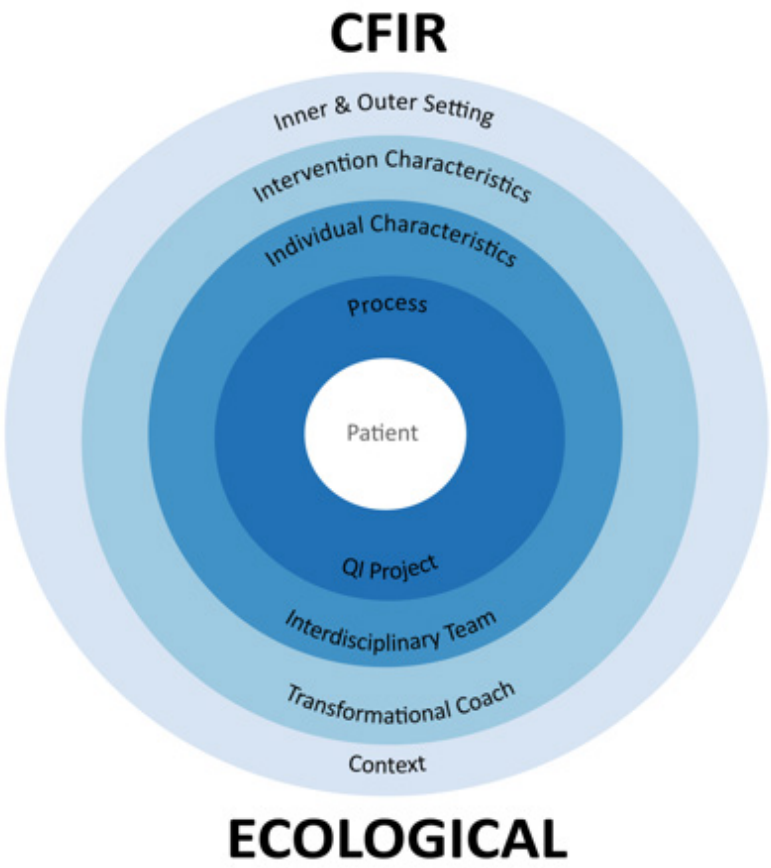
binomial probability test with 2-sided alpha to provide the p value (the probability of observing this or more extreme proportion if in fact the intervention was truly ineffective [*ie*, the proportion of beneficial studies is truly 0.5]). Exact CIs and p values were calculated using "binom.test" function in the R statistical package version 3.5.3 (R Foundation; https://www.R-project.org/). When a given study included multiple outcomes with different directions of effect, we conducted sensitivity analysis to explore impact on proportions if a given study were considered to be beneficial or harmful. The vote-counting approach avoids the error of ignoring potentially clinically significant results from underpowered studies; however, it does not take into consideration the magnitude or precision of effects. In addition, we analyzed the data narratively, focusing on documenting and identifying patterns of the effectiveness of transformational coaching across settings and outcome types. We analyzed potential reasons for inconsistency in treatment effects across studies by evaluating differences in the study population, intervention, comparator, and outcome definitions. For all analyses, we focused on studies at low or moderate ROB.

KQ 2

Similar to the approach for KQ 1b, we summarized the primary literature meeting eligibility criteria for KQ 2 using relevant abstracted data. Summary tables describe the key study characteristics of the primary studies. We used a modified "best-fit framework" synthesis approach for the synthesis of findings in KQ 2, which offers a "pragmatic, flexible approach to integrating theory with findings from practice"[32] and has been promoted as a means to synthesize findings across improvement studies. In the best-fit approach, investigators identify an existing published model that offers a "good enough" starting point from which to form the conceptual underpinning of the approach to analyzing abstracted textual data.[32] Specifically, *a priori* themes are derived from the selected framework(s) and are used to code the data from included studies. Any data that cannot be coded against the identified framework requires the creation of new themes.[33] Published frameworks can be identified through a separate purposive search or opportunistically via topic-relevant searches.[32,33]

Given our timeline and team capacity, we reviewed and considered commonly used frameworks in VA implementation studies. We ultimately chose to use the Consolidated Framework for Implementation Research (CFIR)[34] because it was developed for, and has been used widely within, the VA to assess implementation of complex interventions, and because at the time of selecting a framework, we were uncertain about the variety of concepts we would identify in the literature and felt that the breadth of CFIR's included constructs would accommodate our analysis needs. Early in this process, we found the need to adjust our best-fit framework and incorporated concepts from the socioecological model[35] in keeping with a frequent need to combine multiple frameworks in this analytic approach.[32,33] In Figure 2, we keep the patient at the center to acknowledge that, while not the focus of this analysis, the patient benefits or incurs adverse outcomes from QI activities conducted within this framework. To operationalize the high-level CFIR domains in the context of transformational coaching, we established domain-level definitions (Appendix E). We also consulted with the lead developer of CFIR (a member of our TEP) in the process of adapting CFIR for this review and during the development of our coding approach for this KQ.

Figure 2. Consolidated Framework for Implementation Research (Adapted)



Because KQ 2 was framed around the identification of barriers and facilitators to the uptake of transformational coaching, we conducted an initial round of coding into 2 conceptual buckets: barriers and facilitators. We defined barriers as activities/events/conditions that the coach is facing when working with teams that impede coaching activities related to QI activities and projects. We defined facilitators as something that the coach does (or existing conditions) that helps to enable the coaching process around QI projects (including what the coach does to overcome barriers). While these definitions combine organizational facilitators and coach-level actions to overcome barriers, we included both given their direct applicability to the KQ.

Initially, the KQ 2 team coded 2 articles with these barrier/facilitator codes. We compared and refined our coding approach until an acceptable level of consistency was achieved. We then divided the included articles across pairs from a smaller group of investigators (SR, AL, SH, KG) and applied our operationalized CFIR domains (context, transformational coaching intervention characteristics, team/individual characteristics, QI project/process, and patient) across barriers and facilitators. Each member of the pair reviewed the codes of the other. To ensure rigor and validity, we generated themes for barriers and facilitators by CFIR domains first individually, then within pairs and then mapped these themes to constructs within CFIR domains. We then discussed all coding in the smaller coding group until consensus across the 4 investigators in the smaller group was reached. In addition, throughout this process, we met regularly as a small group to discuss areas of discrepancy until agreement was reached. The

qualitative team use Nvivo software to support first- and second-level coding and analysis (QSR International Pty Ltd, Version 12, 2018).

RATING THE BODY OF EVIDENCE

For KQ 1, the certainty of evidence for each key question was assessed using the approach described by the Grading of Recommendations Assessment, Development and Evaluation (GRADE).[36] We limited GRADE ratings to those outcomes identified by the stakeholder and TEP as critical for decision making. This approach requires assessment of 4 domains: ROB, consistency, directness, and precision. Additional domains used when appropriate are 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 as high, moderate, or low certainty of evidence. In some cases, high, moderate, or low ratings were impossible or imprudent to make. In these situations, a grade of very low certainty of evidence was assigned.

For KQ 2, we assessed the certainty of evidence using the Confidence in the Evidence from Reviews of Qualitative Research (GRADE-CERQual) (Appendix F).[37] Given the large number of findings across a total of 15 CFIR constructs, we had our operational partners prioritize the 5 constructs most critical for decision making for application of CERQual.[37] The CERQual approach requires assessment across 4 components: methodological limitations, coherence, adequacy of data, and relevance. A subgroup of investigators with qualitative methods expertise (SR, AL, SH, KG) determined the assessment of these components and subsequently the overall assessment for each finding as a group through consensus.

PEER REVIEW

A draft version of this report was reviewed by technical experts and clinical leadership. A transcript of their comments and our responses is in Appendix G.

GLOSSARY

Refer to the glossary in Appendix H for additional terms and definitions.

RESULTS

Note that the literature flow diagrams are provided separately under the respective Key Question heading.

KEY QUESTION 1:

1a: What outcomes have been used to assess the effects of transformational coaching across practice, provider, and patient levels?

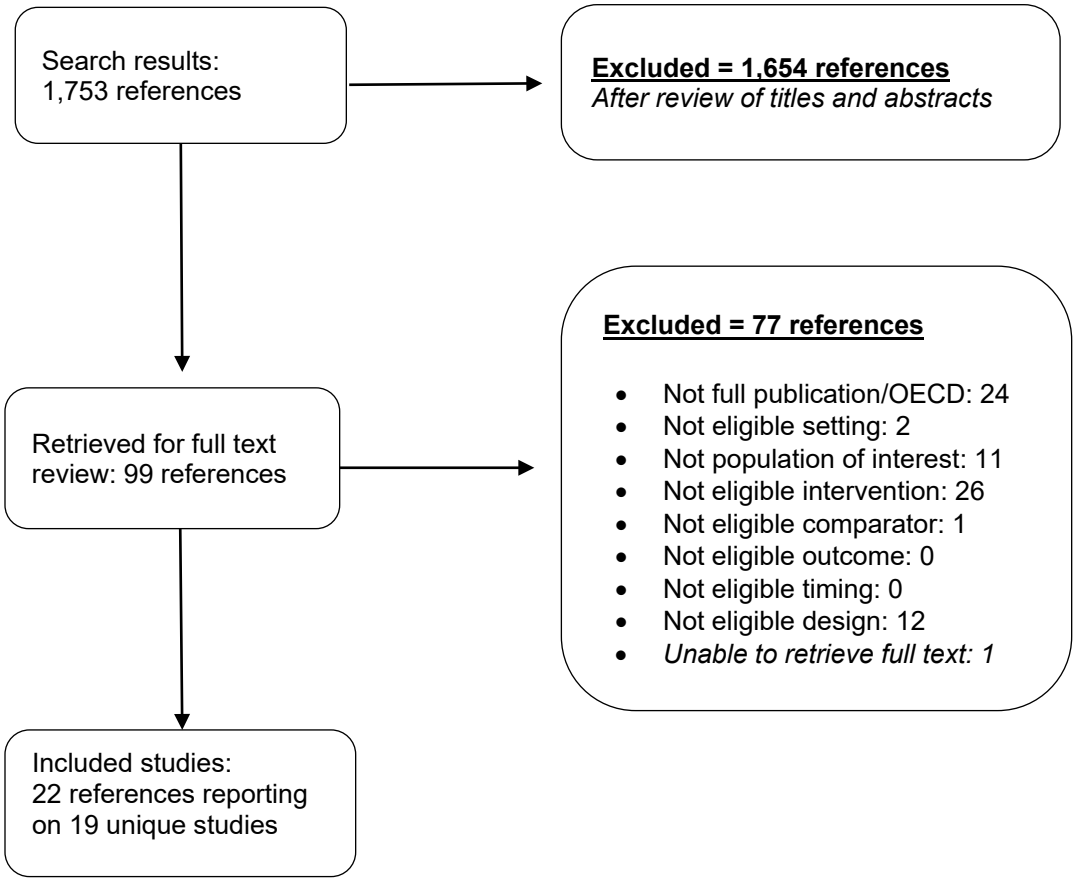
1b: What are the effects of transformational coaching for team-based health care improvement and practice change efforts on process outcomes, specifically:

- **Adoption of targeted process of care activities (*eg*, more appropriate documentation of screening)**
- **Quality improvement PROCESS goal attainment (*eg*, the number of quality improvement projects reaching completion)**
- **Team member knowledge**
- **Team member self-efficacy**

Literature Flow for KQ 1a and KQ 1b

For the KQ 1 search, we identified 2,609 articles through searches of MEDLINE® (via Ovid®), EMBASE, and CINAHL (Figure 3). An additional 8 articles were identified through reviewing bibliographies of relevant review articles for a total of 2,617 articles. After removing duplicates, there were 1,753 articles. After applying inclusion and exclusion criteria to titles and abstracts, 99 articles remained for full-text review. Of these, 19 unique studies were retained for data abstraction. All 19 unique studies were cluster randomized trials. Included studies were conducted across North America, Europe, and Australia. One study was a VA study.

Figure 3. Literature Flow Chart: KQ 1a and KQ 1b



* Search results from MEDLINE (1001), Embase (503), CINAHL (241), and identified from relevant articles (8) were combined.

Key Points

- We identified 19 cluster-randomized trials (CRTs) that addressed the effects of transformational coaching on the process outcomes of interest; all but 1 trial were conducted within the primary care setting.
- Interventions typically targeted multiple simultaneous process of care activities requiring disparate clinical behaviors (*eg*, ordering a lab test, complicated patient counseling) but which were usually linked by a common goal (*eg*, improving management and outcomes for a specific disease).
- We found that coaching probably has a beneficial effect on composite process of care outcomes (n=7 trials) and ordering of labs and vital signs (n=5), and possibly has an beneficial effect on changes in organizational process of care (n=5), appropriate documentation (n=4) and delivery of appropriate counseling (n=2). It is uncertain if coaching has an beneficial effect on the conduct of specific exams and procedures (n=4), and probably does not have an effect on prescription of diagnosis appropriate medications (n=4).

- In 2 randomized trials, coaching interventions had no clear benefit for QI process goal attainment (*ie,* QI project initiation or achieving target goals).

- No trials specifically assessed team member knowledge or self-efficacy after coaching.

Characteristics of Included Studies

Nineteen trials were included that address the effects of transformational coaching. Eleven were conducted in the United States,[18,38-47] 4 in Europe,[48-51] 3 in Canada,[52-54] and 1 in Australia.[55] All but 1 were conducted within the context of primary care or family medicine practices.[44] The labels for the transformational coach-like role included practice facilitator, practice outreach facilitation, practice coach, nurse facilitator, nurse prevention facilitator, and outreach visitor. Some interventions meeting our inclusion criteria had more than 1 individual delivering the intervention and thus did not use a single term for the interventionist.[44,47] Interventions varied in duration from 6 months to 36 months, and the coaching interventionists employed a variety of implementation strategies (see next section). In general, the number, disciplines, and roles of the interdisciplinary team members receiving the coaching intervention were not clearly described.

Transformational Coaching Activities

Across the 19 included trials, we identified 13 distinct transformational coaching activities based on commonly used implementation strategies.[56] Examples of specific transformational coaching activities mapped to Expert Recommendations for Implementing Change (ERIC) strategies[27] are shown in Table 5.

Table 5. Transformational Coaching Activities

Coach-delivered Implementation Strategy	Operationalized Definition[a]	ERIC Strategy Category	Examples from Included Studies
Baseline local need assessment (7 studies)	Collect and analyze data before the start of coaching intervention to assess local needs related to QI project	Use evaluative and iterative strategies	Performed a multimethod practice assessment, including assessment of practice communication, change and work culture, and level of implementation of the Chronic Care Model.[42]
Develop a formal implementation plan (18 studies)	Develop a formal implementation plan that includes clear goals and strategies	Use evaluative and iterative strategies	Group discussion to reflect on findings and identify priorities for improvement.[43]
Educational outreach visits (13 studies)	Coach meets with providers in their practice settings to educate about the clinical innovation	Train and educate stakeholders	Training: study staff conducted an in-person, 6-hour training with each subteam on how to use Get To Outcomes plan, implement, evaluate.[44]
Develop/distribute educational materials (14 studies)	Provide manuals, toolkits, and other supporting materials to teams	Train and educate stakeholders	Coaches introduced the concept of the Chronic Care Model and presented an evidence-based “toolkit”

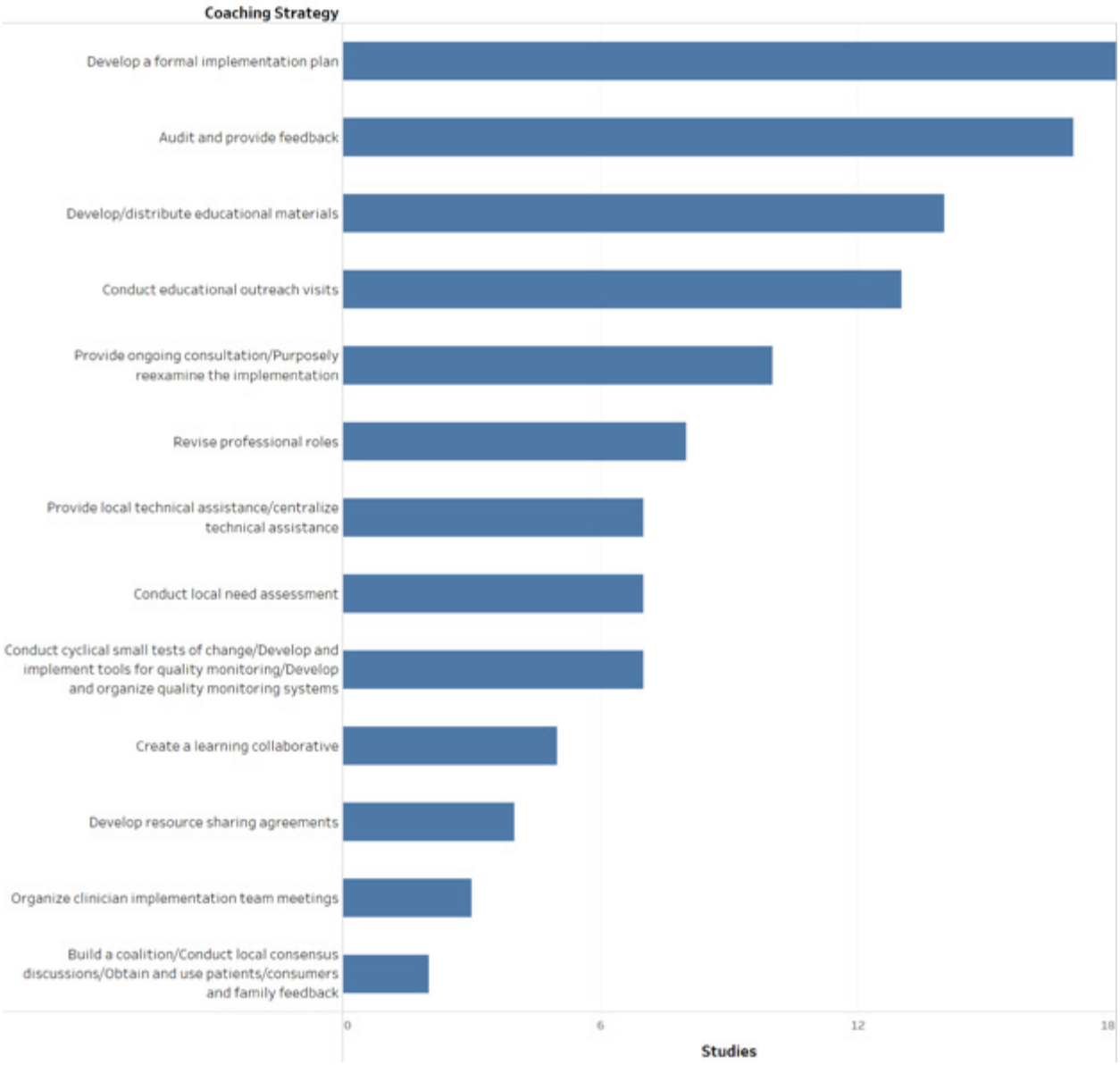
Coach-delivered Implementation Strategy	Operationalized Definition[a]	ERIC Strategy Category	Examples from Included Studies
			comprised of 5 activities to improve diabetes outcomes.[43]
Teach and support implementation/QI tools (7 studies)	Introduce and train teams on QI techniques and tools appropriate to the innovation or QI project being implemented	Use evaluative and iterative strategies	Education on "fostering a continuous QI culture."[39] Used the Chronic Care Model: the QI approach.[52]
Revise professional roles (8 studies)	Shift and revise roles among professionals who provide care, and redesign job characteristics	Support clinicians	A "lead physician" for liaising with the facilitator was identified in the practice.[53]
Technical assistance (7 studies)	Provide technical assistance (*eg*, data support) focused on QI project needs	Provide interactive assistance	MISSION-Vet service data was collected with a Computerized Patient Record System note template that was developed for each team. Data from the notes were extracted to create feedback reports.[44]
Develop resource sharing (4 studies)	Develop partnerships with organizations that have resources needed to implement the innovation	Support clinicians	Enhanced community linkage; "community resources."[52]
Create a learning collaborative[b] (5 studies)	Facilitate the formation of groups of providers or provider organizations and foster a collaborative learning environment to improve implementation of the clinical innovation	Train and educate stakeholders	The learning sessions provided an opportunity for practice members to share successes and challenges with other practices.[42]
Organize clinician team meetings (3 studies)	Develop and support team meetings to structure protected time to reflect on the implementation effort, share lessons learned, and/or support one another's learning	Develop stakeholder interrelationships	All practices were encouraged to initiate or increase routine staff meetings.[43]
Partner with local leadership (2 studies)	Create and engage a formal group of multiple levels of stakeholders (*eg*, local leadership) to provide input and advice on QI/implementation efforts and to elicit recommendations for improvements	Develop stakeholder interrelationships	Get administrative buy-in.[39] Work with opinion leaders and encourage networking.[54]
Audit and feedback[c] (17 studies)	Collect and summarize clinical performance data over a specified time period and provide it to clinicians and administrators to monitor,	Use evaluative and iterative strategies	Written feedback and practice-based discussion of clinical record audit of recording and levels of behavioral and physiological risk factors.[55]

Coach-delivered Implementation Strategy	Operationalized Definition[a]	ERIC Strategy Category	Examples from Included Studies
	evaluate, and modify provider behavior		
Ongoing consultation (10 studies)	Provide ongoing consultation to support maintenance of QI project or innovation	Train and educate stakeholders	The facilitator gradually transfers various tasks to an interested member of the team. The practices also meet without the facilitator to further customize their work.[50]

[a] Operationalized definitions were modified from the ERIC strategy taxonomy.
[b] Studies with a learning collaborative were only included if the collaborative was not longitudinal and was only a minor part of the overall coaching-like intervention.
[c] Audit and feedback are considered 2 separate strategies,[57] though in many included studies they were described together.
Abbreviations: QI=quality improvement

Within the context of coaching interventions, the 3 most commonly used coach-delivered implementation strategies were to develop a formal implementation plan (18/19), audit and provide feedback (17/19), and develop/distribute educational materials (14/19). The least-used strategies were organizing clinician team meetings (3/19) and developing stakeholder interrelationships (2/19) (Figure 4). Since the included trials were not necessarily designed as implementation studies, many do not have the degree of specificity ideally reported for implementation strategies.[58] Within each of these groups of coaching activities, there was also diversity of duration and/or intensity of the intervention, composition and training of the intervention delivery team, mode(s) of delivery for the intervention, target(s) of the intervention, and outcomes addressed. The specific implementation strategies utilized in each of the included trials are in Appendix C.

Figure 4. Coach-delivered Implementation Strategies



Detailed Findings: KQ 1a

Across the 19 included trials that evaluated effectiveness of transformational coaching, we mapped their included outcomes across practice, provider, and patient levels (Table 6). Five trials included outcomes at the practice level with measures addressing care delivery style, practice organization, culture, practice management, number of QI projects initiated, and QI objectives met.[43,44,49-51] Fifteen trials included measures at the provider level.[18,38-42,45-49,51,53-55] Measures at the provider level generally included guideline-concordant actions taken by providers during the delivery of disease specific or prevention related care delivery. Six trials created composite measures of groups of guideline-concordant actions as the outcome of interest.[18,38,42,52-54] Clinical process of care actions at the provider level were almost exclusively measured via medical record review. No trials measured team member satisfaction with coaching experience, team member knowledge, or team member self-efficacy. One provider-level

outcome measured provider confidence in ability to assess specific cardiovascular risk factors.[55] Outcomes measures at the patient level were almost exclusively medical record based assessment of clinical outcomes (*eg*, achieving target blood pressure). One study measured patient self-reported satisfaction with diabetes treatment.[48] Note that because this KQ was to map the outcomes and not evaluate effectiveness, there is no certainty of evidence assessment.

Table 6. Outcome Measures Used to Assess the Effect of Transformational Coaching by Practice, Provider, or Patient Levels

Study	Clinical Context	Outcome
Practice-level outcomes		
Dickinson, 2014[42]	Diabetes	Practice culture assessment • Perceptions of practice characteristics important to practice function and implementation of QI
Parchman, 2013[43]	Diabetes	Assessment of chronic illness care survey • Extent to which care delivered in practice was consistent with elements of Chronic Care Model
Lobo, 2002[51]	Cardiovascular preventive care	Aspects of practice organization: • Availability of instruments and materials (*eg*, medical instruments, leaflets) • Presence of separate preventive clinics (*eg*, specific to diseases) • Teamwork in practice (*eg*, holding regularly scheduled meetings) • Record-keeping (*eg*, using computerized record, systematic recording of cardiovascular disease risk factors) • Follow-up activities (*eg*, make an appointment, provide an appointment card)
Engels, 2006[50]	Primary Care	Dimensions of practice management • Accessibility and availability (*eg*, time in minutes before practice picks up phone) • Medical care (*eg*, delegation of medical technician tasks) • Infrastructure (*eg*, lab facilities in practice) • Team (*eg*, meeting time with practice assistant in minutes) • Computerization (*eg*, electronic communication with hospital) • Quality and safety (*eg*, quality assurance in the practice) Number of projects initiated Objectives met
Provider- and staff-level outcomes		
Mold, 2014[40]	Asthma	Adherence to 6 guideline recommendations: • Assessment of asthma severity • Assessment of environmental triggers • Asthma action plan • Assessment of level of control • Asthma controller medications • Asthma follow-up visits

Study	Clinical Context	Outcome
Chinman, 2017[44]	Implementation of VA MISSION-Vet program by VA HUD-VASH case managers and peer specialists	Implementation measures: • Adoption (case managers trying MISSION-VET) • Reach (patients received any Mission-VET sessions) • Dose MISSION-Vet received
Dickinson, 2019[38]	Diabetes	Process of diabetes care elements (*eg*, hemoglobin A1c measurement, nutrition counseling) • Composite Score (0-9)
Carroll, 2018[39]	Chronic kidney disease	• Avoidance of NSAIDs • Use of ACEi and ARB • Documentation of chronic kidney disease diagnosis
Harris, 2015[55]	Chronic vascular disease prevention	Assessment in medical record of: • Body mass index • Waist circumference • Systolic blood pressure • Alcohol use • Smoking status • Cholesterol • Fasting blood glucose • Absolute cardiovascular risk Self-reported frequency of assessment and confidence in above patient assessments by general practitioner
Meropol, 2014[41]	Well-child visits at age 24-30 months	• Obesity screening and counseling • Screening for lead toxicity • Fluoride varnish application
Dickinson, 2014 [42]	Diabetes	Process of diabetes care elements (*eg*, hemoglobin A1c measurement, nutrition counseling) • Composite score (0-9)
Dickinson, 2019[38]	Diabetes	Total number of self-management support activities (*eg*, collaborative goal setting, action planning around goals)
Rask, 2001[45]	Diabetes	Receipt of diabetic screening services: • HbA1c • Blood pressure • LDL cholesterol • Nephropathy Diabetic eye exam Diabetic foot exam
van Bruggen, 2008[48]	Diabetes	• Fasting blood glucose measured every 3 months • Blood pressure measured every 3 months • Bodyweight measured every 3 months • ACEi/ARB agent prescribed according to guideline
Hogg, 2008[53]	General primary prevention	• Composite index of preventive performance (# appropriate maneuvers/# inappropriate maneuvers/total # eligible maneuvers) • # appropriate maneuvers • # inappropriate maneuvers

Study	Clinical Context	Outcome
Goodwin, 2001[18]	General primary prevention	• Global up-to-date score on receipt of recommended preventive services • Screening preventive services delivery rate • Counseling preventive services delivery rate • Immunizations preventive services delivery rate
Lemelin, 2001[54]	General primary prevention	• Overall index of preventive performance (proportion eligible patients receiving appropriate maneuvers – proportion eligible patients with inappropriate maneuvers) • Proportion recommended maneuvers done • Proportion of inappropriate maneuvers done
Due, 2014[49]	Chronic obstructive pulmonary disease; diabetes	• Change in # annual chronic disease check-ups per 100 patients (EHR & self-report) • Reduction number practices with <1% annual chronic disease check-ups per 100pts • Change in # spirometry tests per 100 patients • Sign-up to data capture software • Changes in use of ICPC diagnosis coding for diabetes and COPD • Changes in use of stratification of patients with diabetes and COPD
Margolis, 2004[46]	General primary prevention	Change over time of proportion of children in each practice who received all four services (immunizations, screening for anemia, screening for lead, screening for tuberculosis)
Lobo, 2002[51]	Cardiovascular preventive care	Preventive tasks performed by the practice assistant (*eg*, blood pressure measurements taken, cardiovascular history assessment, advice provided on smoking)
Ornstein, 2004[47]	Cardiovascular preventive care	Percentage patients achieving clinical targets: Hypertension: • BP measurement in previous 12 months • Diagnosis of hypertension for 3 BP measurements >/=140/90mm Hg • BP measurement in 3 previous months in patients with hypertension • Last BP measurement <140/90 mm Hg for all patients • Last BP measurement <140/90 mm Hg for patients with hypertension Hyperlipidemia: • Cholesterol level in previous 60 months • HDL cholesterol level in previous 60 months • LDL cholesterol level in previous 12 months • Diagnosis of hyperlipidemia for LDL cholesterol level >3.37 mmol/L (>130mg/dL) • Medication for LDL cholesterol level >3.37 mmol/L (>130 mg/dL) Coronary heart disease: • Prescription for beta blocker in patients with a history of MI

Study	Clinical Context	Outcome
		• Last LDL cholesterol level <2.59 mmol/L (<100 mg/dL) • Last BP measurement <140/90 mm Hg Congestive heart failure: Prescription for ACE inhibitor for ARB Atrial fibrillation: Prescription for oral anticoagulant Diabetes mellitus: • HbA1c measurement in previous 12 months • LDL cholesterol level in previous 24 months for patients with diabetes • BP measurements in previous 3 months for patients with diabetes • Last HbA1c level <7% Last LDL cholesterol level <2.59 mmol/L (<100 mg/dL) for patients with diabetes
Patient-level outcomes		
Carroll, 2018[39]	Chronic kidney disease	• CKD progression/annualized loss of eGFR • Change in systolic blood pressure over time • All-cause mortality (only in protocol)
Liddy, 2015[52]	Cardiovascular disease	Adherence to recommended guidelines for cardiovascular disease processes of care: • Blood pressure • Lipid profile • Waistline measure • Smoking status • Glycemic levels • Kidney function • Prescription of all eligible medications • Referral to smoking cessation program
Dickinson, 2019[38]	Diabetes	• HbA1c • Systolic/diastolic pressure • Body mass index
van Bruggen, 2008[48]	Diabetes	Clinical targets: • HbA1c • Blood pressure • Cholesterol • Body mass index Diabetes Treatment Satisfaction questionnaire
Rask, 2001[45]	Diabetes	Achievement of clinical targets: • Blood pressure control • LDL control • HbA1c control
Harris, 2015[55]	Chronic vascular disease prevention	Change in risk factors under control: • Body mass index • Waist circumference • Systolic blood pressure

Study	Clinical Context	Outcome
		• Alcohol use • Smoking status • Cholesterol • Fasting blood glucose • Absolute cardiovascular disease risk

Abbreviations: ACEi/ARB=angiotensin converting enzyme inhibitor/angiotensin receptor blocking; BP=blood pressure; COPD=chronic obstructive pulmonary disease; eGFR=estimated glomerular filtration rate; HbA1c=glycated hemoglobin; ICPC=international classification of primary care; LDL=low-density lipoprotein; NSAID=nonsteroidal anti-inflammatory drug

Detailed Findings: KQ 1b

We organize findings by the 4 *a priori* identified outcomes of most importance to our stakeholders. Specifically, we reviewed the effect of transformational coaching-like interventions on: (1) adoption of targeted process of care activities, (2) QI process goal attainment (*eg*, the number of QI projects reaching completion), (3) team member self-efficacy, and (4) team member knowledge. Due to the wide range of outcomes measured for uptake of targeted process of care activities, we grouped findings for that outcome by complexity of behavior required to conduct a given process of care activity, giving preferential attention to primary outcomes and trials judged to have a low risk of bias (ROB).

Adoption of Targeted Process of Care Activities

Composite Outcomes of Multiple Clinical Processes of Care Activities

Seven trials explored the effects of transformational coaching on composite outcomes by measuring groups of guideline-concordant behaviors (Table 7).[18,38,42,46,52-54] Of these, 4 trials focused on national guidelines for general preventive care activities,[18,46,53,54] 2 focused on aspects of diabetes care,[38,42] and 1 focused on CVD management.[52] For all but 1 of these trials,[38] the process of care composite outcome was the primary outcome for the study. Two trials were found to have low ROB,[46,53] 4 unclear ROB,[18,38,52,54] and 1 high ROB.[42]

National preventive care guidelines

Of the 4 trials focused on implementation of national preventive guidelines, 2 had overlapping authorship and similar methodologic approaches to assessing the implementation of Canadian Task Force on Preventive Health Care guidelines.[53,54] The primary outcome for each was a composite index of preventive performance that factored in the conduct of desired preventive actions and commission of undesirable actions. Hogg and colleagues (2008) conducted a low ROB trial comparing 11.5 months of coaching with control among 54 fee-for-service primary care practices in Ontario, Canada.[53] Authors reported a nonsignificant mean difference of 2.0 (95% CI -3.2 to 7.3) in the number of patients with the appropriate preventative maneuver documented in the health record.

The second study by Lemelin and colleagues (2001) was an unclear ROB trial that randomized 46 health service organizations in Ontario to 18 months of coaching or usual care.[54] They found a change of mean percent patients receiving eligible preventive services from baseline to end of intervention of 31.9% to 43.2% in the intervention arm and 32.1% to 31.9% in the control arm

(between-arm difference 11.5%; p <0.001). Of note, the coaching interventions in these 2 trials used somewhat different sets of coaching implementation strategies as shown in Table 7. In addition to goal setting/action planning, audit and feedback, toolkit provision, and ongoing maintenance support used by both interventions, 1 study also employed stakeholder engagement, informatics assistance, and academic detailing.[54] The other study noted attention to role identification in addition to the common 4 strategies.[53]

The third study of preventive services implementation was a low ROB trial by Margolis and colleagues (2004) that compared a 12-month coaching intervention with an undefined control condition among 44 private pediatric and family practices in North Carolina.[46] Authors examined the conduct of 4 desired preventive processes of care for pediatric patients between 24 and 30 months of age (*ie*, anemia, lead, and tuberculosis screening, and completion of immunization schedule). At 18 months (6 months after end of intervention), the proportion of children receiving all services was 17% in the intervention practices compared with 10% in the control practices, which amounted to a ratio of change from baseline of 2.5 for intervention and 1.0 for control (with a ratio of intervention vs control at 2.4; 95% CI 0.9 to 6.5). While not significant at 18 months, by 30 months the ratio of proportional change from baseline for intervention versus control was 4.6 (95% CI 1.6 to 13.2).

The fourth study was an unclear ROB trial by Goodwin and colleagues (2001) that compared the effect of a 12-month coaching intervention to an unspecified control arm on implementation of the US Preventive Services Task Force's preventive guidelines.[18] Authors reported a significant end of intervention difference for implementation of screening, counseling, and immunization guidelines with 42.4% of 38 intervention primary practices compared with 37.2% of 39 control practices (adjusted p<0.001).

Diabetes processes of care

Of the 2 trials addressing improvements in diabetes processes of care, 1 was judged unclear ROB[38] and the other was judged high ROB for objective outcomes and unclear ROB for subjective outcomes.[42] In the first study, Dickinson and colleagues (2019) randomized 36 primary care practices to 1 of 3 implementation strategies to increase self-management support for patients with diabetes (education only; education plus access to an evidence-based interactive behavior-change technology program; or education plus program plus brief coaching intervention).[38] The total number of self-management support activities by patient chart documentation (a secondary outcome) increased from baseline to end of intervention for the coaching arm compared with the education-only control (7.68 vs 4.58; p=0.0013). A mediator analysis showed a nonsignificant difference between the slopes for coaching and education arms related to change in hemoglobin A1c (primary outcome) over time.

In the second study, Dickinson and colleagues (2014) evaluated the effects of 2 different types of coaching (based on reflective adaptive process and continuous QI approaches) compared with enhanced usual care on adherence to 9 items of care recommended by the American Diabetic Association.[42] Among 40 primary care practices (822 patients), the authors found all 3 arms improved by end of intervention; however, the coaching arm based on continuous quality improvement (CQI) arm experienced greater improvement in process of care score (3.58 to 4.91; p<0.0001) than either the reflective adaptive process (4.54 to 4.85) or the enhanced usual care arm (3.63 to 4.39; p <0.0001).

Cardiovascular disease management

The final study was an unclear ROB trial by Liddy and colleagues (2015) that was a pragmatic stepped-wedge CRT evaluating the effects of 24 months of coaching intervention on mean adherence to cardiovascular disease process of care guidelines (8 clinical indicators).[52] Across 84 primary care practices (5292 patients), authors found an absolute decrease in mean adherence of 4.2% (95% CI -5.7% to -2.6%) at Year 2.

Bottom Line

Of the 7 trials that assessed the effect of coaching interventions on composite process of care outcomes, 6 were low or unclear ROB and 1 was high ROB. Five favored the intervention (83%; 95% CI 36% to 99%). The probability of observing 83% of trials with a beneficial effect if coaching interventions are truly ineffective is p=0.22. Two of the 7 trials were low ROB, and 1 of these favored the intervention at the end of intervention time point.[53] The other low ROB study did not provide a comparison to baseline at end of intervention but did find a significant effect favoring the intervention at 18 months, which continued to increase up to 36 months.[46]

Table 7. Effects of Transformational Coaching on Composite Outcomes

Study N Unit of Randomization	Duration of Intervention Comparator	Outcome	Overall ROB	Available Data[a]	Metric[b]
Hogg, 2008[53] 54 primary care practices	11.5 months Usual Care	(Number of appropriate preventive maneuvers minus inappropriate) divided by total eligible maneuvers	Low	MD 2.0 (95% CI -3.2 to 7.3)	1
Margolis, 2004[46] 44 pediatric/family practice clinics	12 months Undefined	Proportion of children with 4 preventive maneuvers (anemia/lead/tuberculosis screening, complete immunization schedule)	Low	–	–
Lemelin, 2001[54] 46 health service organizations	18 months Usual care	(Number of appropriate preventive maneuvers minus inappropriate) divided by total eligible maneuvers	Unclear	MD 11.5 (p<0.001)	1
Goodwin, 2001[18] 77 primary care practices	12 months Undefined	Proportion of eligible prevention services received	Unclear	42.4% vs 37.2 %; p<0.01	1
Dickinson, 2019[38] 36 primary care practices	18 months Education only	Total number of diabetes self-management support activities documented[c]	Unclear	7.68 vs 4.58; p=0.0013	1
Liddy, 2015[52] 84 primary care practices	24 months Stepped wedge	Mean adherence to 8 clinical indicators for cardiovascular care	Unclear	MD -4.2% (95% CI -5.7 to -2.6); P < 0.0001	0
Dickinson, 2014[42] 40 primary care practices	12 RAP/18 CQI months[d] Enhanced usual care	Receipt of 0-9 diabetes process of care items	High	(RAP) 4.54→4.85 (CQI) 3.58→4.91 (EUC) 3.63→4.39 EUC vs RAP p=0.03 CQI vs EUC p<0.0001 CQI vs RAP p<0.001	1 (CQI only)

[a] When available data are provided, intervention is always listed before comparator.
[b] For values in metric column: 1 = beneficial effect, 0 = no effect/harmful; Values based on direction of effect without consideration of magnitude of effect or statistical significance
[c] Secondary outcome.
[d] For the 2 coaching intervention arms: reflective adaptive process–based coaching was 6 months with up to 12 months of consultation; continuous quality improvement–based coaching was 18 months.
Abbreviations: CI=confidence interval; CQI=continuous quality improvement; EUC=enhanced usual care; MD=mean difference; RAP=reflective adaptive process; ROB=risk of bias

Organizational Processes of Care

Five trials explored transformational coaching interventions aimed at improving organizational structures related to clinical processes of care,[43,44,49-51] which was a primary outcome for all but 1 study.[50] Parchman and colleagues (2013) conducted a low ROB stepped-wedge trial to examine the effect of a 12-month coaching intervention on the extent to which 40 small primary care practices delivered their diabetes care using the chronic care model.[43] This study described the most implementation strategies across this subgroup focused on organizational processes, with 10 employed by their coaching intervention (Table 8). After 12 months of a coaching intervention, they found significant within-group improvement of adherence to chronic care model principles as measured by the chronic illness care survey at the end of the intervention (mean difference 0.75; 95% CI 0.09 to 1.40), but the between-group effect was not significant.

Lobo and colleagues (2002) conducted a low ROB trial testing the ability of a 21-month coaching intervention to improve the organizational deficiency score of adherence to 6 aspects of preventive cardiovascular care (*eg*, teamwork in the practice, availability of instruments and materials) across 124 primary care practices in the Netherlands.[51] Compared to a "no stimuli" control arm, the intervention arm had a significantly greater reduction in all organizational deficiency scores ($p<0.001$).

The other 3 trials were at unclear ROB. One by Engels and colleagues (2006) studied the effect of a 12-month intervention using a continuous QI framework on practice management as a secondary outcome.[50] There were no significant differences between 26 interventions and 23 usual care control primary care practices on 20 dimensions of practice management, though the direction of effect favored intervention in 12 of the 20 dimensions. The second trial at unclear ROB was conducted in Denmark by Due and colleagues (2014) using a stepped-wedge design to study the effect of coaching on the implementation of disease management programs for chronic obstructive pulmonary disease and type 2 diabetes mellitus. Authors found no difference in the change in annual chronic disease check-ups per 100 patients (primary outcome).[49] The third trial, from Chinman and colleagues (2017), was a VA-based CRT that measured the impact of the Getting to Outcomes (GTO) strategy for implementing an evidence-based practice, in this case the MISSION-Vet treatment model for Veterans with a history of homelessness and co-occurring substance use disorder.[44] The unit of randomization was the Department of Housing and Urban Development–Veterans Affairs Supportive Housing (HUD-VASH) subteam. While not delivered by a single person or coach, the components of the GTO intervention met our criteria for inclusion collectively and used a total of 6 implementation strategies. Because this was a hybrid type III study, the relevant primary outcomes were implementation outcomes of adoption and reach. Authors found a significant improvement in reach (*ie*, the percentage who received any MISSION-VET sessions) from 0% to 7% in the implementation arm compared with the control arm 0% ($p<0.05$), and adoption (*ie*, the percentage of case managers trying MISSION-VET) from 0% to 68% versus 0% to 0% ($p<0.05$).

Bottom Line

Of the 5 trials that assessed the effect of coaching on organizational process of care outcomes, 4 favored the interventions (80%; 95% CI 28% to 99%; $p>0.99$). If we consider the study by Engels and colleagues to favor no effect, this drops to 3 of 5 or 60% (95% CI 15% to 95%).[50] Both low ROB trials favored the coaching intervention.

Table 8. Effects of Transformational Coaching on Organizational Processes of Care

Study N Unit of Randomization	Duration of Intervention Comparator	Outcome (Scale Details)	Overall ROB	Available Data	Metric
Parchman, 2013[43] 40 primary care practices	12 months Stepped wedge	Mean adherence to chronic care model principles (assessment of chronic illness care survey; 0-11 on each of 6 subscales)	Low	MD 0.75 (95% CI 0.09 to 1.40; p=0.02)	1
Lobo, 2002[51] 124 primary care practices	21 months Usual care	Change in deficiency score across 6 aspects of practice organization (*ie*, availability of instruments/materials, teamwork in practice)	Low	Favors coaching for all 6 aspects; p<0.001	1
Engels, 2006[50] 49 primary care practices	12 months Usual care	20 dimensions of practice management[a]	Unclear	All 20 dimensions of practice management nonsignificant, though direction favors intervention in 12 dimensions	0/1
Due, 2014[49] 189 primary care practices	9 months Stepped wedge	Change in annual chronic disease check-ups per 100 patients	Unclear	Median (IQR): Coaching 0.5 (0.0 to 1.9) Delayed 0.5 (0.0 to 1.3) p=0.1639	0
Chinman, 2017[44] 69 housing services subteam	12-23 months Usual implementation	Adoption (% case manager implementing any MISSION-Vet) Reach (% Veterans receiving any MISSION-Vet sessions)	Unclear	Coaching vs comparator: Adoption 0→68% vs 0→0%; p<0.05 Reach 0→7% vs 0→0%; p<0.05	1

[a] Secondary outcome.

Abbreviations: CI=confidence interval; MD=mean difference; IQR=interquartile range

Appropriate Documentation

Four trials evaluated the effect of transformational coaching on appropriate medical record documentation (Table 9).[39,40,47,55] The study by Mold and colleagues (2014), judged to have unclear ROB, examined implementation of 6 key guideline-concordant asthma recommendations in 45 primary care practices randomized to 1 of 4 six-month interventions: transformational coaching, a local learning collaborative, coaching plus collaborative, and enhanced usual care (*eg*, performance feedback, academic detailing, guideline summaries, and a toolkit).[40] Five of 6 guidelines measured were related to documentation (*ie*, asthma severity, level of control assessment, triggers, follow-up visit plan, and action plan). There was no difference between the enhanced usual care and transformational coaching arms for documentation of asthma triggers, follow-up visit plan, or action plan (p=0.58, 0.83, and 0.24, respectively; no odds ratios given), though in a matched-pair analysis within the transformational coaching arm, assessment of asthma triggers was significantly improved from 42% preintervention to 57% postintervention. Both assessment of level of asthma control (n=937) and asthma severity (n=977) were found to have significant preintervention-to-postintervention increases when compared to control, with odds ratios (ORs) of 2.3 (95% CI 1.5 to 3.5) and 2.5 (95% CI 1.7 to 3.8), respectively.

The other 3 trials that assessed documentation after a coaching intervention were judged to have high ROB.[39,47,55] One by Harris and colleagues (2015) measured documentation of cardiovascular disease risk, alcohol use, and smoking assessment across 32 practices before and after a 6-month practice facilitation intervention compared to an undefined control.[55] All 3 findings were significant, with ORs ranging from 1.50 (95% CI 1.04 to 2.18) to 2.24 (95% CI 1.17 to 4.29). Ornstein and colleagues (2004) studied a 24-month multi-method QI intervention compared to enhanced usual care (*ie,* quarterly practice performance reports) on 21 quality indicators for primary and secondary prevention of cardiovascular disease across 23 US primary care practices.[47] Two of the 21 performance targets for this trial were related to documentation (*ie*, documented diagnosis of hypertension for 3 blood pressure recordings >140/90; diagnosis of hyperlipidemia for low-density lipoprotein >130*).* Authors found mixed results with an adjusted difference in improvement of percent-eligible patients at target of 15.7 (95% CI 5.2 to 26.3) for hypertension diagnosis and 11.3 (95% CI -5.9 to 28.5) for hyperlipidemia. The third high ROB study, by Carroll and colleagues (2018) randomized 42 primary care practices to either electronic health record (EHR)-based clinical decision support (CDS) alone or CDS plus transformational coaching to support implementation of guideline-concordant care of patients with chronic kidney disease (CKD).[39] Documentation of CKD diagnosis was a secondary outcome and there was no significant difference between arms.

Bottom Line

Of the 4 transformational coaching models that assessed the effect on appropriate documentation, 3 included outcomes that favored the interventions (75%; 95% CI 0.19 to 99%; p=0.625). There were no low ROB trials in this subgroup.

Table 9. Effects of Transformational Coaching on Appropriate Documentation

Study N Unit of Randomization	Duration of Intervention Comparator	Outcome	Overall ROB	Available Data	Metric
Mold, 2014[40] 45 primary care practices	6 months Enhanced usual care	5 of 6 asthma guideline targets (*ie*, asthma severity, level of control assessment, triggers, follow-up visit plan, and action plan)	Unclear	Nonsignificant for triggers, follow up, action plan Level control OR 2.3 (95% CI 1.5 to 3.5) Severity OR 2.5 (95% CI 1.7 to 3.8)	–/1
Harris, 2015[55] 32 primary care practices	6 months Undefined	Assessment of cardiovascular risk, alcohol use, smoking status	High	CVD: OR 1.50 (95% CI 1.04 to 2.18) Alcohol use: OR 2.19 (95% CI 1.04 to 4.64) Smoking: OR 2.24 (95% CI 1.17 to 4.29)	1
Ornstein, 2004[47] 23 primary care practices	24 months Enhanced usual care	2 of 21 performance targets related to primary and secondary cardiovascular prevention (diagnosis of HTN for SBP >140/90 x 3; hyperlipidemia for LDL >130)	High	Adjusted difference in improvement (HTN) 15.7 (95% CI 5.2 to 26.3); p<0.001 (HL) 11.3 (-5.9 to 28.5); p>0.2	1
Carroll, 2018[39] 42 primary care practices	36 months EHR Clinical decision support	CKD diagnosis on problem list[a]	High	Adjusted model coefficient: -0.04 (SE 0.06); p=0.46	0

[a] Secondary outcome.

Abbreviations: CKD=chronic kidney disease; CI=confidence interval; CVD=cardiovascular disease; LDL=low-density lipoprotein; HL=hyperlipidemia; HTN=hypertension; OR=odds ratio; SE=standard error; SBP=systolic blood pressure

Appropriate Medication Prescription

Four trials measured the effect of transformational coaching on the prescription of disease-appropriate medications (Table 10).[39,40,47,48] The unclear ROB study by Mold and colleagues (2014) also measured the provision of asthma controlled medications; however, there was no difference between the enhanced usual care and transformational coaching arms (p=0.24) or within the transformational coaching arm in a matched-pair analysis.[40]

A study judged to have unclear ROB by van Bruggen and colleagues (2008) employed a 12-month coaching intervention across 30 primary practices and found no difference in prescription of ACE-i or ARB among patients with diabetes (p=0.6).[48]

The previously described high ROB pragmatic CRT by Carroll and colleagues (2018)[39] found that neither of the relevant secondary outcomes—use of ACE-i/ARB and avoidance of nonsteroidal anti-inflammatory drugs—was significantly improved in the coaching arm compared with the comparator.

The high ROB study by Ornstein and colleagues (2004) measured 4 of 21 performance targets related to medication prescription for the following conditions: coronary heart disease (*ie*, beta-blockers, cholesterol medication), congestive heart failure (*ie*, angiotensin converting enzyme inhibitors [ACE-i], angiotensin-receptor blockers [ARB]), and atrial fibrillation (*ie*, anticoagulants).[47] Authors found no significant effect across these performance targets measured by percent-adjusted difference in improvement ranging from -7.1 to 6.5 (all p values >0.17).

Bottom Line

Of the 3 studies that allowed assessment of the direction of effect on appropriate medication prescription, 2 included at least 1 outcome that favored the coaching interventions (66%; 95% CI 9% to 99%; p >0.99). There were no low ROB trials in this subgroup, and neither of the unclear ROB trials showed a statistically significant difference.

Table 10. Effects of Transformational Coaching on Appropriate Medication Prescription

Study N Unit of Randomization	Duration of Intervention Comparator	Outcome	Overall ROB	Available Data	Metric
Mold, 2014[40] 45 primary care practices	6 months Enhanced usual care	1 of 6 asthma guideline targets (*ie*, asthma controller medication)	Unclear	Nonsignificant	–
Van Bruggen, 2008[48] 30 primary care practices	12 months Usual care	ACEi/ARB for type 2 diabetes[a]	Unclear	67.4% vs 65.1%; nonsignificant; p=0.6	0
Ornstein, 2004[47] 23 primary care practices	24 months Enhanced usual care	4 of 21 performance targets related to primary and secondary cardiovascular prevention (beta-blocker and cholesterol medication for CAD, ACEi/ARB for CHF, anticoagulation for AF)	High	Adjusted difference in improvement: Beta-blocker: 6.5 (95% CI -17.1 to 30.0; p>0.2) Cholesterol: 1.6 (95% CI -12.4 to 15.5; p>0.2) ACEi/ARB: 2.0 (95% CI -8.2 to 12.3; p>0.2) Anticoagulation: -7.1 (95% CI -17.7 to 3.6; p=0.171)	1/0
Carroll, 2018[39] 42 primary care practices	36 months EHR clinical decision support	Use of ACEi/ARB and avoidance of NSAIDs among patients with chronic kidney disease[a]	High	Adjusted model coefficient (ITT) NSAID: 0.42 (SE 0.34); p=0.22 ACEi/ARB: -0.52 (SE 0.47); p=0.27	1/0

[a] Secondary outcome.

Abbreviations: ACEi/ARB=angiotensin converting enzyme inhibitor/angiotensin-receptor blocker; AF=atrial fibrillation; CAD=coronary artery disease; CHF=congestive heart failure; CI=confidence interval; NSAID=nonsteroidal anti-inflammatory drug; SE=standard error

Appropriate Counseling

We identified 2 low ROB trials that addressed the effect of transformational coaching on providing appropriate counseling (Table 11).[41,51] Meropol and colleagues (2014) examined the effect of a 6-month coaching intervention on improving 3 prevention measures, 1 of which was pediatric obesity screening and counseling for 35 primary care practices.[41] Practices were randomized to either early-phase or late-phase (control) of the intervention. For obesity screening/counseling, the coaching intervention was associated with large improvements in all practices; obesity screening/counseling rose from 3.5% to 82.8.% in early-phase and from 6.3% to 12.2% in late-phase practices ($p<0.001$) at 4 months (before the late phase received the intervention) as measured by well-child visit chart reviews.

Lobo and colleagues (2002) tested the ability of a 21-month coaching intervention in 124 primary care practices in the Netherlands to improve the organizational deficiency score of preventive cardiovascular care. One subcomponent of the primary outcome was percent of practices with the practice assistant giving advice on diet, smoking, weight loss, exercise, and alcohol use.[51] For these counseling on these 6 aspects of preventive cardiovascular care, the intervention groups showed a range of absolute increase in percent adherence from 24 to 34 from baseline compared with 3 to 10 for the comparator ($p <0.05$).

Bottom Line

Both of the low ROB trials that assessed the effect of coaching on counseling provision favored the interventions (100%; 95% CI 16 to 100). For 1 study, this outcome was a subcomponent of the primary outcome.[51]

Table 11. Effects of Transformational Coaching on Appropriate Counseling

Study N Unit of Randomization	Duration of Intervention Comparator	Outcome	Overall ROB	Available Data	Metric
Meropol, 2014[41] 31 pediatric practices	6 months Stepped wedge	Pediatric obesity screening and counseling (pre/post %)	Low	Coaching: 3.5/82.8 (95 % CI 76.1 to 87.9) Comparator: 6.3/12.2 (95% CI 8.2 to 17.8) p<0.001	1
Lobo, 2002[51] 124 primary care practices	21 months Usual care	Advice given by practice assistant on diet, smoking, weight loss, exercise, alcohol (change in pre/post %)	Low	Coaching: 24-36 Comparator: 3-10 All p<0.05	1

Abbreviations: CI=confidence interval

Appropriate Provider Exams and Procedures

We identified 4 trials that assessed the effect of transformational coaching on appropriate provider exams and procedures (Table 12).[41,49,55] The low ROB stepped-wedge study by Meropol and colleagues (2014) noted previously also examined the effect of its 6-month coaching intervention on improvement of fluoride application.[41] The early-phase intervention had improvements from 0.01% to 89.1% compared with the late-phase control at 0.01% to 4.4% at 4 months (before the late phase started the intervention).

Rask and colleagues (2001) conducted an unclear ROB trial to test the ability of a 12-month coaching intervention to increase the rate at which diabetes patients receive guideline-concordant preventive services including foot and eye exams.[45] The coaching intervention took place in 4 community-based primary care clinics, and practices were randomized to either a multifaceted coaching intervention or a feedback-only comparator. Following the coaching intervention, there were statistically significant increases in the documentation of foot examinations ($p< 0.001$) but not eye exams in the multifaceted intervention groups.

Due and colleagues (2014) conducted a stepped-wedged trial at unclear ROB to study the effect of coaching on the implementation of disease management programs for chronic obstructive pulmonary disease and type 2 diabetes mellitus and found no significant differences in the use of spirometry per 100 patients ($p=0.0835$).[49]

Last, Harris and colleagues (2015) conducted a high ROB CRT to evaluate the effect of a coaching intervention on improving implementation of guideline-concordant care for chronic vascular disease.[55] The coaching intervention took place in 32 primary care practices in Australia and lasted 6 months. For the procedure of measuring waist circumference, risk recording improved in the intervention group (OR 2.52; 95% CI 1.30 to 4.91) but not in the control group.

Bottom Line

Of the 4 trials that assessed the effect of coaching on provision of appropriate exams or procedures, 3 included outcomes that favored the interventions (75%; 95% CI 19% to 99%). Both negative findings in this sensitivity analysis were from secondary outcomes.

Table 12. Effects of Transformational Coaching on Provider Exams and Procedures

Study N Unit of Randomization	Duration of Intervention Comparator	Outcome	Overall ROB	Available Data	Metric
Meropol, 2014[41] 30 pediatric practices	6 months Stepped wedge	Application of fluoride during well-child visits aged12-35 months (pre/post%)	Low	Coaching: 0.1/89.1 Comparator: 0.1/4.4 p<0.001	1
Due, 2014[49] 189 primary care practices	9 months Stepped wedge	Spirometry per 100 patients[a]	Unclear	Median (IQR): Coaching 0.6 (0.2 to1.2) Delayed 0.5 (0.1 to 0.8) p=0.0835	0
Rask, 2001[45] 4 primary care clinics	12 months Enhanced usual care	Diabetic eye/foot exam (pre/post %)[b]	Unclear	Eye: Coaching: 11/13 Comparator: 22/13 Foot: Coaching: 5/32 Comparator: 33/29 Both nonsignificant	0/1
Harris, 2015[55] 32 primary care practices	6 months Undefined	Waist circumference	High	OR 2.52 (95% CI 1.30 to 4.91)	1

[a] Definite secondary outcome.
[b] Possible secondary outcome.
Abbreviations: CI=confidence interval; IQR=interquartile range; OR=odds ratio

Ordering Laboratory Tests and Vital Signs

Five trials explored transformational coaching interventions aimed at improving the ordering of laboratory tests and assessment of vital signs (Table 13).[41,45,47,48,55] The third main outcome from the low ROB Meropol (2014) study was successful lead screening.[41] For this outcome, the coaching intervention was associated with improvements in lead screening in the first 4 months (*ie*, early-phase practices receiving the intervention), with screening rising from 62.2% to 86.3%; however, screening fell in late-phase practices (*ie*, delayed intervention) from 77.8% to 70.9% ($p<0.001$).

The previously described study by Rask (2001), evaluated as unclear ROB, tested the ability of a 12-month coaching intervention to increase the rate at which diabetes patients receive guideline-concordant preventive services including glycosylated hemoglobin (HbA1c), low-density lipoprotein (LDL) cholesterol, blood pressure, and nephropathy screening.[45] The multifaceted intervention increased the odds of receiving all 4 screening services compared to the control groups, but only the increase in HbA1c monitoring was statistically significant (OR 1.70; 95% CI, 1.08 to 2.68).

The trial by van Bruggen and colleagues (2008) was an unclear ROB CRT to assess the effects of a coaching intervention on the implementation of a locally adapted type 2 diabetes practice guideline in the Netherlands.[48] The coaching intervention lasted 12 months, and the outcomes of interest (nonprimary outcomes) were every-3-month measurement of fasting blood glucose, blood pressure, and body weight. The coaching intervention arm had significantly higher levels of meeting these targets across all 3 outcomes compared with control in both unadjusted and adjusted analyses: 87.8% versus 68.6% for fasting blood glucose every 3 months ($p<0.001$); blood pressure every 3 months 82.5% versus 65.4% ($p<0.01$); and body weight every 3 months 82.5% versus 65.4% ($p<0.001$).

Two high ROB trials also addressed this type of process of care outcome. First, Ornstein and colleagues (2004) found no significant effect on adjusted difference in improvement of percent-eligible patients for any of the following 8 performance targets: cholesterol level in last 60 months, high-density lipoprotein level in the last 60 months, LDL cholesterol level in the previous 12 months, HbA1c in the last 12 months, LDL in the previous 24 months, blood pressure in last 12 months, or blood pressure in last 3 months. However, 5 of the 8 outcomes favored the intervention with wide confidence intervals. Finally, Harris and colleagues (2015) also evaluated the effect of coaching on improving implementation of guideline-concordant care for chronic vascular disease[55] including body mass index, blood pressure, and lipids/fasting blood glucose. All reported odds ratios favored the intervention but were not statistically significant.

Bottom Line

Of the 5 trials that assessed the effect of coaching on ordering of labs or vitals, all included at least some outcomes that favored the interventions (100%; 95% CI 48% to 100%; $p=0.0625$). In a sensitivity analysis in which 2 trials were considered to have no evidence of beneficial effect, only 3 of 5, or 60% (95% CI 15% to 95%), favored coaching intervention.[45,47]

Table 13. Effects of Transformational Coaching on Ordering Lab Tests and Vital Signs

Study N Unit of Randomization	Duration of Intervention Comparator	Outcome	Overall ROB	Available Data	Metric
Meropol, 2014[41] 31 pediatric practices	6 months Stepped wedge	Lead screening (pre/post %)	Low	Coaching: 62.2/86.3 (95% CI 77.4 to 92.0) Comparator: 77.8/70.9 (95% CI 56.8 to 81.9)[a] p<0.001	1
Rask, 2001[45] 4 primary care clinics	12 months Enhanced usual care	Screening for glycosylated hemoglobin (HbA1c), low-density lipoprotein (LDL), blood pressure, and nephropathy (4 of 6 targets; pre/post%)	Unclear	HbA1c: OR 1.70 (95% CI 1.08 to 2.68) LDL: 68/71 vs 63/64; nonsignificant BP: 80/95 vs 74/92; nonsignificant Nephropathy: 49/44 vs 58/43; nonsignificant	1/0
van Bruggen, 2008[48] 30 primary care practices	12 months Usual Care	Measurement of fasting blood glucose, weight, blood pressure every 3 months (post %)	Unclear	Blood glucose: 87.8 vs 68.6; p<0.001 Weight: 82.5 vs 65.4; p<0.01 BP: 78.9 vs 48.5; p<0.001	1
Ornstein, 2004[47] 23 primary care practices	24 months Enhanced usual care	8 of 21 performance targets related to primary and secondary cardiovascular prevention (cholesterol level in last 60 months, HDL level in last 60 months, LDL level in previous 12 months (CHD), a1c in last 12 months (DM), LDL cholesterol level in previous 24 months, BP in last 12 months, BP in last 3 months (HTN/DM))	High	Adjusted difference in improvement Cholesterol: 0.2 (95% CI -12.0 to 12.4) HbA1c: 5.8 (95% CI -10.0 to 21.6) BP: 3.2 (-4.2 to 10.7) BP (HTN): 6.7 (95% CI -1.0 to 14.4) BP (DM): 5.0 (95% CI -4.6 to 14.7) HDL: -1.9 (95% CI -8.4 to 12.2) LDL (CHD): -11.0 (95% CI -23.0 to 1.0) LDL (DM): -1.9 (95% CI -13.8 to 9.9)	1/0
Harris, 2015[55] 32 primary care practices	6 months Undefined	Measurement of BMI, blood pressure, cholesterol	High	BMI: OR 1.28 (95% CI 0.87, 1.88) BP: OR 1.12 (95% CI 0.79, 1.58) Cholesterol: OR 1.29 (95% CI 0.88, 1.91)	1

[a] Results are from the 4-month assessment with early-phase as coaching compared with late-phase coaching intervention as the comparator.
Abbreviations: BMI=body mass index; BP=blood pressure; CHD=coronary heart disease; CI=confidence interval; DM=diabetes mellitus; HbA1c= glycosylated hemoglobin; HDL=high-density lipoprotein; HTN=hypertension; LDL=low-density lipoprotein

QI Process Goal Attainment

We identified 2 trials that addressed the effect of transformational coaching on goal attainment. The first, by Engels and colleagues (2006), was a CRT at unclear ROB studying the effect of a 12-month continuous QI-based intervention on practice management in 49 primary care practices in the Netherlands.[50] Compared with usual care (*ie*, feedback and suggestions from a standard practice management assessment required for accreditation), the intervention arm initiated more QI projects during the intervention, with a mean of 3.9 QI projects per practice versus 2.6 ($p<0.001$). As a secondary outcome, intervention practices were more likely to meet their self-defined objectives for 80% of their projects than were usual care practices (80% vs 69%; $p<0.001$).

The second study, by Ornstein and colleagues (2004), was a high ROB CRT evaluating the effect of a 24-month multi-method QI intervention compared with enhanced usual care (*ie*, quarterly practice performance reports) on 21 quality indicators for primary and secondary prevention of cardiovascular disease (CVD) across 23 US primary care practices.[47] Of note, the intervention in this study was delivered by more than 1 person. For the primary practice-level outcome, authors found that there was no significant difference between the intervention and control practices in the percentage of mean indicators at or above target ($p>0.2$). Both arms had a significant within-group increase by 24 months, with the intervention arm increasing from 11.3% to 33.7% ($p=0.02$) and the control group from 6.3% to 22.7% ($p=0.027$).

Bottom Line

There were mixed results on the effect of transformational coaching interventions on QI process goal attainment across only 2 relevant studies. The 1 unclear ROB study with 49 sites found a significant increase in the number of QI projects per practice in the intervention versus the comparator arms (primary outcome).[50]

Team Member Knowledge

No trials addressed the effect of transformational coaching or similar roles on team member knowledge.

Team Member Self-efficacy

While we identified no studies that directly addressed self-efficacy of team members related to the practice of QI methods or skills related to a specific QI project after interaction with a transformational coach, the high ROB study by Harris and colleagues (2015) addressed a similar construct as a secondary outcome.[55] Authors evaluated confidence in the ability to assess 6 patient lifestyle behaviors important for prevention of chronic vascular disease: smoking status, nutrition, risky drinking, physical activity, readiness to change, and absolute risk for CVD. The study measured these areas of self-confidence among 97 primary care providers across 32 practices before and after a 6-month practice facilitation intervention compared to an undefined control. Only 2 areas showed significant improvement among intervention providers compared to control: assessment of a patient's readiness to change and absolute CVD risk. The percentage of providers reporting being very confident (5 on a 5-point Likert scale) increased by 14.3% on readiness to change for intervention compared with a decrease of 9.8% in the control group

(p=0.04), and +16.0% for absolute CVD risk for the intervention compared with -7.3% for the control group (p=0.03).

Bottom Line

No trials directly addressed team member self-efficacy. One high ROB trial found statistically significant improvement in provider confidence in assessment of 2 of 6 CVD lifestyle behaviors post-intervention.

Quality of Evidence for Key Question 1b Studies

For the 19 CRTs, the ROB was judged to be low for 6 studies,[41,43,46,50,51,53] unclear for 9 studies,[18,38,40,44,45,48,49,52,54] and high for 4 studies.[39,42,47,55] Patterns that led to higher ROB included differences in baseline patient (n=3)[39,42,45] and practice characteristics (n=3),[46,54,55] attrition/incomplete outcome assessment (n=4),[39,42,47,55] detection bias for patient-reported outcomes (n=2),[49,55] protection against contamination (n=2),[44,49] and missing information about statistical compensation for effect of cluster randomization (n=6).[38,40,45,49,53,54] Multiple studies were missing clear details about both practice- and patient-level characteristics. In addition, multiple studies did not include enough detail about the randomization mechanism and allocation concealment to fully determine the level of ROB. Risk of bias ratings are shown for each study in Figure 5 and across all studies in Figure 6.

Figure 5. Risk of Bias Assessment for Included Studies in KQ 1b

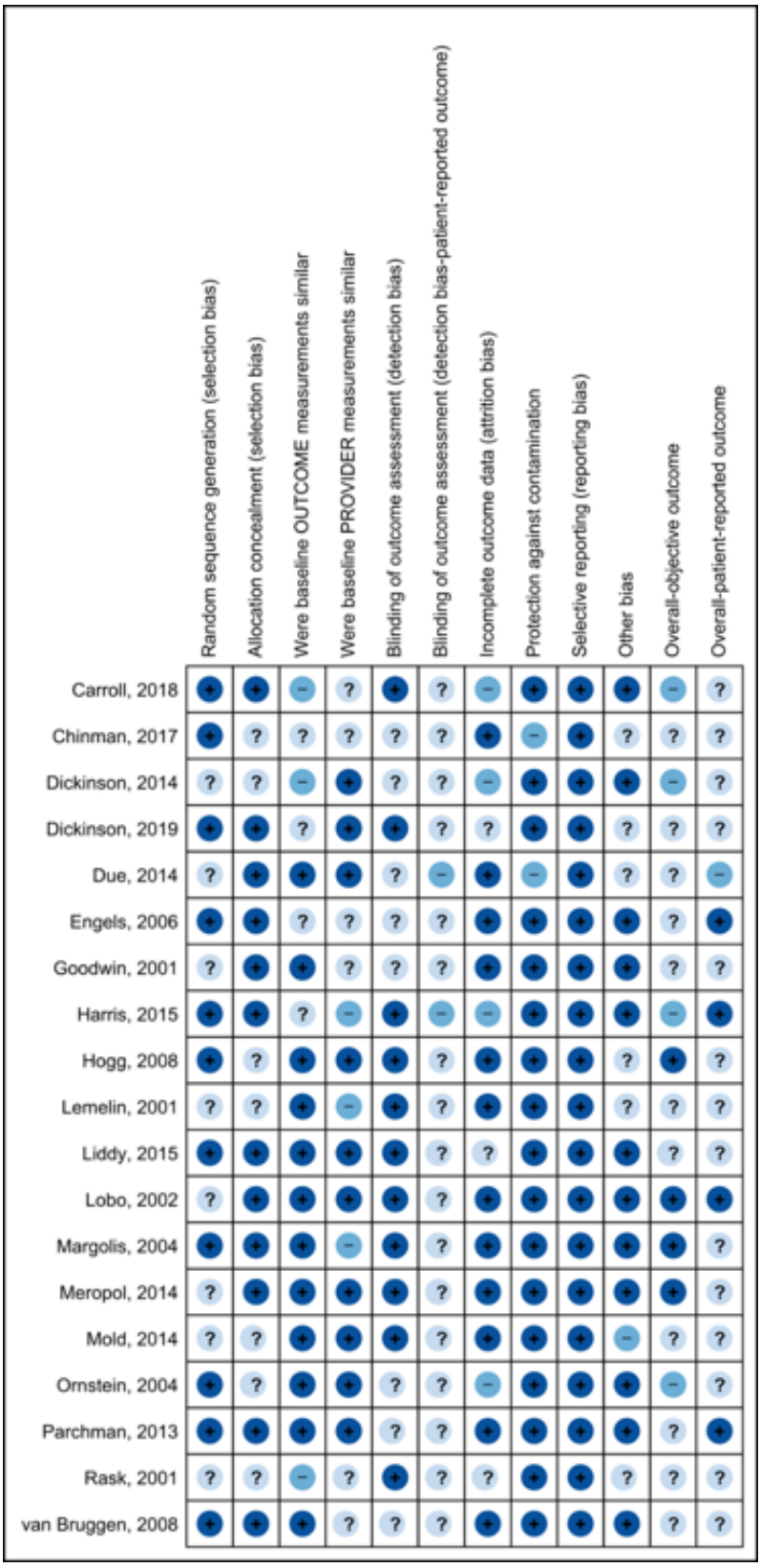
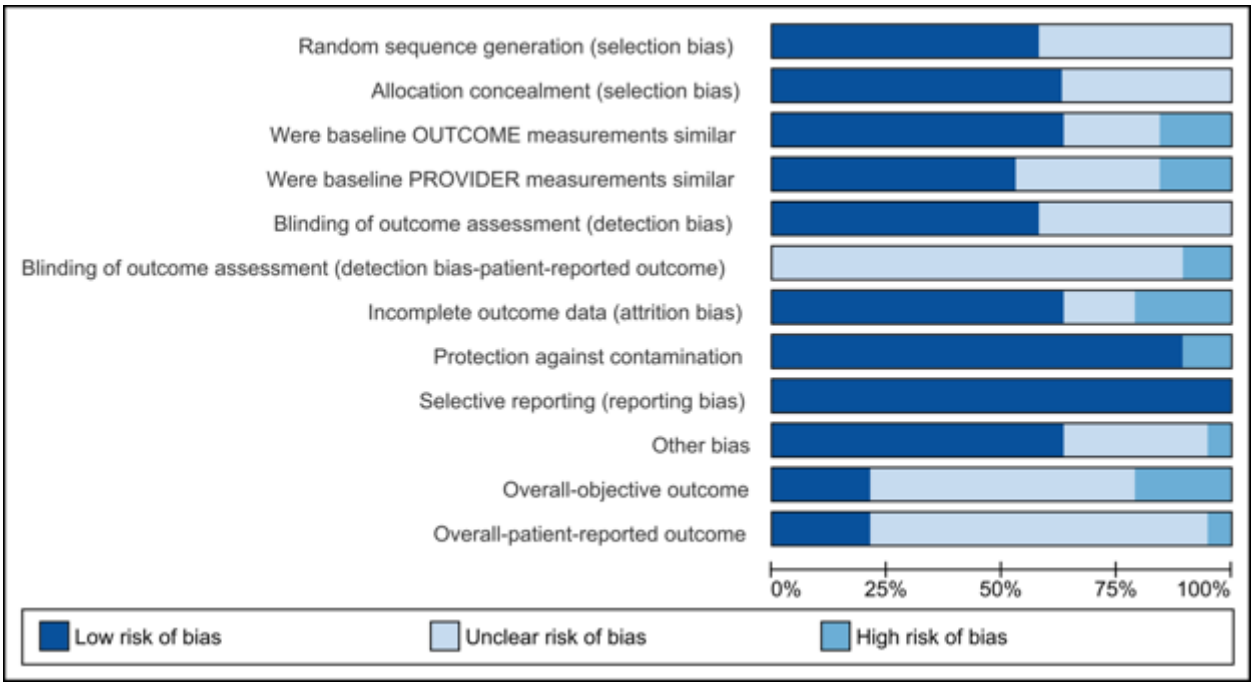


Figure 6. Risk of Bias Assessment Across Included Studies (n=19) in KQ 1b



Certainty of Evidence for Key Question 1b

The certainty of evidence as determined through assessment of GRADE criteria for the effect of transformational coaching is shown in Table 14. Note that there is no certainty of evidence evaluation for KQ 1a because it mapped outcomes rather than determined effect.

Table 14. Certainty of Evidence for KQ 1b

Outcome	Number of Studies (N)	Range of Effects	Certainty of Evidence (Rationale)
Adoption of targeted process of care activities			
Composite process of care outcomes	7 randomized trials (381 practices and health service organizations)	5 of 7 trials (83%; 95% CI 36% to 99%) with at least 1 outcome favoring the intervention; 4 trials with statistically significant findings	**Low certainty that coaching probably has a beneficial effect on composite process of care outcomes** (rated down for serious risk of bias and imprecision)
Organizational processes of care	5 randomized trials (471 practices)	4 of 5 trials (80%; 95% CI 28% to 99%) with at least 1 outcome favoring the intervention; 3 trials with statistically significant findings	**Very low certainty that coaching possibly has a beneficial effect on organizational processes of care** (rated down for serious risk of bias, inconsistency, indirectness and imprecision)
Appropriate documentation	4 randomized trials[b] (142 practices)	3 of 4 trials (75%; 95% CI 19% to 99%) with at least 1 outcome favoring the intervention; 3 trials with	**Very low certainty that coaching possibly has a beneficial effect on appropriate documentation**

Outcome	Number of Studies (N)	Range of Effects	Certainty of Evidence (Rationale)
		statistically significant findings	(rated down for very serious risk of bias and serious inconsistency)
Appropriate medication prescription	4 randomized trials[b] (140 practices)	2 of 3 trials (66%; 95% CI 9% to 99%) with at least 1 outcome favoring the intervention; none statistically significant	**Low certainty that coaching probably does not have a beneficial effect on appropriate medication prescription** (rated down for serious risk of bias and serious imprecision)
Appropriate counseling	2 randomized trials (155 practices)	2 of 2 trials (100%; 95% CI 16% to 100%); both statistically significant	**Low certainty that coaching possibly has a beneficial effect on appropriate counseling** (rated down for serious indirectness and imprecision)
Appropriate provider exams and procedures	4 randomized trials (255 practices)	3 of 4 trials (75%; 95% CI 19% to 99%) with at least 1 outcome favoring the intervention; 2 trials with statistically significant findings	**Very low certainty of uncertain effect of coaching on improvement of provider exams/procedures** (rated down for serious risk of bias, inconsistency, and imprecision)
Ordering of lab tests and vital signs	5 randomized trials (120 practices)	5 of 5 trials (100%; 95% CI 45% to 100%); 4 trials with statistically significant findings	**Very low certainty that coaching probably has a beneficial effect on ordering of labs/vitals** (rated down for serious risk of bias, inconsistency, and very serious imprecision)
QI process goal attainment (eg, the number of QI projects reaching completion)			
Mean # of QI projects initiated	1 randomized trial (49 practices)	3.9 QI projects per practice (intervention) vs 2.6 (comparator); p<0.001	**Low certainty that coaching possibly has a beneficial effect on number of the projects initiated** (rated down for serious inconsistency and imprecision)
% mean indicators at target	1 randomized trial (23 practices)	Not significant[a]	**Very low certainty that coaching has no effect on the number of indicators at target** (rated down for serious risk of bias, inconsistency, and imprecision)
Improved team member knowledge			
No trials addressed this outcome	–	–	–
Improved team member self-efficacy			
No trials directly addressed this outcome	–	–	–

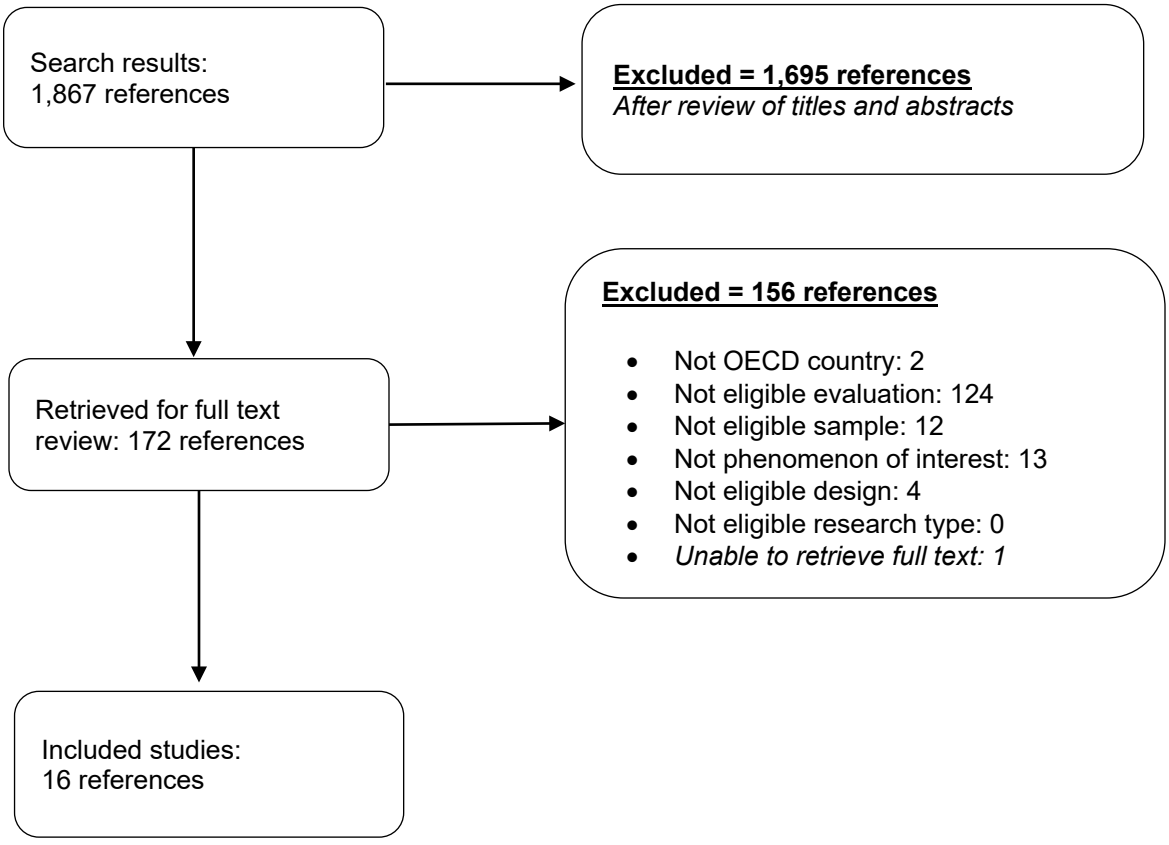
[a] Authors only reported not significant results for comparison of relevance
[b] Only 3 trials provided valid information on direction of effect.
Abbreviations: CI=confidence interval; QI=quality improvement

KEY QUESTION 2: What are the identified barriers and facilitators that impact the uptake of transformational coaching in a large health care system such as the VA?

Literature Flow for KQ 2

For the KQ 2 search, we identified 3,354 articles through searches of MEDLINE® (via Ovid®), EMBASE, and CINAHL (Figure 7). When reviewing bibliographies of relevant review articles, no studies were identified. After removing duplicates, there were 1,867 articles. After applying inclusion and exclusion criteria to titles and abstracts, 172 articles remained for full-text review. Of these, 16 articles were retained for data abstraction. Four articles [19,59-61] reported on 2 interventions that were included in KQ 1 as well.[49,52] The 16 studies consisted of 10 qualitative studies, 3 mixed method studies, 2 multi-method studies, and 1 survey. Included studies were conducted in Canada, Denmark, Norway, and the USA.

Figure 7. Literature Flow Chart: KQ 2



* Search results from MEDLINE (1116), Embase (103), and CINAHL (648) were combined.

Key Points

- The interdependent nature of the components of the transformational coaching intervention—the intended role of the coach, the quality improvement (QI) project, and the context—requires that the coach see both the big picture context as well as the specific details of a given team and QI project to overcome barriers and maximize facilitators.
- Collaboration, goal setting, and expectation management for the QI project and coaching process is key to the success of coaching and the project.
- Uptake of coaching is more successful when teams have the knowledge, skills, engagement level, support, and resources to apply learned coaching strategies to successfully conduct their QI projects.
- Adaptability is an essential characteristic of coaching, as the coach may need to modify the approach and/or QI project to fit the context and needs of the team.
- The variable availability of data was identified as a significant barrier for teams, as the lack of data hindered the ability of the coach to support the team, generate reports, address challenges, and provide education related to the data and QI project.
- The ability of the coach to foster multiple types of relationships including those with the team, among team members, and between the team and external support is an important aspect of coaching.

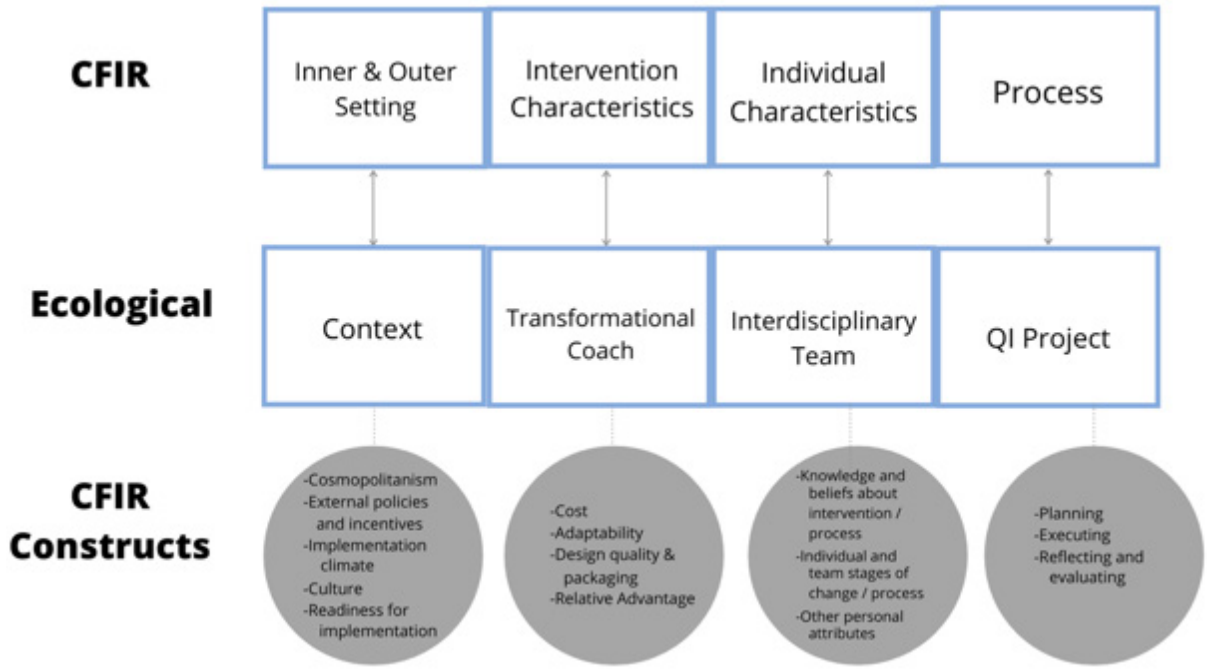
Characteristics of Included Studies

Sixteen studies were included that address the facilitators and barriers of transformational coaching. All studies meeting eligibility criteria used qualitative or mixed methods (including 1 survey with open-ended questions). Eight were conducted in the United States,[15,62-68] 5 in Canada,[59,60,69-71] and 3 in Europe.[19,61,72] All but 2 were conducted within the context of primary care or family medicine practices, and those 2 studies were set in nursing homes and health departments.[15,72] The study designs of the studies included qualitative methods, mixed methods, and multi-methods, as well as survey-based design. Labels for the transformational coach-like role included practice facilitator, external facilitator, coach, QI coach, QI advisor, and nurse facilitator. The clinical context of the included interventions was cardiovascular health, electronic health record (EHR) use, chronic disease management, and improvement of general QI capacity. Interventions varied in duration from 5 weeks to 6 years. Included articles did not consistently describe the number of individuals within a team, disciplines of individuals within that team, and roles of the interdisciplinary team members.

Detailed Findings

In this section, we describe barriers and facilitators related to the uptake of transformational coaching. We organize our findings by the 5 socioecologically informed domains in the Consolidated Framework for Implementation Research (CFIR)[34]: (1) Context, (2) Intervention Characteristics, (3) Individual/Team Characteristics, (4) QI Project/Process, and (5) Patients. Within each domain, we organize findings by relevant CFIR constructs (Figure 8).

Figure 8. Adapted CFIR and Ecological Frameworks



Context

We defined context as any level outside the team that is receiving transformational coaching (Table 15) and included organizational factors as well as larger systemic issues. For coaching interventions, we determined that context most closely aligns with the CFIR domains of Outer Setting and Inner Setting.[34] Within these domains, we mapped our findings of barriers and facilitators to these CFIR constructs: Implementation Climate (Inner Setting), Culture (Inner Setting), Readiness for Implementation (Inner Setting), Cosmopolitanism (Outer Setting), and External Policies and Incentives (Outer Setting). Overall, 11 studies contributed to themes under these constructs.[19,59-66,71,72]

Table 15. Consolidated Framework for Implementation Research: Context

CFIR Construct	FACILITATORS (*Activities that promoted coach-like role*)	BARRIERS (*Activities that impeded coach-like role*)
Inner Setting		
Implementation Climate		Lack of practice engagement due to relative priority, tension for change
Culture	• Positive, open-minded practice culture • Long-standing relationship • Aligning approaches with existing practice culture	• Practice behavior • External facilitators having limited control
Readiness for Implementation	• Provision of expertise, knowledge, tailored recommendation • Protected resources such as sufficient time and staff	• Lack of credible evidence and understanding of the intervention • Lack of resources such as time, monetary cost, data, and technological knowledge
Outer Setting		
Cosmopolitanism		Lack of network for information exchange
External Policies and Incentives	Government approach	External influences (*eg*, environmental factors, policy-related factors)

Implementation Climate (Inner Setting)

We identified 1 barrier and no facilitators for Implementation Climate. The overall barrier related to how capacity for change and shared receptivity of practices influenced the implementation of the coaching. One example of this barrier occurred when the QI project was a low priority for the practice due to the practice's competing demands. Additionally, a common occurrence was when unanticipated events shifted the focus of the practice and led to a loss of momentum for the QI project.[60,63,65,66] This barrier also extended to resistance at the leadership level.[63,66] Making and sustaining change was difficult when practice leadership did not prioritize the implementation of QI effort lacked interest in the QI project, or did not see the need for change. Additionally, difficulties occurred when practices had a vague notion of what to expect, a limited understanding of the intervention, a lack of engagement, and a resistance to change.[19,60] One study perceived costs associated with QI effort (*eg*, human capital, hardware, software) that led to difficulty in fostering a positive implementation climate.[65]

Culture (Inner Setting)

We identified 2 barriers and 3 facilitators associated with the norms and values of a given organization that had an impact on the coaching implementation. One barrier was related to practice behavior.[60,66] For example, a practice that resists involving individuals external to the organization could be a barrier for coaches, who are often not part of the practice organization. Additionally, coaches external to the organization may have limited control over the way practices are organized (*eg*, teamwork, practice readiness, and leadership structure).[60] Being a person external to an organization may exacerbate this barrier depending on the practice's culture.

One facilitator related to the internal culture of a practice was a willingness to engage in a coaching effort.[63] Internal cultural shifts around the importance of an intervention or QI project also served as a facilitator.[66] For instance, 1 practice shared their experience, "There was not a lot of emphasis [on PCMH] before. We've had big cultural shifts, which was positive for us."[66] A second facilitator focused on relationships, whereby a longstanding relationship between the coach and practice leaders was deemed helpful for carrying out QI projects.[63] A third facilitator focused on coaching style. Examples included aligning the coaches' approach with the existing practice culture[60] and, similarly, adapting the coaching style to reflect interactions with the participating staff.[72]

Readiness for Implementation (Inner Setting)

We identified 2 barriers and 2 facilitators related to the tangible and immediate indicators of an organizational commitment to implement coaching. One barrier related to data challenges included limited access to internal reporting functionality and queries[64] and technological difficulties such as setting up the data module[61] and working with the electronic health record (EHR).[65] The other barrier included having limited understanding of the intervention[19] and a lack of reliable high-quality evidence to support the intervention.[71]

The first facilitator was provision of expertise, knowledge, and tailored recommendations.[19,59,62,63] Examples included expertise with the EHR and how hands-on support from facilitators was deemed helpful to the team members.[62,63] One clinician stated, "The practice facilitator was very instrumental in setting up parameters for us in the EHR. Any time we had any questions, she was always ready to either come or to guide us in the path to follow."[62] Assistance in setting up data modules for the QI project and having coaching meetings that focused on the practice also fostered a faster implementation process.[19] Practices learned about community resources available to patients through the coaches. The coach's tailoring of suggestions relevant to patients served by the practice was useful.[59] The second facilitator was protected resources.[19,63] Having protected time for coaching visits[19] and having a stable group of physicians and staff members on the team receiving coaching[63] were deemed advantageous in implementing coaching.

Cosmopolitanism (Outer Setting)

We identified 1 barrier and no facilitators related to the lack of a network for information exchange. One example of the barrier included how small, independent practices with few staff members were functioning in isolation, and thus clinicians did not have the network of colleagues for information exchange and learning about QI.[62] The other example of this barrier occurred when the coach and site are located in different time zones.[15] While a timely response to team members' questions, requests, and concerns was seen as helpful, the lack of a timely response impacted the ability of the coaching intervention to work as intended.

External Policies and Incentives (Outer Setting)

One barrier and 1 facilitator were related to this construct. The barrier related to an environmental factor was an unanticipated competing demand. For example, an H1N1 influenza outbreak was an example of an unforeseen event that shifted the focus of the practices, and eventually impacted the coaching process by reordering clinical priorities.[60] One practice facilitator stated, "I think to a large extent, you have to wait. Very often, you can't move forward

until these other issues have resolved in some fashion, and you have to respect that."[60] Policy-related factors were discussed both as barriers and facilitators. Practices identified the lack of external policy (*eg*, payment reform) aligned with ongoing QI efforts and their commitment to improving care as a second barrier.[65] On the other hand, government-distributed guidelines, when consistent with best practices identified by the QI project's expert panel, were perceived as a facilitator.[71]

Bottom Line

The external factors as well as internal culture/climate were potential determinants of transformational coaching. The external factors became a barrier if an unforeseen event occurred and thus shifted the practices' focus and priority but also served as a facilitator if a policy was aligned with ongoing QI efforts. One notable facilitator was aligning the coaches' approaches with the existing practice culture and, similarly, adapting the coaching style to reflect interactions with the participating staff.

Intervention Characteristics

We determined the transformational coaching intervention itself most closely aligned with the CFIR domain of Intervention Characteristics.[34] Within that domain, we mapped the findings of barriers and facilitators to these CFIR constructs: Cost, Adaptability, Design Quality and Packaging, and Relative Advantage (Table 16). Overall, 16 studies contributed to themes under these constructs.[15,19,59-72]

Table 16. Consolidated Framework for Implementation Research: Intervention Characteristics

CFIR Construct	FACILITATORS (*Activities that promoted coach-like role*)	BARRIERS (*Activities that impeded coach-like role*)
Cost	Availability of training for the practice facilitators	High workload for the coach
Adaptability	• Doing whatever it takes to complete the QI project • Characteristics and behaviors of the coach	Coach did not provide support or information the practice desired
Design Quality and Packaging	• How coach engaged in coach role during QI project • Practice facilitator was a knowledgeable resource for practice during QI project	• Not enough time for coach to complete coach activities • Lack of knowledge or comfort with QI process • Lack of technical or clinical knowledge
Relative Advantage	Active engagement by practice	Lack of engagement by practice

Cost

We identified 1 barrier and 1 facilitator related to costs associated with investment and opportunity for the coach during the QI project. The identified barrier was a high workload for the coach.[63,64,70] Examples included that the coach found it burdensome to engage in completing

the designated QI activities at the same time as collecting data for the QI project,[63] or not having the anticipated prerequisite data available for the QI project and needing to spend time and effort identifying solutions.[64] For example, "the [coaches] used over a quarter of their work time on administrative work. They searched for specific knowledge and strategies to address the challenges faced by the primary health care teams, sorted out questions and answers through emails, analyzed the best practice guidelines, and documented team progress."[70] Other examples included that the workload and daily coaching routine changed day to day, and that the coach spent time doing administrative tasks that took away from the ability to complete duties, including the actual coaching work.[70] The identified facilitator focused on the investment of training for the coaches.[68,70-72] For example, the availability of initial and ongoing training helped the coach engage in the QI process and understand their role as a coach. Additionally, training facilitated the development of a network of other coaches that enabled the exchange of knowledge and support about engaging in QI and applying QI concepts.

Adaptability

One barrier and 2 facilitators describe how coaches tailored and refined their role during the QI project. Of note, it is unclear if these adaptations were in keeping with fidelity to the intervention or not. The barrier occurred when the coach did not provide the support or information the team desired.[19,61,66] For example, the coach did not provide materials to help practices retain information between coaching visits,[19] was not available to answer questions in between meetings,[15] did not meet often enough with the practice,[15] or was unfamiliar with the culture and/or historical context of the practice.[66] Additionally, scheduling meetings was a challenge when the coach and practice were in different time zones.[15]

The first facilitator consisted of the coach "doing whatever it takes" to complete the QI project.[59,60,62-71] Examples include when the coach was an extra set of hands for the practice to complete the QI project such as serving as a liaison for the practice with external entities (*ie*, EHR vendor), helping to identify problems, and running reports.[59,60,62-66,68-71] An additional feature of "doing whatever it takes" includes the coach developing strategies to overcome challenges encountered while engaging in the QI project.[60,64,66,67,69,70] For example, 1 study noted that, "without performance data, [coaches] worked on workflows and 'pain points' identified by practices. They found they could strengthen relationships with practices by working on practice needs … [Coaches] reported that they found this strategy particularly useful in cases where practices were reluctant to select a specific … measure to work on without first seeing their performance data."[64]

The second facilitator focused on characteristics and behaviors of the coach.[15,19,59-61,65,67-70,72] An example was how the coach collaborated with, and engaged, members of the practice by asking questions and helping individuals at the practice take charge.[61] Another was when the coach had technical knowledge (*eg*, knew how to use the practice's EHR), clinical knowledge (*eg*, was a physician or nurse), or QI process knowledge appropriate for their role in the project.[15,19,59-61,65,67-70,72]

Design Quality and Packaging

We identified 3 barriers and 2 facilitators related to how the coach was presented to the practices during the QI project. The first barrier was not having enough time allotted for the coach to

complete the coaching activities.[19,70] Examples include not enough time for discussion in meetings[19,70] and when the coach needed more time to get to know the practice.[70] The second barrier was when the coach lacked knowledge and comfort with the QI process and/or the coach's role.[15,19,61,63,64,68,70] These instances occurred when the coach lacked sufficient QI training prior to and during the coaching intervention,[61,64] did not have the information needed to engage in the role and QI process,[61,64] did not facilitate discussion,[19] and conducted meetings that lacked structure and organization.[15,19] Notable instances also occurred when the coach did not clarify the reason for the QI project at the practice,[19,61,68] did not engage with practices to tailor support,[19,61,68] did not provide clear roles and instructions for the practice during the QI project,[19] or lacked confidence in being seen as a role model or trainer.[61,70] The third barrier was when the coach did not have the technical or clinical knowledge to facilitate the completion of the QI project.[19,66]

The first facilitator was how the coach engaged in the role during the QI project.[59,60,63,66-70] Examples include how the coach fostered an ongoing and longitudinal relationship with the practice[59,60,63,66-70] and that the coach and practice were in close geographic proximity.[70] The second facilitator was how the coach was a knowledgeable resource for the practice during the QI project.[15,19,59-71] Examples include how the coach exchanged information and support [15,19,59-71] and was knowledgeable and flexible in completing activities in the coaching role.[60,67,69,70]

Relative Advantage

We identified 1 barrier and 1 facilitator related to whether the coaching intervention was viewed unfavorably or favorably. The barrier was related to a lack of engagement in the QI project by the practice.[19,63,70,72] Examples include when the QI intervention was not a priority for the practice,[19,63] there were limited resources in the practice for the project,[70] the coach had to push the practices along to make a change,[70] and different personalities in the practice made leading meetings challenging.[72] Another example of this barrier was when there was a reliance on a single practice champion who subsequently left the practice.[63] One study noted that when the QI project was not a priority in a busy practice, the coach found it challenging to have a function or role.[70]

The facilitator focused on instances when the practice was engaged in the QI project.[19,59-61,63,65,66,68-70] Notably, in these instances the coach's presence and actions helped hold practices accountable to making a change.[19,59-61,65,66,68-70] The meetings with the coach were protected times for the practice, which may have helped create structure for change,[19,65] and meetings occurred in a convenient location (*ie*, the practice).[19] One study noted that the involvement, support, and investment of the practice leaders helped the coach implement the QI project.[63]

Bottom Line

The characteristics and knowledge of the coach were potential determinants of coaching uptake. One notable barrier was when the transformational coach lacked knowledge and comfort with the QI process and/or the coach's role. One notable facilitator was when the coach "did whatever it took" to complete the QI project—in these instances the coach served as a liaison, ran reports, and identified solutions to challenges the practice faced.

Individual and Team Characteristics

We determined that the recipients of the transformational coaching intervention most closely aligned with the CFIR domain of Characteristics of Individuals.[34] Within that domain, we mapped the findings for barriers and facilitators to these CFIR constructs: Knowledge and Beliefs about the Intervention, Individual Stage of Change, and Other Personal Attributes. Given the nature and definition of transformational coaching, we included the team as a unit receiving the coaching in addition to individuals on the team (Table 17). Overall, 12 studies contributed to themes under these constructs.[15,19,59,60,62-64,66-68,70,72]

Table 17. Consolidated Framework for Implementation Research: Individual and Team Characteristics

CFIR Construct	FACILITATORS (*Activities that promoted coach-like role*)	BARRIERS (*Activities that impeded coach-like role*)
Knowledge and Beliefs about Intervention/Process	Open attitude	• Lack of knowledge • Lack of ability to work with data
Individual and Team Stages of Change/Process	• Tailoring • Engagement • Instrumental support	• Resistance to change • Limited engagement
Other Personal Attributes	• Relationship with coach • Leadership style • Collaboration	• Poor team dynamics • Competing priorities • Team leadership challenges • Team size

Knowledge and Beliefs About the Intervention and Process

The knowledge and attitudes of the individuals and teams being coached can impact the success of both the QI process and the coaching intervention. We identified 2 barriers and 1 facilitator for this construct. The first barrier occurred when the team's ability to implement the QI project was impeded by a lack of knowledge or gap in understanding.[15,19,64,66] Specifically, a lack of understanding was not knowing what to expect from the coach,[19] a lack of familiarity with the QI projects being implemented,[15,66] or limited knowledge of the technical aspects of the EHR.[64] In addition, the team's ability to work with the data aspect of a QI project posed challenges for the coach to overcome.[64] One coach relayed such an experience with a team member, stating, "When we started this process, she [the provider] sat down and said, 'I have no idea what we are even looking for.' I walked her through the screens to the existing quality reports and we did not find what we needed. We decided to call technical support for the EHR. She said, 'I do not even know what to ask for, can you please explain to them what we need?' So I explained it to them as we sat together."[64] On the other hand, clinical team members who displayed a more "open attitude to improvement" tended to implement more impactful changes in practice.[59]

Individual and Team Stages of Change

The readiness or willingness to change on the part of the individual or team has implications for the ability of the coach to support the QI process. Two barriers and 3 facilitators aligned with this construct. First, the team's resistance to change created a barrier.[60,64,66,68] Some individuals

within the teams did not feel the need to make changes due to perceived QI project implementation barriers,[64,68] failures with prior QI attempts leading to a skeptical attitude that the current effort would have a different outcome,[66] a lack of relevant training related to the systems change the practice was trying to implement,[66] or displeasure with QI tools and coach feedback. For example, "They did not always welcome coaching feedback and frequently disliked the technical tools and collaborative processes."[68] In addition to resisting change, limited engagement with the QI process and/or coaching was identified as a second barrier.[19,60,66,70] Some teams were described by the coach as having low levels of engagement, which posed an additional obstacle to overcome.[60,66] Teams exhibited limited buy-in when they did not recognize the need for a change to occur.[19] Teams with low engagement described that they would have experienced limited progress if it were not for the supportive efforts of the coach.[60,66,70] Additionally, frustration with the technological aspects (*eg*, data access, EHR capabilities) of the project created barriers to both the coach and the QI process.[19]

The ability of the coach to tailor their approach to the teams' characteristics was viewed as a facilitator.[19,60,63,64,72] Coaches who used a flexible approach to meet the team's needs were viewed as helpful to the team.[63,64] The individualization of approach including offering choices,[19] understanding and accounting for practice-specific settings,[19] and choosing strategies to help the team and individuals on the team.[60,63,72] For example, a coach said the following, "I was able to present to the team the option of looking at the clinical improvement side while we wait for the data IT issue to be resolved. This brought forth great brainstorming and excitement from the team."[64] The second facilitator was engagement of the team which positively impacted the coaching and QI processes.[60,63] The team's commitment was influenced by having a consistent group of individuals with no turnover engaging in the QI project, [63] the presence and active participation of a practice champion,[60] and the team's open-minded culture.[60,63] The team also had an easier time engaging when they were familiar with the EHR[63] and had a consistently involved coach.[60] In addition, the teams felt they were better equipped to make changes when they had institutional support, which allowed the teams meet the desired outcome.[19,62-64,66,70] For example, the specific tools the coach provided to help with the change process included education,[19,63,66] helping the teams with goal-setting needs,[19,63,70] and developing the team's EHR skills.[62,64]

Other Personal Attributes

Selected characteristics of the team and individual members can influence the coach's ability to facilitate QI implementation. There were 4 barriers and 3 facilitators for this construct. The first barrier was poor team dynamics or negative interactions among the team members.[60,67,70] For example, when team members experienced conflict with one another,[60,67] or lack of comfort with each other,[70] the negative aspects of the relationship posed a barrier to coaching and QI implementation. Organizational structure, such as a hierarchy, could also hinder implementation of QI.[60] Second, when teams faced competing demands, it was difficult for the team to participate in QI activities or complete the QI project.[19,60,63] Some clinical teams faced limited time available to devote to QI,[60,63] and the coach found it difficult to schedule time with the each team.[60] When meetings or QI did get scheduled, the team did not always have an opportunity to focus on the QI process or interact fully with the coach due to general interruptions[19] and urgent clinical issues.[60] A third barrier arose for some teams when practice leaders posed an obstacle for the coach to overcome.[63,66,68,72] In some instances, practice leaders controlled the decisions such as how often the coach could meet with the team[63,66] or what staff might be involved and what

projects could be implemented rather than collaboratively making decisions with the team and/or the coach. The coach also described the negative impact of difficult relationships with leaders.[68] The level of engagement and/or resistance of the leader helped set the tone for the team. When the leader was not engaged,[72] the team may not have been as supportive of the process[66] or efforts may have stalled.[72] A fourth barrier was noted by 1 study which noted that teams comprised of fewer individuals seemed to appreciate the coaching services more.[62]

The first facilitator was that the team's positive relationship with the coach was viewed as helpful.[60,66,68] Specifically, the team appreciated an ongoing relationship with the coach[66] as well as the encouragement and feelings of support the coach provided to them.[68] Other teams appreciated the coach's efforts to integrate into the team[60] so they had a better understanding of the team's dynamics. Some teams also welcomed the feedback that an external coach was able to provide.[66] While leadership style can be a barrier if obstructive, it may also be a facilitator if participatory.[60,66,68,72] For example, practice leader actions were facilitators for coaching when they engaged with the QI process,[60,72] gained increased confidence during the process,[68] and created a supportive culture.[66,72] One coach noted that when facilitating change for bigger teams, it is essential to have the leaders on board: "For that kind of change, you would need the clinical lead …. You see, individual people might sign up, but the head of that team might not. And you really need buy-in at the highest level to do anything."[60] Improved collaboration among the team was facilitated by new communication skills, team problem- solving, and redefined responsibilities.[67]

Bottom Line

The team's knowledge, skills and attitudes were all potential determinants of transformational coaching. The need for knowledge and skills related to obtaining and using data were particularly important. The team's attitude toward the change contributed to their level of engagement. One facilitator of note was the coaches' ability to meet the team's needs through a tailored approach.

Quality Improvement Project/Process

We considered the actual QI project that an interdisciplinary team was being coached on as its own construct and that it most closely aligned with the Process domain in the CFIR framework.[34] We mapped the findings by barrier and facilitator under these CFIR constructs: Planning, Executing, and Reflecting and Evaluating (Table 18). Overall, 12 studies contributed to themes under these constructs.[15,19,59,61,63-67,70-72]

Table 18. Consolidated Framework for Implementation Research: QI Project/Process

CFIR Construct	FACILITATORS (*Activities that promoted coach-like role*)	BARRIERS (*Activities that impeded coach-like role*)
Planning	• Fit of QI Project • High-quality project materials and resources	• Mismatch of project and team members • Unclear roles and tasks • Poor QI design • QI project timelines

CFIR Construct	FACILITATORS (*Activities that promoted coach-like role*)	BARRIERS (*Activities that impeded coach-like role*)
Executing	• Application of coach QI techniques knowledge and skills • Application of coach technology/data knowledge and skills • Workarounds for data systems	• Mismatch of project demands • Inability to collect QI data • Not following intended QI project processes
Reflecting and Evaluating		Data obstacles

Planning

We identified 4 barriers and 2 facilitators for this construct. Barriers related to a mismatch of project and team priorities; unclear roles and tasks; poor QI design; and inappropriate QI project timelines. The first barrier arose when a team's preferred interaction style or clinical priorities were not aligned with the focus and conduct of a given QI project[61,63]; for example, "both practice leaders and [coaches] said that the program was focused on improving patient care and documentation, but not patient adherence to treatment, which was a more immediate and vexing problem."[63] A second barrier occurred when poorly designed QI projects and processes impeded project success. This occurred when the structure of a QI project (*eg*, inconvenient meeting times or lack of responsibility designations) did not support the desired team QI milestones or planned processes (*eg*, reflective discussions or leadership follow-through).[61,72] Another example included physical obstacles to implementing a QI project as planned, such as when a clinic was unable to rearrange their waiting room to meet isolation precautions during flu season as dictated by their preplanned QI project.[71]

A third barrier arose from unclear project roles and tasks for either the team generally or their leadership in particular. Lack of clarity or guidance around steps in between coaching sessions led to failure of teams carrying project activities forward.[61,72] Teams often stated a desire for the coach to be more present and involved in local QI activities to boost momentum, particularly when teams were busy.[70] A fourth barrier was inappropriate QI project timelines. Multiple studies noted that there was no single right timeline for a particular QI project that would be appropriate across all teams or practices. Rather, timelines needed to be tailored to a particular team's availability and skillset.[15,67,70,71]

Facilitators for planning QI projects focused on a good fit for a given team and clinical practice setting and high-quality materials and resources. The first facilitator was appropriate QI outcome measures and strategies that supported engagement with the project and energized the teams.[61,63,65,66,71] One way that coaches supported the right fit was by having teams articulate their thoughts and ideas about the planned QI activities.[61] Project challenges offered an opportunity for adaptations or adjustment to planned activities that could further improve project fit.[63] A second facilitator was offering teams high-quality project materials and resources.[63]

Executing

We identified 3 barriers and 3 facilitators for this construct. The first barrier was a mismatch between the QI project and resources that manifested in 2 ways. One way was when the project

requirements were not a good fit for the coach's skills (*eg*, a lack of familiarity with the team's electronic health record).[61] A second way was when the team was not able to collect the QI data required for project activities.[19,63] If teams were unable to extract needed data or reports from their EHR—either due to lack of knowledge or technical limitations—projects could stagnate and team engagement could suffer: "[T]he technical problems experienced in the process triggered increased frustration with the [EHR]: 'Well it is just difficult to mobilize any energy among the doctors.'"[19] It was also problematic during project execution when teams and coaches did not engage in planned activities, particularly internal reflection and discussion.[61]

The most widely reported facilitator for this construct was the direct sharing of QI technique, knowledge, and skills by the team's coach. [15,59,61,64,66,67] Multiple specific QI techniques were mentioned including chart audits, daily team huddles, and creating cause and effect diagrams. Other particular actions by the coach that were found to be helpful during the course of engaging in QI project activities included having the coach connect teams to community resources[59,64] and having coaches share their own experiences conducting similar QI projects.[61] Similarly, when coaches were able to provide technical support either at a general level or one-on-one, this was found to be valuable to teams and often offered "quick wins."[19,61,63,64] Technological support for coaches facilitated intervention activities when teams were able to find data workarounds for roadblocks, allowing the project to move forward.[64]

Reflecting and Evaluating

There was only a single barrier for this construct, having to do with problems with acquiring needed data during the execution of QI project activities, acquiring data necessary for project evaluation was problematic in many cases.[61,63] We identified no facilitators for reflecting and evaluating.

Bottom Line

QI project purpose, design, and data requirements were all potential determinants of transformational coaching uptake. The fit of these QI project characteristics to the interest and skills of the team conducting the QI project and the skill set of the coach supporting that team could be both a barrier (if a poor fit) or a facilitator (if the fit was good). One notable facilitator at the QI project level was when coaches taught specific QI strategies and techniques for teams to apply during project conduct.

Patients

While we identified the patient as a separate level in our socioecologically informed CFIR domains, we did not identify any barriers and facilitators at this level.

Quality of Evidence for Key Question 2

For the 16 qualitative studies included in KQ 2, ROB concerns were found under appropriateness of methodology (n=1),[15] match between recruitment strategy and study aims (n=1),[72] data collection (n=2),[68,72] consideration of relationship between researcher and participant (n=2),[71,72] analytic rigor (n=3),[15,71,72] and lack of clarity of research findings (n=1).[72] There was frequently insufficient information for assessment of relationship between researcher and participant and

consideration of ethical issues. Risk of bias ratings for each study are shown in Figure 9, and the ROB ratings across all studies are shown in Figure 10.

Figure 9. Risk of Bias for Included Studies in KQ 2

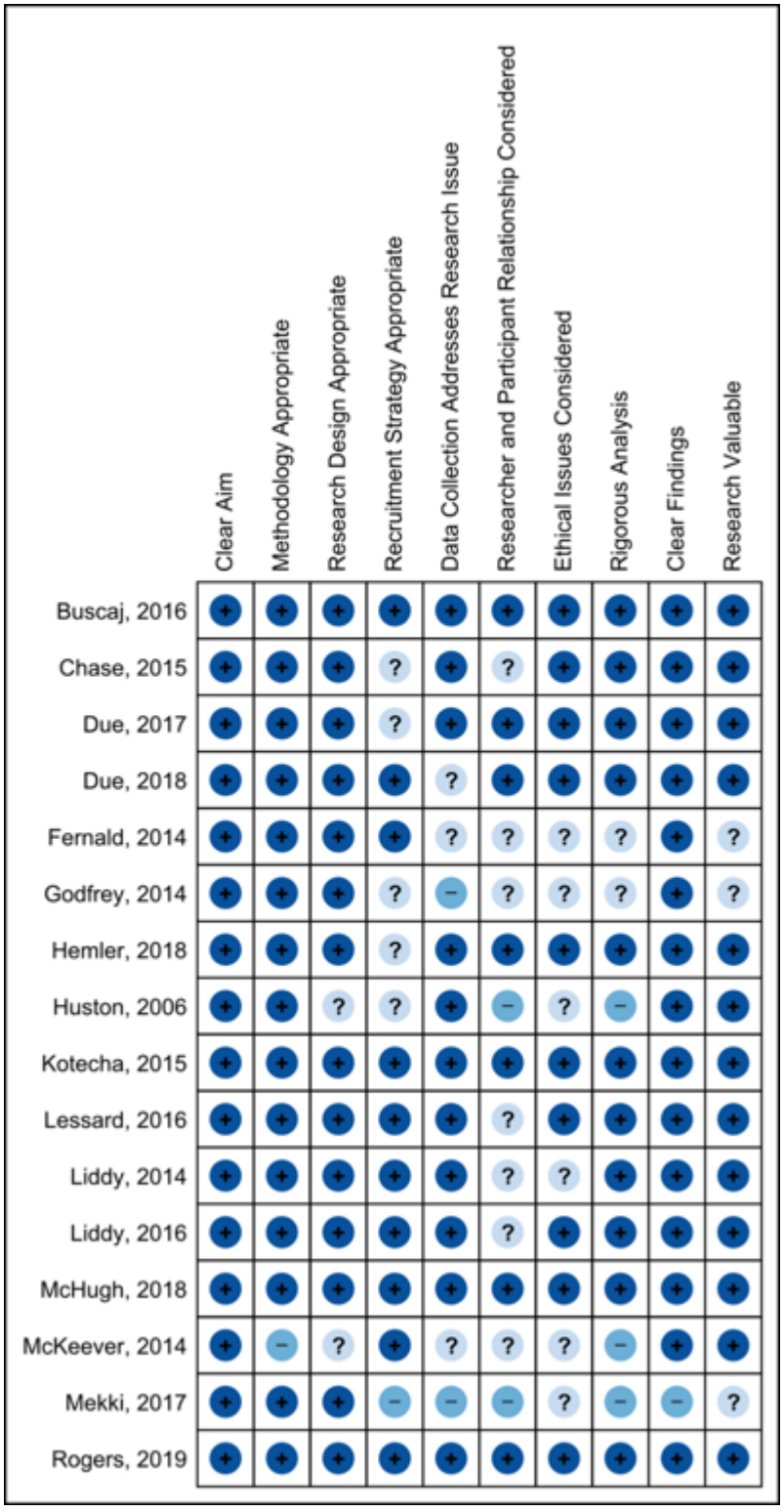
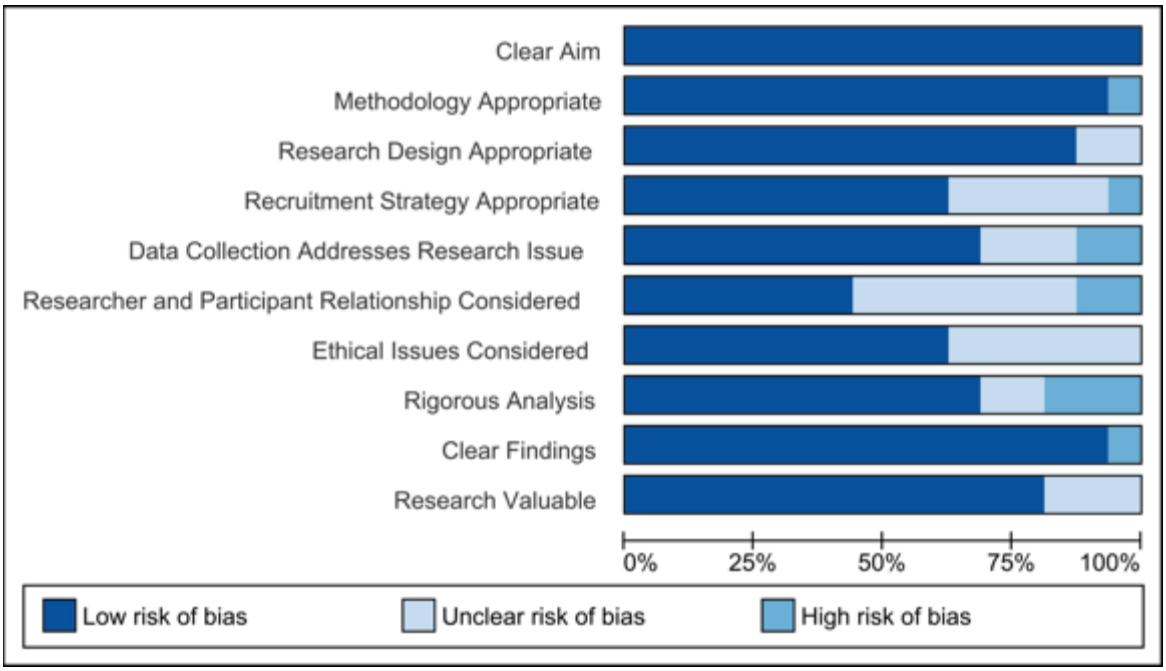


Figure 10. Risk of Bias Assessment Across Included Studies (n=16) in KQ 2



Certainty of Evidence for Key Question 2

The overall confidence of the evidence was assessed using CERQual for the findings within each of the 5 CFIR constructs prioritized by our operational partners is shown in Table 19. A detailed table is in Appendix F.

Table 19. CERQual Summary of Qualitative Findings Table for KQ 2

Summary of Review Findings	Studies Contributing Review Finding	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Assessment
External policy and incentives (context: inner and outer setting)			
Barriers: External policy not aligned with the ongoing QI effort When the external policies governing practice level activities were not consistent with requirements of a QI project, this was problematic. For example, practices expressed the need for payment reform to align with the ongoing time and effort they are committing to improving quality of care.	Fernald, 2014[65]	Very low confidence	This finding was graded as very low confidence because of significant concerns regarding methodological limitations and significant concerns regarding adequacy.
Barriers: Unanticipated competing demands shift focus on QI	Liddy, 2014[60]	Low confidence	This finding was graded as low confidence because of significant

Summary of Review Findings	Studies Contributing Review Finding	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Assessment
When teams were faced with unexpected events from outside the practice, their focus on coaching and QI could be derailed. For example, practices working on QI activities during the H1N1 influenza outbreak found it difficult to retain momentum.			concerns about adequacy moderate concerns regarding methodological limitations.
Facilitators: Project alignment with Government guidelines Coaching was more successful when QI project activities were aligned with guideline-identified best practices. For instance, the Ministry of Health distributed guidelines for respiratory infection control in community settings which were consistent with the QI intervention to improve respiratory infection control.	Huston, 2006[71]	Low confidence	This finding was graded as low confidence because of significant methodological limitations and concerns about adequacy.
Relative advantage (transformational coaching/intervention characteristics)			
Barriers: Lack of engagement by practice When practices were not invested in activities related to their QI projects or transformational coach, it was difficult for coaches to deliver the intended QI project. Examples of lack of engagement included when teams did not prioritize the planned QI intervention and when practices had limited resources allotted for transformational coaching and QI activities. Coaches found that when lack of engagement occurred, they had to "push" practices along and, at times, had difficulty finding a role for themselves within a busy practice.	McHugh, 2018[63] Due, 2018[19] Kotecha, 2015[70] Mekki, 2017[72]	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations and moderate concerns about adequacy.
Facilitators: Active engagement by practice Examples of practice engagement included teams having protected time and a convenient location for	McHugh, 2018[63] Due, 2018[19] Due, 2017[61] Fernald, 2014[65] Buscaj, 2016[66]	Moderate to high confidence	This finding was graded as moderate to high confidence because of moderate concerns regarding methodological limitations.

Summary of Review Findings	Studies Contributing Review Finding	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Assessment
coaching activities, and the support of practice leadership. When engaged, coach presence and the coach's actions helped practices be accountable during the QI project to making a change.	Lassard, 2016[69] Liddy, 2016[59] Kotecha, 2015[70] Liddy, 2014[60] Godfrey, 2014[68]		
Cost (intervention characteristics/transformational coaching)			
Barriers: High workload for coach Coaches found it burdensome when, in addition to their planned QI support role, they had to compensate for data problems such as needing to collect data directly. Other sources of additional workload came from administrative tasks and a constantly changing daily routine.	McHugh, 2018[63] Hemler, 2018[64] Kotecha, 2015[70]	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations and moderate concerns about adequacy.
Facilitators: Investing in training coaches It was beneficial when coaches had adequate initial and ongoing training to help them with the QI process and understanding their role as a coach. One way to support ongoing training for coaches was the creation of a network of other coaches to learn from during coaching activities.	Kotecha, 2015[70] Godfrey, 2014[68] Mekki, 2017[72] Huston, 2006[71]	Low confidence	This finding was graded as low confidence because of significant concerns regarding methodological limitations and moderate concerns about adequacy.
Knowledge and beliefs about the intervention (individual or team characteristics)			
Barriers: Lack of knowledge Team level lack of knowledge regarding the coaching process, QI project details, and technical aspects of electronic medical records as they relate to QI data collection was a barrier to coaching success.	Hemler, 2018[64] Due, 2018[19] Buscaj, 2016[66] McKeever, 2014[15]	Low confidence	This finding was graded as low confidence because of significant concerns regarding methodological limitations and moderate concerns regarding adequacy.
Barriers: Lack of ability to work with data Coaches experienced challenges when teams were not comfortable or readily able to work with QI data.	Hemler, 2018[64]	Very low confidence	This finding was graded as very low confidence because of significant concerns regarding adequacy and moderate concerns regarding methodological limitations.

Summary of Review Findings	Studies Contributing Review Finding	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Assessment
Reflecting and evaluating (QI project)			
Barriers: Data obstacles Teams often had trouble acquiring the needed data for a given QI project which interfered with evaluating projects as planned. This led to team frustration and an inability of the coaches to execute relevant coaching implementation activities.	McHugh, 2018[63] Due, 2017[61]	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations and moderate concerns about adequacy.

SUMMARY AND DISCUSSION

SUMMARY OF EVIDENCE BY KEY QUESTION

Key Question 1a

We mapped the outcome measures used across the 19 included trials to the practice, provider, and patient levels. The level with the most studies measuring at least 1 outcome was the provider level (15 studies), followed by patient (n=6), and then practice (n=5). Of the outcomes measures at the provider level, 6 studies used composite measures of multiple process of care behaviors.

Key Question 1b

We identified 19 cluster-randomized trials (CRTs) that evaluated the effectiveness of transformational coaching for team-based health care improvement and practice change efforts on 4 process outcomes: adoption of targeted process of care activities, QI process goal attainment, team member knowledge, and team member self-efficacy. There were 6 low, 9 unclear, and 4 high risk of bias (ROB) trials. All but 1 of the 19 included trials were conducted within primary care settings. Coaches in these studies employed a median of 5.73 implementation strategies (range 3 to 9) to support teams around a specific QI project. The most common coaching strategy was to develop a formal implementation plan and the least common was developing stakeholder relationships. QI projects conducted by the coached teams typically targeted multiple simultaneous process of care activities requiring disparate clinical behaviors (*eg*, ordering a lab test, complicated patient counseling) but which were usually linked by a common goal (*eg*, improving management and outcomes for a specific disease). Overall, heterogeneity of outcome measure, timing of outcomes, and length of intervention prevented pooling of study outcomes in a meta-analysis.

The most commonly reported process of care outcome was adoption of targeted clinical care activities, which we divided into 7 subcategories based on the complexity of required activity: composite outcomes of multiple process of care activities, organizational process of care, appropriate documentation, appropriate medication prescriptions, patient counseling, exam or procedures, and appropriate ordering of test and vital signs. There is very low to low certainty of evidence that transformational coaching-like interventions are probably effective at improving composite processes of care, organizational processes of care, and ordering of lab tests and vital signs. It has uncertain effectiveness on improving appropriate documentation, provision of patient counseling, and conduct of appropriate exams and procedures and probably has no effect on prescription of diagnosis appropriate medications.

We found mixed results among 2 CRTs on the effect of transformational coaching on QI process goal attainment. No studies specifically assessed team member knowledge or self-efficacy after transformational coaching. One trial examined clinician self-confidence in assessment of various lifestyle behaviors as a secondary outcome after a coaching intervention compared to an unspecified control and found mixed results.

Key Question 2

We found 16 studies that evaluated barriers and facilitators to implementation of a transformational coaching intervention. These 16 studies collected primary qualitative data from

multiple perspectives including the coach delivering the intervention, the person or team receiving the intervention, and sometimes a combination. Multiple approaches were used for data collection including individual interviews, focus groups, surveys, and observational field notes. We examined themes related to barriers and facilitators of transformational coaching interventions across socioecologically informed CFIR domains of context (inner and outer setting), transformational coaching (intervention characteristics), individual or team receiving the coaching (characteristics of the individual), QI process or project (process), and the patient targeted by a given QI project.

Within the CFIR domains, we mapped 29 barriers and 24 facilitators across 15 CFIR constructs. Constructs with more facilitators than barriers—where there may be more opportunity to improve uptake—included culture (within context), adaptability (within intervention characteristics), and individual or team stages of change (within individual/team characteristics). Similarly, constructs with more barriers than facilitators and where problem-solving may need to be focused included design quality/packaging (QI project/process), knowledge and beliefs about intervention (team characteristics), and other personal attributes (team characteristics). We assessed the certainty of evidence for a selection of prioritized CFIR constructs. Specifically, we considered themes related to the following barriers to the uptake of coaching: high workload for coaches (moderate certainty of evidence); lack of engagement by practice team members (moderate certainty); evaluation (moderate certainty); unanticipated competing demands shift focus from QI activities (low certainty); lack of team knowledge about coaching and QI (low certainty); lack of team ability to work with data for project conduct (very low certainty); and when external policies were not aligned with the QI effort (very low certainty). We also considered facilitators, including active engagement by practices (moderate to high certainty of evidence), projects aligned with government guidelines (low certainty), and investing in training coaches (low certainty).

Overarching findings were:

- The person in the transformational coach-like role needs to see both the big picture and small details in order to overcome barriers and maximize facilitators.
- Care should be taken when introducing the coach and the project to properly set expectations for all involved.
- Working with teams to tailor coaching techniques and QI process activities to the teams needs and preferences is key for success.
- Coaches need to be well-versed and able to teach QI process skills to teams.
- Data acquisition and manipulation are critical for EHR-based QI activities and coaches who can support these QI activities for teams are well-positioned.
- Relationship building at all levels is critical (*eg*, between team members, teams and their stakeholders/leadership, and teams and coaches).

PRIOR SYSTEMATIC REVIEWS

Our findings build on recently conducted reviews of roles similar to transformational coaching, specifically external change agents and practice facilitation. Baskerville and colleagues (2012)

conducted a systematic review of 23 included articles looking at the impact of practice facilitation on evidence-based practice behavior.[11] Baskerville's approach differed from ours in that they considered adoption of evidence-based guidelines to be a common outcome measure and calculated standardized mean difference across studies and combined them for a pooled estimate. With this approach, they reported an effect size of 0.56 (95% CI 0.43 to 0.68) favoring practice facilitation in the adoption of evidence-based guidelines. Our findings are largely consistent with and build on those of Baskerville et al. Specifically, we considered adoption of evidence-based processes of care by complexity of the specific care activity or collection of care activities, and noted that there appears to be variation in the effect of coaching-type roles on different types of processes of care. A more recent review by Wang and colleagues (2018) examined the impact of practice facilitation on chronic disease management in primary care.[73] They grouped outcomes by type of outcome (*eg*, lab vs diagnosis) within disease group (*eg*, cervical cancer process of care measures vs chronic kidney disease process of care). This approach is consistent with the way that interventions are often designed, specifically around management of a particular disease; however, it could mask differences in effect by the complexity of process of care. Across 25 studies, Wang et al concluded that process measures improved on average 8.8% with screening, and diagnosis improved the most, whereas we found the best evidence for a likely effect on composite process of care outcomes (which were sometimes disease-specific and sometimes more general such as preventive guidelines), organizational processes of care, counseling, and more simple tasks such as ordering of labs and vital signs. We found uncertain effect on documentation (including documentation of diagnoses) and likely no effect on prescription of disease appropriate medications.

Prior reviews have also looked at which aspects of coach-like roles are likely contributors to an overall effect. Alagoz and colleagues (2018) explored the role of external change agents in promoting changes health care organization in small primary care clinics across 21 included studies.[74] They concluded that clinic-level, regular, individualized follow-up via practice facilitation models are the most effective approaches, while the most commonly employed are academic detailing and audit and feedback. Similarly, we found that audit and feedback (89% studies) and academic detailing, or educational outreach visits (68% studies), were among the most commonly used implementation strategies along with developing a formal implementation plan (95%) and distributing educational materials (74%), and that only 10 of 19 studies employed ongoing consultation (53%). Baskerville et al found that tailoring, intervention intensity (average number of contacts x average meeting time in hours), and number of intervention practices per facilitator modified the effect of practice facilitation.[11] Similar to Baskerville et al, we found that coaches need to be flexible to be effective and need to be able to adjust by team to meet the needs of individual practices (*ie*, tailoring); however, this could mean less time for some teams and more for others. In addition to considerations of intervention length and intensity, we found that certain implementation strategies used by transformational coaches were seen as more helpful than others (*ie*, technical data support, instruction of specific QI strategies, and stakeholder and leadership engagement). To date, however, these strategies have been uncommon in coaching-like interventions (only 37%, 37%, and 10% respectively).

CLINICAL POLICY IMPLICATIONS

The findings from our review are generalizable broadly to coach-led support for team-based QI activities, including those conducted within the VA. The VA has a longstanding and ongoing commitment to providing high-quality patient-centered care, and continues to seek effective

strategies that can accelerate the speed and impact of improvement efforts. The results from this review suggestion that transformational coaching could play an important role in the VA's overall commitment to QI. For example, we found that coaches can play a critical role in facilitating access to and use of data and technical resources for QI activities. Currently, the VA is planning a national transition in electronic health record of use from the VA-created Computerized Patient Record System (CPRS) to a new system developed by Cerner. One impact of the coming medical record transition will be a significant learning curve for QI teams related to gathering of EHR data to measure and evaluate the success of their improvement projects. Transformational coaching could support teams during this technological transition. Another example is that we found that interventions like transformational coaching probably have benefit on ordering of labs and vital signs but not prescription of diagnosis appropriate medications, and that teams with greater levels of process engagement have greater uptake of transformational coaching. These findings could contribute to organizational decisions about which QI projects and which clinical teams could most benefit from transformational coaching support. One current VA effort that is already making use of transformational coaching is the national effort to become a high-reliability organization (HRO). Health care systems that are HROs employ processes and practices to effectively target and resolve emerging safety problems to promote high-quality care.[75] Becoming an HRO requires process improvement in the pursuit of prioritizing safety as a critical component of organizational conduct.[76,77]

Our findings from mapping the outcomes measured in effectiveness evaluations of coach-like interventions could also inform ongoing efforts to improve the quality of VA care. Specifically, the choice of metrics with which to determine the success of QI and coaching activities need to be carefully considered. We found a variety of outcomes used to assess the effectiveness of the coach-like role, including both practice- and provider-level process outcomes as well as patient-level outcomes. An appropriate metric for a given situation must be clinically meaningful and significant to parties at each of these levels (*ie*, administrative leadership and providers).[78] Examples of stakeholder-driven, purposeful selection of quality metrics for VA QI efforts demonstrate the rigor required for the selection process.[79] Recent work by the American College of Physicians has outlined criteria with which to assess the validity of quality measures,[80] including domains such as importance, appropriate care, clinical evidence base, measure specifications, and measure feasibility and applicability. Future work in this area could explore application of these criteria to common outcomes used to assess coaching-like interventions to improve the relevance and utility of studied metrics.

LIMITATIONS

Our findings should be considered within the context of the limitations of the identified literature and of our approach.

Limitations of Identified Literature

Publication Bias

Our findings showed a mix of both positive and negative findings which argues against a significant publication bias, however, given that interventions like transformational coaching are often employed in the context of QI, many of them may never be published. Even when published, not all relevant data may be included. In particular, some studies were excluded for not including eligible process of care outcomes.

Study Quality

We noted some common issues specific to study quality. First, all of the included studies for KQ 1b were cluster-randomized controlled trials (CRTs), including stepped-wedge studies, which is appropriate for a team/practice level intervention such as transformational coaching. However, recruiting and randomizing in clusters creates some particular methodologic challenges. For example, some studies experienced uneven dropout of entire practices across study arms, leading to clinically significant unevenness across arms. In addition, CRTs did not always provide adequate description of both patient- and practice-level characteristics from which to judge the degree of similarity across study arms. Also important for CRTs is incorporation of the effect of clusters for any patient-level analysis (*ie*, intraclass correlation and other approaches); however, this was not always done or at least not always described. Lack of consideration of clustering with patient-level data could over or under estimate true effects. Finally, many included studies did not clearly state the intended primary outcome, or included a large number of apparent primary outcomes (sometimes over 20) without clear power calculations supporting their approach.

For KQ 2 studies, common quality concerns related to the lack of clarity around the relationship of individuals collecting primary qualitative data to the participants, and poorly described recruitment procedures.

Heterogeneity

There were multiple sources of heterogeneity across the included studies. First and foremost, the specific activities of the transformational coach-like roles were varied and not always clearly described. In order to make adequate comparisons and to inform implementation, clear descriptions of not only the coaching activities but also the components of intervention dose (specifically duration, frequency, and amount[81]) will be critical. Moreover, using a framework for strategies employed by the transformational coach (such as CFIR used in this report) will support such comparisons and applications. The duration and time intensity also varied across included studies and could be considered as potential effect modifier in the future. Other contributors to heterogeneity include the size and location of the practices (*eg*, rural vs urban, small vs large), the background training of the coaches themselves (*eg*, nonclinical professionals vs nurses vs physicians), the targeted clinical process of care for QI (*eg*, general QI capacity, disease specific, or general preventive care), and the way outcomes were defined and collection (*eg,* mean proportions, discrete scales, or as a continuous variable). Diverse stakeholder involvement is inconsistently used in both clinical research and QI projects. Incorporating opinions from providers and patients in addition to clinical and administrative leadership could ensure that outcome measures are valid and relevant to all involved parties. In particular for KQ 2 included studies, there was a diversity among who collected the qualitative data. While this can advantageous and contribute to the richness of study findings, if not properly justified or balanced by other perspectives, it can present biased results.

Limitations of Review Approach

It is important to consider methodologic decisions made in our approach to this review and how they may have impacted our findings. First, our review was guided by the operational definition of *transformational coaching,* which is a role defined within the VA setting and which is similar but not identical to other roles (*eg*, practice facilitator, outreach visitor) intended to support the

implementation of evidence-based practices within clinical care settings. While introducing heterogeneity into the included studies, drawing from across scholarly fields offered depth and breadth to the literature included in this review. The eligibility limitations imposed by this operational definition of transformational coaching may have led to the exclusion of related literature that could be relevant to this topic. Second, we limited studies in KQ 1 to those that provided high-quality evidence for coaching effectiveness as determined by EPOC criteria. While supporting the validity of our findings, we have likely missed some QI interventions that did not meet these stringent criteria. Third, we only included studies that supported an isolation of treatment effect for a coaching-like intervention. This led to the inclusion of studies with a minor component of such commonly co-delivered interventions as learning collaboratives but exclusion of studies in which a co-delivered intervention was a major component (defined as using a longitudinal approach). As coaching-like strategies are often employed in conjunction with other interventions, this may have excluded studies that could provide valuable information. Fourth, after extensive consideration and exploration, we determined that the process of care measures used across included studies for KQ 1 were too heterogeneous with respect to the measured outcome and the type of outcome data provided (*eg*, proportions vs means, discrete scales vs dichotomized variables) such that conversion to a common summary statistic for a pooled analysis was statistically inappropriate. This choice limited our ability to draw conclusions about effect size; however, we employed guidance from established review organizations to conduct a systematic vote-counting method to conduct our meta-synthesis.[30] Fifth, for KQ 2, we selected the CFIR framework to guide our analysis of included studies about the barriers and facilitators to uptake of transformational coaching. As there are multiple other potentially relevant frameworks that could have been chosen for the best-fit framework approach, it is possible that other framework choices could have led to different conclusions. Moreover, our approach to synthesis in KQ 2 allowed for overlap in the CFIR domains, particularly for the coach. Coaches have the ability to intervene at both the team level and improvement strategy level to drive the process toward the desired goal. The inclusion of both organizational and coach-implemented facilitators may appear to conflate the facilitator's results; however, they are intrinsically intertwined. Finally, we conducted a certainty of evidence assessment only for those KQ 2 findings mapped to CFIR constructs prioritized by our operational partners. It is possible that other constructs would be prioritized in different contexts.

Applicability of Findings to the VA Population

One VA-based study[44] met our eligibility criteria and was included in the analysis for KQ 1b. However, we believe that all of the included studies provide reasonably direct evidence that would be applicable to the VA primary care setting. Many were conducted in national health care systems outside the United States (*ie*, Denmark, Canada), which share characteristics of common infrastructure and parallel processes. Studies that included small private primary care practices provide less direct evidence, though still could inform the use of transformational coaching-like interventions in small VA community based outpatient clinics. As almost all included studies were conducted in the primary care setting, these findings may not be applicable to specialty care.

RESEARCH GAPS/FUTURE RESEARCH

We identified several gaps in the existing literature that warrant further consideration. To systematically identify the existence of, and reason for, these gaps, we used an existing

framework (Tables 20 and 21). Robinson and colleagues[82] propose the identification of gaps categorically using the PICOTS framework (population, intervention, comparator, outcome, timing, and setting) and classification by reason (insufficient or imprecise information, biased information, inconsistency and/or not the right information). We have adapted this framework approach to identify gaps in the qualitative literature examined in KQ 2 using the SPIDER framework.[25]

Table 20. Evidence Gaps Related to Effectiveness of Transformational Coaching on Process of Care Outcomes

Evidence Gap	Reason	Types of Studies to Consider
Population		
• Clinical teams smaller than the practice level (*eg*, Patient Aligned Care Teams)	• Insufficient information	• CRTs including stepped-wedge trials
Interventions		
• Coaching interventions employing implementation strategies identified as most important and likely most effective (*eg*, technical assistance) • Coaching interventions with transparent description of implementation strategies both planned and delivered • Multiple types of coaching interventions, including those designed to promote general QI capacity, those promoting predetermined QI projects, and those promoting team-driven QI projects	• Insufficient information	• CRTs including stepped-wedge trials
Comparators		
• Continued comparison to usual care/enhanced usual care	• Insufficient information	• CRTs including stepped-wedge trials
Outcomes		
• Consistent use of common clinical process of care measures comparing end of intervention to baseline by treatment arm	• Biased information	• CRTs including stepped-wedge trials
Setting		
• Clinical contexts outside of primary care	• Insufficient information	• CRTs including stepped-wedge trials

Abbreviations: CRT=cluster-randomized trial; QI=quality improvement

Table 21. Evidence Gaps Related to Barriers and Facilitators of Transformational Coaching Implementation

Evidence Gap	Reason	Types of Studies to Consider
Sample		
• All team members receiving coaching (*ie*, not restricting samples to just physicians or facilitators) • Leaders and stakeholders peripherally involved with team receiving coaching with relationship to team clearly delineated • Patient population which is the focus of a given team's QI project	• Insufficient information	• Individual interviews balanced by training/team role • Focus groups separated by training/team role • Surveys
Phenomenon of interest		
• Coaching interventions without non-coaching components • Multiple types of coaching interventions, including those designed to promote general QI capacity, those promoting predetermined QI projects, and those promoting team-driven QI projects • Coaches' decision making with regard to coaching strategy selection • Organizational factors that facilitate/hinder the implementation of coaching interventions • How, for whom, and when coaching works during the QI process	• Insufficient information	• Individual interviews separated by training/team role and throughout the coaching/QI process • Focus groups separated by training/team role surveys • Mixed/multiple method • Observation
Design		
• Continue inclusion of primary data collection from individuals involved in transformational coaching-like interventions	• Insufficient information	• Mixed/multiple method
Evaluation		
• Evaluate determinants of adoption of specific implementation strategies used by transformational coaches	• Insufficient information	• Individual interviews • Focus groups separated by training/team role surveys • Mixed/multiple methods • Observation
Research type		
• Continue inclusion of qualitative studies	• Insufficient information	• Longitudinal qualitative and quantitative studies to further understand the impact of coaching on QI and implementation

Abbreviation: QI=quality improvement

CONCLUSIONS

Transformational coaching is a complex intervention that has the potential to support access to and use of data and technical resources for QI activities at the team and practice level. Transformational coaching, and other interventions with similar characteristics (*ie*, facilitation, outreach visitors), may have an effect on certain process of care activities, including composite process of care outcomes and ordering of labs and vital signs, and possibly on changes in organizational process of care and delivery of appropriate counseling. Differences among studies in the description and dosing of implementation strategies employed by coaches, as well as outcome measurement, precluded a more definitive estimate of effects. Specific strategies like adapting coaching techniques to team needs and preferences appears to be better received than other strategies. Future research that standardizes and provides more detail about how coaching interventions are used will better support future comparisons and implementation efforts.

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APPENDIX A. SEARCH STRATEGIES

KEY QUESTION 1

Database: MEDLINE (via Ovid)

Search date: 10/8/2019

1	((coach or coaches or coaching or mentor or mentors or mentorship or leader or leaders or leadership) and transformational).ti,ab.	953
2	((coach or coaches or coaching) adj3 (practice or unit or "health system" or "health systems" OR clinical OR QI OR "quality improvement" OR interprofessional OR "practice enhancement")).ti,ab.	402
3	((advisor or advisors) adj4 (practice or "health system" or "health systems" or unit or "practice enhancement")).ti,ab.	37
4	((assistant or assistants) adj4 "practice enhancement").ti,ab.	6
5	(external adj4 internal adj4 (facilitator or facilitators or facilitation)).ti,ab.	46
6	("practice champion" or "practice champions" or "practice moderator" or "practice moderators" or "coach strategy" or "coaching strategy" or "coach strategies" or "coaching strategies" or "practice facilitator" or "practice facilitators" or "practice facilitation" or "project facilitator" or "project facilitators" or "project facilitation" or "change agent" or "change agents" or "facilitation intervention" OR "implementation facilitator" OR "implementation facilitators" OR "implementation facilitation" OR "nurse facilitator" OR "nurse facilitators" OR "nurse facilitation").ab,ti.	1359
7	1 or 2 or 3 or 4 or 5 or 6	2769
8	exp Evaluation Studies as Topic/	1016800
9	exp Cohort Studies/	1906026
10	exp Longitudinal Studies/	127276
11	randomized controlled trial.pt.	491034
12	controlled clinical trial.pt.	93308
13	comparative study.pt.	1841804
14	clinical trial.pt.	518304
15	evaluation studies.pt.	246280
16	(randomized or randomised or randomization or randomisation or placebo or randomly or trial or groups or "clinical trial" or "clinical trials" or "evaluation study" or "evaluation studies" or "intervention study" or "intervention studies" or cohort or longitudinal or longitudinally or prospective or prospectively or "follow up" or "comparative study" or "comparative studies" or nonrandom or "non-random" or nonrandomized or "non-randomized" or nonrandomised or "non-randomised").ti,ab.	4415642
17	(quasi-experiment* or quasiexperiment* or quasirandom* or quasi-random* or quasi-control* or quasicontrol*).ti,ab.	17600
18	("pre-post" or posttest or "post-test" or pretest or "pre-test" or "repeated measure" or "repeated measures").ti,ab.	68961
19	(before and after).ti,ab.	712412
20	(before and during).ti,ab.	373111
21	("time series" and interrupt*).ti,ab.	2792
22	("time points" and (multiple or one or two or three or four or five or six or seven or eight or nine or ten or month or monthly or day or daily or week or weekly or hour or hourly)).ti,ab.	60555
23	8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22	7628476
24	7 and 23	944

Database: EMBASE (via Elsevier)

Search date: 10/8/2019

1	((coach:ab,ti or coaches:ab,ti or coaching:ab,ti or mentor:ab,ti or mentors:ab,ti or mentorship:ab,ti or leader:ab,ti or leaders:ab,ti or leadership:ab,ti) and transformational:ab,ti)	1002
2	((coach or coaches or coaching) NEAR/4 (practice or unit or 'health system' or 'health systems' OR clinical OR QI OR 'quality improvement' OR interprofessional OR 'practice enhancement')):ab,ti	698
3	((advisor or advisors) NEAR/4 (practice or 'health system' or 'health systems' or unit or 'practice enhancement')):ab,ti	53
4	((assistant or assistants) NEAR/4 'practice enhancement'):ab,ti	6
5	(external NEAR/4 internal NEAR/4 (facilitator or facilitators or facilitation)):ab,ti	53
6	('practice champion' or 'practice champions' or 'practice moderator' or 'practice moderators' or 'coach strategy' or 'coaching strategy' or 'coach strategies' or 'coaching strategies' or 'practice facilitator' or 'practice facilitators' or 'practice facilitation' or 'project facilitator' or 'project facilitators' or 'project facilitation' or 'change agent' or 'change agents' or 'facilitation intervention' OR 'implementation facilitator' OR 'implementation facilitators' OR 'implementation facilitation' OR 'nurse facilitator' OR 'nurse facilitators' OR 'nurse facilitation'):ab,ti	1592
7	1 or 2 or 3 or 4 or 5 or 6	3358
8	'randomized controlled trial'/exp OR 'crossover procedure'/exp OR 'double blind procedure'/exp OR 'single blind procedure'/exp OR randomization:ti,ab OR randomisation:ti,ab OR randomized:ti,ab OR randomised:ti,ab OR randomly:ti,ab OR crossover:ti,ab OR 'cross over':ti,ab OR placebo:ti,ab OR 'double blind':ti,ab OR 'double blinded':ti,ab OR 'single blind':ti,ab OR 'single blinded':ti,ab OR 'clinical study'/exp OR 'clinical trial':ti,ab OR 'clinical trials':ti,ab OR 'controlled study'/exp OR 'evaluation study'/exp OR 'evaluation study':ti,ab OR 'evaluation studies':ti,ab OR 'intervention study'/exp OR 'intervention study':ti,ab OR 'intervention studies':ti,ab OR 'case control study'/exp OR 'case control':ti,ab OR 'cohort analysis'/exp OR cohort:ti,ab OR cohorts:ti,ab OR longitudinal:ti,ab OR longitudinally:ti,ab OR prospective:ti,ab OR prospectively:ti,ab OR retrospective:ti,ab OR 'follow up'/exp OR 'follow up':ti,ab OR 'comparative effectiveness'/exp OR 'comparative study'/exp OR 'comparative study':ti,ab OR 'comparative studies':ti,ab	15801633
9	'pre post':ti,ab OR prepost:ti,ab OR 'post test':ti,ab OR posttest:ti,ab OR pretest:ti,ab OR 'pre test':ti,ab OR 'quasi experiment':ti,ab OR quasiexperiment:ti,ab OR 'quasi experimental':ti,ab OR quasiexperimental:ti,ab OR quasirandom:ti,ab OR 'quasi random':ti,ab OR 'quasi control':ti,ab OR quasicontrol:ti,ab OR 'repeated measure':ti,ab OR 'repeated measures':ti,ab	114686
10	('time series':ti,ab AND interrupt:ti,ab) OR (before:ti,ab AND after:ti,ab) OR (before:ti,ab AND during:ti,ab)	1250928
11	'time points':ti,ab AND (multiple:ti,ab OR one:ti,ab OR two:ti,ab OR three:ti,ab OR four:ti,ab OR five:ti,ab OR six:ti,ab OR seven:ti,ab OR eight:ti,ab OR nine:ti,ab OR ten:ti,ab OR month:ti,ab OR monthly:ti,ab OR day:ti,ab OR days:ti,ab OR daily:ti,ab OR week:ti,ab OR weekly:ti,ab OR hour:ti,ab OR hourly:ti,ab)	102813
12	8 OR 9 OR 10 OR 11	16230359
13	7 AND 12	1176

Database: CINAHL Complete (via EBSCO)

Search date: 10/8/2019

1	TI (coach or coaches or coaching or mentor or mentors or mentorship or leader or leaders or leadership) OR AB (coach or coaches or coaching or mentor or mentors or mentorship or leader or leaders or leadership)	68060
2	TI (transformational) OR AB (transformational)	1888
3	1 AND 2	1131
4	TI ("practice coach" OR "practice coaches" OR "practice coaching" OR "unit coach" OR "unit coaches" OR "unit coaching" OR "health system coach" OR "health system coaches" OR "health system coaching" OR "clinical coach" OR "clinical coaches" OR "clinical coaching" OR "QI coach" OR "QI coaches" OR "QI coaching" OR "quality improvement coach" OR quality improvement coaches" OR "quality improvement coaching" OR "interprofessional coach" OR "interprofessional coaches" OR "interprofessional coaching" OR "practice enhancement coach" OR "practice enhancement coaching" OR "practice enhancement coaches") OR AB TI ("practice coach" OR "practice coaches" OR "practice coaching" OR "unit coach" OR "unit coaches" OR "unit coaching" OR "health system coach" OR "health system coaches" OR "health system coaching" OR "clinical coach" OR "clinical coaches" OR "clinical coaching" OR "QI coach" OR "QI coaches" OR "QI coaching" OR "quality improvement coach" OR quality improvement coaches" OR "quality improvement coaching" OR "interprofessional coach" OR "interprofessional coaches" OR "interprofessional coaching" OR "practice enhancement coach" OR "practice enhancement coaching" OR "practice enhancement coaches")	33
5	TI (advisor OR advisors) OR AB (advisor OR advisors)	6145
6	TI (practice or "health system" or "health systems" or unit or "practice enhancement") OR AB (practice or "health system" or "health systems" or unit or "practice enhancement")	514841
7	5 AND 6	496
8	TI (assistant or assistants) OR AB (assistant OR assistants)	14849
9	TI ("practice enhancement") OR AB ("practice enhancement")	26
10	8 AND 9	4
11	TI (external AND internal) OR AB (external AND internal)	10758
12	TI (facilitator or facilitators or facilitation) OR AB (facilitator or facilitators or facilitation)	15928
13	11 AND 12	154
14	TI ("practice champion" or "practice champions" or "practice moderator" or "practice moderators" or "coach strategy" or "coaching strategy" or "coach strategies" or "coaching strategies" or "practice facilitator" or "practice facilitators" or "practice facilitation" or "project facilitator" or "project facilitators" or "project facilitation" or "change agent" or "change agents" or "facilitation intervention" OR "implementation facilitator" OR "implementation facilitators" OR "implementation facilitation" OR "nurse facilitator" OR "nurse facilitators" OR "nurse facilitation") OR AB ("practice champion" or "practice champions" or "practice moderator" or "practice moderators" or "coach strategy" or "coaching strategy" or "coach strategies" or "coaching strategies" or "practice facilitator" or "practice facilitators" or "practice facilitation" or "project facilitator" or "project facilitators" or "project facilitation" or "change agent" or "change agents" or "facilitation intervention" OR "implementation facilitator" OR "implementation facilitators" OR "implementation facilitation" OR "nurse facilitator" OR "nurse facilitators" OR "nurse facilitation")	1103
15	3 OR 4 OR 7 OR 10 OR 13 OR 14	2896
16	(MH "Randomized Controlled Trials+") OR TI ("randomized controlled trial" OR "controlled clinical trial" OR "randomized" OR "randomization" OR	775384

	"randomised" OR "randomisation" OR "randomly" OR "trial" OR "groups" OR "comparative study" OR "nonrandom" OR "non-random" OR "nonrandomized" OR "non-randomized" OR "nonrandomised" OR "non-randomised" OR quasi-experiment* OR quasiexperiment* OR quasirandom* OR quasi-random* OR quasi-control* OR quasicontrol* OR (controlled AND (trial OR study)) OR "pre-post" OR "posttest" OR "post-test" OR "pretest" OR "pre-test" OR "repeated measure" OR "repeated measures" OR ("time series" AND "interrupt") OR ("time points" AND (multiple OR one OR two OR three OR four OR five OR six OR seven OR eight OR nine OR ten OR month OR monthly OR day OR daily OR week OR weekly OR hour OR hourly)) OR (before AND after) OR (before AND during)) OR AB ("randomized controlled trial" OR "controlled clinical trial" OR "randomized" OR "randomization" OR "randomised" OR "randomisation" OR "randomly" OR "trial" OR "groups" OR "comparative study" OR "nonrandom" OR "non-random" OR "nonrandomized" OR "non-randomized" OR "nonrandomised" OR "non-randomised" OR quasi-experiment* OR quasiexperiment* OR quasirandom* OR quasi-random* OR quasi-control* OR quasicontrol* OR (controlled AND (trial OR study)) OR "pre-post" OR "posttest" OR "post-test" OR "pretest" OR "pre-test" "repeated measure" OR "repeated measures" OR ("time series" AND "interrupt") OR ("time points" AND (multiple OR one OR two OR three OR four OR five OR six OR seven OR eight OR nine OR ten OR month OR monthly OR day OR daily OR week OR weekly OR hour OR hourly)) OR (before AND after) OR (before AND during))	
17	15 AND 16	489

KEY QUESTION 2

Database: MEDLINE (via Ovid)

Search date: 10/8/2019

1	((coach or coaches or coaching or mentor or mentors or mentorship or leader or leaders or leadership) and transformational).ti,ab.	953
2	((coach or coaches or coaching) adj3 (practice or unit or "health system" or "health systems" OR clinical OR QI OR "quality improvement" OR interprofessional OR "practice enhancement")).ti,ab.	402
3	((advisor or advisors) adj4 (practice or "health system" or "health systems" or unit or "practice enhancement")).ti,ab.	37
4	((assistant or assistants) adj4 "practice enhancement").ti,ab.	6
5	(external adj4 internal adj4 (facilitator or facilitators or facilitation)).ti,ab.	46
6	("practice champion" or "practice champions" or "practice moderator" or "practice moderators" or "coach strategy" or "coaching strategy" or "coach strategies" or "coaching strategies" or "practice facilitator" or "practice facilitators" or "practice facilitation" or "project facilitator" or "project facilitators" or "project facilitation" or "change agent" or "change agents" or "facilitation intervention" OR "implementation facilitator" OR "implementation facilitators" OR "implementation facilitation" OR "nurse facilitator" OR "nurse facilitators" OR "nurse facilitation").ab,ti.	1359
7	1 or 2 or 3 or 4 or 5 or 6	2769
8	exp qualitative research/	49182
9	exp Focus Groups/	27720
10	exp Interviews as Topic/	58980
11	"Surveys and Questionnaires"/	438043
12	exp Health Care Surveys/	35787

13	(qualitative or qualitatively or interview or interviewed or interviews or interviewing or interviewer or interviewers or survey or surveys or surveyed or surveying or questionnaire or questionnaires or "focus group" or "focus groups" or "mixed method" or "mixed methods" or theme or themes or thematic or "group discussion" or "group discussions").ab,ti.	1429055
14	8 or 9 or 10 or 11 or 12 or 13	1575514
15	7 AND 14	1091
16	15 NOT (case reports.pt OR editorial.pt OR letter.pt OR comment.pt)	1084

Database: EMBASE (via Elsevier)

Search date: 10/8/2019

1	((coach:ab,ti or coaches:ab,ti or coaching:ab,ti or mentor:ab,ti or mentors:ab,ti or mentorship:ab,ti or leader:ab,ti or leaders:ab,ti or leadership:ab,ti) and transformational:ab,ti)	1002
2	((coach or coaches or coaching) NEAR/4 (practice or unit or 'health system' or 'health systems' OR clinical OR QI OR 'quality improvement' OR interprofessional OR 'practice enhancement')):ab,ti	698
3	((advisor or advisors) NEAR/4 (practice or 'health system' or 'health systems' or unit or 'practice enhancement')):ab,ti	53
4	((assistant or assistants) NEAR/4 'practice enhancement'):ab,ti	6
5	(external NEAR/4 internal NEAR/4 (facilitator or facilitators or facilitation)):ab,ti	53
6	('practice champion' or 'practice champions' or 'practice moderator' or 'practice moderators' or 'coach strategy' or 'coaching strategy' or 'coach strategies' or 'coaching strategies' or 'practice facilitator' or 'practice facilitators' or 'practice facilitation' or 'project facilitator' or 'project facilitators' or 'project facilitation' or 'change agent' or 'change agents' or 'facilitation intervention' OR 'implementation facilitator' OR 'implementation facilitators' OR 'implementation facilitation' OR 'nurse facilitator' OR 'nurse facilitators' OR 'nurse facilitation'):ab,ti	1592
7	1 or 2 or 3 or 4 or 5 or 6	3358
8	'qualitative research'/exp OR 'interview'/exp OR 'surveys'/exp OR 'questionnaire'/exp OR 'mixed methods'/exp	926104
9	(qualitative or qualitatively or interview or interviewed or interviews or interviewing or interviewer or interviewers or survey or surveys or surveyed or surveying or questionnaire or questionnaires or 'focus group' or 'focus groups' or 'mixed method' or 'mixed methods' or theme or themes or thematic or 'group discussion' or 'group discussions'):ab,ti	1930573
10	8 OR 9	2087733
11	7 AND 10	1369
12	11 NOT ('case report'/exp OR 'case study'/exp OR 'editorial'/exp OR 'letter'/exp OR 'note'/exp OR [conference abstract]/lim)	1062

Database: CINAHL Complete (via EBSCO)

Search date: 10/8/2019

1	TI (coach or coaches or coaching or mentor or mentors or mentorship or leader or leaders or leadership) OR AB (coach or coaches or coaching or mentor or mentors or mentorship or leader or leaders or leadership)	68060
2	TI (transformational) OR AB (transformational)	1888
3	1 AND 2	1131
4	TI ("practice coach" OR "practice coaches" OR "practice coaching" OR "unit coach" OR "unit coaches" OR "unit coaching" OR "health system coach" OR "health system coaches" OR "health system coaching" OR "clinical coach" OR	33

	"clinical coaches" OR "clinical coaching" OR "QI coach" OR "QI coaches" OR "QI coaching" OR "quality improvement coach" OR quality improvement coaches" OR "quality improvement coaching" OR "interprofessional coach" OR "interprofessional coaches" OR "interprofessional coaching" OR "practice enhancement coach" OR "practice enhancement coaching" OR "practice enhancement coaches") OR AB TI ("practice coach" OR "practice coaches" OR "practice coaching" OR "unit coach" OR "unit coaches" OR "unit coaching" OR "health system coach" OR "health system coaches" OR "health system coaching" OR "clinical coach" OR "clinical coaches" OR "clinical coaching" OR "QI coach" OR "QI coaches" OR "QI coaching" OR "quality improvement coach" OR quality improvement coaches" OR "quality improvement coaching" OR "interprofessional coach" OR "interprofessional coaches" OR "interprofessional coaching" OR "practice enhancement coach" OR "practice enhancement coaching" OR "practice enhancement coaches")	
5	TI (advisor OR advisors) OR AB (advisor OR advisors)	6145
6	TI (practice or "health system" or "health systems" or unit or "practice enhancement") OR AB (practice or "health system" or "health systems" or unit or "practice enhancement")	514841
7	5 AND 6	496
8	TI (assistant or assistants) OR AB (assistant OR assistants)	14849
9	TI ("practice enhancement") OR AB ("practice enhancement")	26
10	8 AND 9	4
11	TI (external AND internal) OR AB (external AND internal)	10758
12	TI (facilitator or facilitators or facilitation) OR AB (facilitator or facilitators or facilitation)	15928
13	11 AND 12	154
14	TI ("practice champion" or "practice champions" or "practice moderator" or "practice moderators" or "coach strategy" or "coaching strategy" or "coach strategies" or "coaching strategies" or "practice facilitator" or "practice facilitators" or "practice facilitation" or "project facilitator" or "project facilitators" or "project facilitation" or "change agent" or "change agents" or "facilitation intervention" OR "implementation facilitator" OR "implementation facilitators" OR "implementation facilitation" OR "nurse facilitator" OR "nurse facilitators" OR "nurse facilitation") OR AB ("practice champion" or "practice champions" or "practice moderator" or "practice moderators" or "coach strategy" or "coaching strategy" or "coach strategies" or "coaching strategies" or "practice facilitator" or "practice facilitators" or "practice facilitation" or "project facilitator" or "project facilitators" or "project facilitation" or "change agent" or "change agents" or "facilitation intervention" OR "implementation facilitator" OR "implementation facilitators" OR "implementation facilitation" OR "nurse facilitator" OR "nurse facilitators" OR "nurse facilitation")	1103
15	3 OR 4 OR 7 OR 10 OR 13 OR 14	2896
16	(MH "Qualitative Studies+") OR (MH "Focus Groups") OR (MH "Interviews+") OR (MH "Surveys") OR (MH "Narratives+") OR TI (qualitative OR qualitatively OR interview OR interviewed OR interviews OR interviewing OR interviewer OR interviewers OR survey OR surveys OR surveyed OR surveying OR questionnaire OR questionnaires OR "focus group" OR "focus groups" OR "mixed method" OR "mixed methods" OR theme OR themes OR thematic "group discussion" OR "group discussions") OR AB (qualitative OR qualitatively OR interview OR interviewed OR interviews OR interviewing OR interviewer OR interviewers OR survey OR surveys OR surveyed OR surveying OR questionnaire OR questionnaires OR "focus group" OR "focus groups" OR "mixed method" OR "mixed methods" OR theme OR themes OR thematic OR "group discussion" OR "group discussions")	725243
17	15 AND 16	1208

APPENDIX B. STUDY CHARACTERISTICS TABLES

For full study citations, please refer to the main report's reference list.

KEY QUESTION 1

Study Country # Enrolled # Arms Funding Source Companion Paper	Eligibility	Intervention Duration Name of coaching role Intervention Description	# Team Members Team Composition: N (%) VA-based?	Primary Outcomes Outcomes Type	Risk of Bias
Carroll, 2018[39] USA 42 practices 2 arms NIDDK	Non-hospital based, ambulatory primary care practices with at least 1 physician and a minimum of 2000 patients seen in past year	Duration: 36 months Coaching role: practice facilitator Practice facilitation (PF) arm received site coordination, identified a local physician champion (had an academic mentor); audit and feedback; creation of QI team; and education via academic detailing. PF delivered virtually, to assist with goal-setting, help QI teams strategize/ test/ implement change, facilitate meetings and foster continuous QI culture, liaison for data and performance feedback and share best practices and linking intervention practices.	# team members: NR Team composition: NR VA: No	Annualized loss of eGFR (protocol paper gives "patient-level score based on % of goals achieved" as primary outcome) Outcome type: process of care activities	Objective: High Self-reported: NA
Chinman, 2017[44] USA 69 teams 2 arms	The 3 HUD-VASH teams were selected based on their willingness to participate and	Duration: 12-23 months Coaching role: technical assistance	# team members: NR Team composition: Case manager: 100%	NR (2 outcomes noted in Abstract; Adoption and Reach of MISSION-Vet)	Objective: Unclear Self-reported:

Study Country # Enrolled # Arms Funding Source Companion Paper	Eligibility	Intervention Duration Name of coaching role Intervention Description	# Team Members Team Composition: N (%) VA-based?	Primary Outcomes Outcomes Type	Risk of Bias
VA HSR&D QUERI	similarity to each other in terms of Veteran composition. Within the 3 HUD-VASH teams, all case managers were invited to participate.	A 10-step process to build capacity for implementation of evidence-based practices was used, called Getting to Outcomes (GTO). This involved a manual, 6-hour training, and ongoing technical assistance, which consisted of bi-weekly phone calls to help sub-teams implement GTO practices. Meetings included goal-setting, tailoring of performance targets, additional training to address gaps, reviewing performance data and troubleshooting.	VA: Yes	Outcome type: process of care activities	
Dickinson, 2014[42] USA 40 practices 3 arms NIDDK; NIMH	Small to midsize community health centers and independent mixed-payer primary care practices in Colorado	Duration: 6, 12, or 18 months, depending on arm Coaching role: practice facilitator Practice facilitator met with practices over 18 months an average of 9.7 times. Practices in the CQI group received practice facilitation based on the Model for Improvement. The CQI facilitators provided a structure and process for quality improvement using CQI tools that particularly focused on sequential PDSA cycles guided by quality measurement data.	# team members: NR Team composition: NR VA: No	Diabetes process of care Outcome type: process of care activities	Objective: High risk Self-reported: Unclear risk

Study Country # Enrolled # Arms Funding Source Companion Paper	Eligibility	Intervention Duration Name of coaching role Intervention Description	# Team Members Team Composition: N (%) VA-based?	Primary Outcomes Outcomes Type	Risk of Bias
Dickinson, 2019[38] USA 36 practices 3 arms NIDDK	Family medicine or general internal medicine practices with at least 80 patients with type 2 diabetes, all clinicians agreeing to participate	Duration: NR Coaching role: practice facilitator Short-term PF by a "trained" practice facilitator; 4 meetings to assist with Connection to Health (CTH) adoption plan, followed by monthly PF calls to review data with practice on CTH use; optional booster session; control arm included self-management support education (SMS ED).	# team members: NR Team composition: • CTH+PF intervention clinicians: mean 6.1 (SD 4.3) • CTH intervention clinicians: mean 7.3 (SD .41) • SMS ED control clinicians: • mean 7.4 (SD 3.4) VA: No	HbA1c, systolic and diastolic blood pressure, body mass index Outcome type: process of care activities	Objective: Unclear Self-reported: NA
Due, 2014[49] Denmark 186 practices 2 arms Danish Research Foundation; Health Insurance foundation; Research Foundation for Primary Care	Consecutively included Danish general practices that signed up for facilitation visits and completed a baseline questionnaire	Duration: 9 months Coaching role: facilitator Facilitators helped define goals and suitable means for achieving, support a process of change, demonstrate instruments, standardized visit reports	# team members: NR Team composition: NR VA: No	Change in # of annual chronic disease checkups per 100 patients affiliated with the practice Outcome type: process of care activities	Objective: Unclear Self-reported: High
Engels, 2006[50] Netherlands 49 practices 2 arms Netherlands Organisation for	Primary care practices that were on a list for a practice assessment using the national Dutch Visitation	Duration: 1 year Coaching role: outreach visitor After initial assessment, the practices in the intervention group	# team members: NR Team composition: NR VA: No	NR Outcome types: process of care activities; goal attainment	Objective: NA Self-reported: Low

Study Country # Enrolled # Arms Funding Source Companion Paper	Eligibility	Intervention Duration Name of coaching role Intervention Description	# Team Members Team Composition: N (%) VA-based?	Primary Outcomes Outcomes Type	Risk of Bias
Health Research and Development	Instrument for Practice management were contacted	undertook a CQI process with the help of an "outreach visitor." Outreach visitors were all experienced practice assistants who had also participated in a 3-day training program to learn how to organize the QI meetings, guide the practice team through the steps of the CQI model and deal with group processes in general.			
Goodwin, 2001[18] USA 79 practices 2 arms NCI; Family Practice Research Center from American Academy of Family Physicians Companion paper: Stange, 2003[83]	Members of the Ohio Academy of Family Physicians practicing in northeast Ohio were invited to participate	Duration: 12 months Coaching role: nurse facilitator Nurse facilitator worked with individual practices during 1-day practice assessment to inform strategy tailoring, complete a practice environment checklist, then during 1.5 hour meetings using peer data comparison, supported strategy choices, planed generation for change, identified a practice leader, provided a manual and conducted several follow up visits.	# team members: NR Team composition: NR VA: No	Rate of patients being up to date on USPSTF recommended prevention services by medical record review = # preventive services up-to-date by age/sex eligible/total eligible Outcome type: process of care activities	Objective: Unclear Self-reported: NA
Harris, 2015[55] Australia 32 practices	Primary care practices with use of EHR, which could be	Duration: 6 months Coaching role: practice facilitator	# team members: NR Team composition:	Change in proportion of patients aged 40-	Objective: High

Study Country # Enrolled # Arms Funding Source Companion Paper	Eligibility	Intervention Duration Name of coaching role Intervention Description	# Team Members Team Composition: N (%) VA-based?	Primary Outcomes Outcomes Type	Risk of Bias
2 arms National Health and Medical Research Council; Australian National Heart Foundation	audited as well as employment of a practice nurse	Facilitation included a training workshop, 3 practice visits with GP, practice nurse, and possibly office manager; 3 follow-up phone calls; clinical audit provided to practices; goal setting, local resource provision, problem solving.	• MD: 83 • PN: 40 VA: No	69 years with smoking status, alcohol intake, body mass index (BMI), waist circumference, blood pressure recorded, and for those aged 45-69 years with lipids, fasting blood glucose and cardiovascular risk in the medical record Outcome types: process of care activities; self-efficacy	Self-reported: Low
Hogg, 2008[53] Canada 54 practices 2 arms CIHR	Primary care practices (solo or group) in Eastern Ontario with 6 or fewer physicians	Duration: 11.5 months Coaching role: outreach facilitator One of 2 nurses would make monthly visits to a practice. Practice facilitation included feedback from an initial audit, discussion of the use of tools such as prevention flow sheets, chart flags, sticker reminders, electronic reminders, patient care	# team members: NR Team composition: • Intervention physicians: mean 3.5 • Control physicians: mean 2.6 VA: No	Composite index of preventive performance, defined as the number of appropriate preventive maneuvers done minus the number of inappropriate maneuvers done,	Objective: Low Self-reported: NA

Study Country # Enrolled # Arms Funding Source Companion Paper	Eligibility	Intervention Duration Name of coaching role Intervention Description	# Team Members Team Composition: N (%) VA-based?	Primary Outcomes Outcomes Type	Risk of Bias
		records, *etc*, and developing a plan for improvement with physicians. Periodic follow-up visits (every 3-6 weeks) involved monitoring progress on plan and making any adjustments.		divided by the total number of eligible preventive maneuvers Outcome type: process of care activities	
Lemelin, 2001[54]refid: 2987 Canada 46 practices 2 arms Ontario Ministry of Health	Community primary care practices with a payment system based primarily on capitation. HSOs located in remote areas were excluded because of cost, and the HSO in which investigators worked were also excluded	Duration: 18 months Coaching role: facilitator Nursing prevention facilitators met with up to 8 practices in person and via email. They used 7 intervention strategies: audit and ongoing feedback, consensus building, opinion leaders and networking, academic detailing and education materials, reminder systems, patient-mediated activities, patient education materials.	# team members: NR Team composition: • Intervention: MD: mean 2.91; RN: mean 1.16 • Comparator MD: mean 2.70; RN: mean 1.64 VA: No	Overall index of preventive performance (calculated by subtracting the proportion of patients receiving inappropriate preventative maneuvers from the proportion of patients who received the 8 recommended preventive maneuvers) Outcome type: process of care activities	Objective: Unclear Self-reported: NA
Liddy, 2015[52] Canada	Eligible practices provided general	Duration: 2 years	# team members: 182 providers	"Quality of care composite score"	Objective: Unclear

Study Country # Enrolled # Arms Funding Source Companion Paper	Eligibility	Intervention Duration Name of coaching role Intervention Description	# Team Members Team Composition: N (%) VA-based?	Primary Outcomes Outcomes Type	Risk of Bias
84 practices 3 stepped-wedge clusters Ontario Ministry of Health; Pfizer Canada (indirectly); CIHR; Ottawa Hospital Companion paper: Deri Armstrong, 2016[84]	primary care and were in operation for at least 2 years	Coaching role: practice facilitator Practice outreach facilitation (audit and feedback, consensus building and regular meetings to focus on goal setting, planning and implementation via PDSA cycles, interactive collaborative meetings [a series of half-day]) with chronic care model (decision support, community resources, self-management support ad delivery system redesign).	Family physicians: 100% VA: No	= patient-level score intended to reflect adherence to recommended guidelines for cardiovascular disease Outcome type: processes of care	Self-reported: NA
Lobo, 2002[51] Netherlands 124 practices 2 arms Netherlands Heart Foundation	Primary care practices with the presence of a computer system, ancillary staff present, and no major changes planned during the course of the project.	Duration: 21 months Coaching role: outreach visitor Coach was an "outreach visitor," met with teams for 15 visits (first 8 visits were dedicated to organization of preventive care, last 7 visits were dedicated to clinical decision making), coaching interactions followed theoretical model of change intervention allowed practice members to draw up and prioritize their own list of gaps and planned changes. The intervention focused on 6 aspects of practice organization: availability of instruments and	# team members NR Team composition: • Intervention: GP: 57 (% of practices with 1 GP); practice assistants 27 (% with only one practice assistant) • Comparator: GP: 55 (% of practices with 1 GP); practice assistants: 32 (% with only one practice assistant) VA: No	Difference between the deficiency scores in each aspect of organizing preventive care before and after the intervention; this enabled consideration of the ratio of baseline score and postintervention score.	Objective: Low Self-reported: Low

Study Country # Enrolled # Arms Funding Source Companion Paper	Eligibility	Intervention Duration Name of coaching role Intervention Description	# Team Members Team Composition: N (%) VA-based?	Primary Outcomes Outcomes Type	Risk of Bias
		materials, involvement of the practice assistant in preventive tasks, presence of separate preventive clinics, teamwork within the practice, record-keeping and follow-up routines.		Outcome type: process of care activities	
Margolis, 2004[46] USA 44 practices 2 arms AHRQ; US Bureau of Maternal and Child Health; NC Division of Medical Assistance; NC AHEC; RWJF	Primary care practices near UNC Chapel Hill and Charlotte AHEC; sufficient newborns enrolled, not an academic affiliate or publicly funded center, annual Medicaid billing >$50,000	Duration: 2 years Coaching role: project staff Practices form teams and review chart abstractions, academic detailing, selection of goals and strategies; project staff (coach in this case) provide tools and help with customizing; help teams run PDSA cycles, spread of positive outcomes to other staff	# team members NR Team composition: • Intervention: clinicians: mean 5.6 (range: 1 to 12); staff: mean 17.0 (range: 1 to 56) • Control: clinicians: mean 4.4 (range: 1, 12); staff: mean 14.1 (range: 3 to 31) VA: No	Change over time of proportion of children in each practice who received all 4 services (immunizations, screening for anemia, screening for lead, screening for TB) Outcome type: process of care activities	Objective: Low Self-reported: NA
Meropol, 2014[41] USA 30 practices 2 arms Medicaid Technical Assistance and Policy Program; Center for Child	Primary care practices were identified through 2 PBRNs; practices had at least 15% of patients 10 years of age or younger and at least 20% of pediatric patients	Duration: 6 months Coaching role: practice facilitator Practice coaching and rapid-cycle feedback/change to improve delivery of recommended pediatric preventive services in 3 domains. During weekly visits, the	# team members NR Team composition: • Intervention clinicians per practice: mean 3.5 (SD 2.34); nonclinician staff: mean 4.74 (SD 3.97)	NR Outcome type: process of care activities	Objective: Low Self-reported: NA

Study Country # Enrolled # Arms Funding Source Companion Paper	Eligibility	Intervention Duration Name of coaching role Intervention Description	# Team Members Team Composition: N (%) VA-based?	Primary Outcomes Outcomes Type	Risk of Bias
Health and Policy at Rainbow Babies	covered by Medicaid insurance, and agreed to provide at least 2 of 3 targeted services and participate in educational meetings and chart reviews	facilitator reviewed a small convenience sample of charts from the previous week and documented whether targeted services were performed; plotted each week's results on "run charts"; and "huddled" briefly with available practice members to review run charts, assess what had worked, brainstorm solutions for further improvement, and select new tools/procedures to implement during the coming week.	• Control clinicians per practice: mean 3.64 (SD 2.27); nonclinician staff: mean 3.14 (SD 1.67) VA: No		
Mold, 2014[40] USA 45 practices 4 arms NHLBI	Primary care practices were members of 1 of 3 practice-based research networks in Oklahoma or New York	Duration: 6 months Coaching role: practice facilitator Assistance from practice facilitator during visits either half day weekly or a full day every other week to assist practice with meeting goals.	# team members: NR; # practices with mid-level practitioners: 27 (63%) VA: No	NR explicitly; appears to be adherence to 6 guideline recommendations Outcome type: process of care activities	Objective: Unclear Self-reported: NA
Ornstein, 2004[47] USA 20 practices 2 arms AHRQ; DHHS	Primary care practices that are community-based family or general internal medicine practices with the	Duration: 2 years Coaching role: NA (coaching by team of people)	# team members: NR Team composition: • MD: 45 • Mid-level providers: 17 VA: No	Primary practice-level outcome was the percentage of performance targets achieved; primary patient-	Objective: High risk Self-reported: NA

Study Country # Enrolled # Arms Funding Source Companion Paper	Eligibility	Intervention Duration Name of coaching role Intervention Description	# Team Members Team Composition: N (%) VA-based?	Primary Outcomes Outcomes Type	Risk of Bias
	same electronic medical record.	Multimethod quality improvement intervention that included 6-7 site visits, audit and feedback as well as 2 network meetings. The site visits were led by one of the coauthors and included engaging clinicians and staff in the project, general education and group discussion. Teams also identified specific clinical indicators that they wished to work on.		level outcome was the percentage of patients for whom the recommended process measures had occurred or the recommended outcome measure had been achieved Outcome type: process of care activities; goal attainment	
Parchman, 2013[43] USA 40 practices 2 arms NIDDK; Audie L. Murphy Veterans Hospital, Veterans Health Administration Companion paper: Noel, 2014[85]	Small, autonomous primary care practices in South Texas Exclusion criteria: • Multi-specialty practices • Practice owned by a large vertically integrated health care system	Duration: 12 months Coaching role: practice facilitator Coach was a practice facilitator who coached practices to implement changes of delivery of care to improve diabetes care, primary care teams consisting of providers and non-providers. Practice facilitators held a minimum of 6 one-hour team meetings within each practice over a 12-month period of time.	# team members: NR Team composition: • MD or DO: 15.4% • NP: 3.6% • PA: 2.9% • RN/LVN: 5.4% • Medical Assistant: 31.8% • Receptionist: 12.1% • Office manager: 7.5% • Other: 21.4%	Certified Case Manager score Outcome type: process of care activities	Objective: NA Self-reported: Low

Study Country # Enrolled # Arms Funding Source Companion Paper	Eligibility	Intervention Duration Name of coaching role Intervention Description	# Team Members Team Composition: N (%) VA-based?	Primary Outcomes Outcomes Type	Risk of Bias
	• Practices with 5 or more physicians	PF efforts, baseline chart audit, and feedback, as well as interactive consensus building and goal setting, were incorporated into the intervention.	VA: No		
Rask, 2001[45] USA 4 practices 2 arms Aetna Inc. through the Quality Care Research Fund	Community-based clinics that are part of a larger primary care center located in Atlanta, Georgia. Clinics were selected for the study because of their high patient volume and relatively large populations of diabetes patients.	Duration: 1 year Coaching role: nurse facilitator Nurse facilitator oriented the clinics to the performance-improvement activity, conducted in-services with new office staff, attended monthly operations meetings, and visited the clinics weekly to answer questions about the study. The nurse facilitator also distributed materials and a summary of the ADA clinical practice recommendations. The facilitator also created and distributed a patient reminder form and conducted monthly medical record reviews then provided site-specific feedback to the physicians and medical directors. Control arm included feedback only.	# team members: NR Team composition: • Internal medicine physicians: 22 • Family practice physicians: 6 VA: No	NR Outcome type: process of care activities	Objective: Unclear Self-reported: NA
van Bruggen, 2008[48] Netherlands	Patients with diagnoses of type 2 diabetes in 1 of 30	Duration: 1 year Coaching role: nurse facilitator	# team members: NR Team composition: NR	Percentage of people with poor glycemic control	Objective: Unclear

Study Country # Enrolled # Arms Funding Source Companion Paper	Eligibility	Intervention Duration Name of coaching role Intervention Description	# Team Members Team Composition: N (%) VA-based?	Primary Outcomes Outcomes Type	Risk of Bias
1640 patients 2 arms AGIS Insurance Center	primary care clinics agreed to participate from the broader population of 70 clinics solicited. Exclusions included the inability to complete a questionnaire, severe mental illness, unwillingness to attend the practice regularly, a limited life expectancy, or current treatment in the outpatient clinic of the local hospital.	Two nurse facilitators interviewed practice staff, analyzed barriers, discussed means to overcome barriers and handed out abstracts of guidelines for diabetes care. These trained facilitators visited all intervention practices 2 times per month for approximately 3 hours. They trained the GPs, practice assistants and nurses in the guidelines, encouraged the introduction of structured diabetes care, emphasized the need for 3-monthly control and gave assistance in managing people with type 2 diabetes. Performance feedback was given at 6 months.	VA: No	at baseline that achieved an HbA1c of <8% Outcome type: process of care activities	Self-reported: Unclear

Abbreviations: ADA=American Diabetes Association; AHEC=Area Health Education Center; AHRQ=Agency for Healthcare Research and Quality; CIHR=Canadian Institutes of Health Research; CQI=continuous quality improvement; CTH=Connection to Health; DHHS=Department of Health and Human Services; DO=Doctor of Osteopathy; eGFR=estimated glomerular filtration rate; EHR=electronic health record; GP=general practitioner; GTO=Getting to Outcomes; HSO=Health Standards Organization; HSR&D=Health Services Research and Development; HUD=Housing and Urban Development; LVN=licensed vocational nurse; NA=not applicable; NCI=National Cancer Institute; NHLBI=National Heart, Lung, and Blood Institute; NIDDK=National Institute of Diabetes and Digestive and Kidney Diseases; NIMH=National Institute of Mental Health; NR=not reported; NP=nurse practitioner; PA=physician assistant; PBRN=practice-based research network; PDSA=Plan, Do, Study, Act; PF=practice facilitation; QUERI=Quality Enhancement Research Initiative; QI=quality improvement; RN=registered nurse; RWJF=Robert Wood Johnson Foundation; SD=standard deviation; SMS ED=self-management support education; USPSTF=U.S. Preventive Services Task Force; VASH=Veterans Affairs Supportive Housing

KEY QUESTION 2

Study Country # Enrolled Study Design VA- based? Funding Source	Methods Used Source of Primary Data (N) Team Background (N)	Eligibility	Intervention Duration Name of coaching role Intervention Description	CFIR Findings	Risk of Bias
Buscaj, 2016[66] USA 11 practices Qualitative VA: No Colorado Health Foundation	Individual interviews, field observation, coach reflection notes Primary data: faculty, residents, and staff members Team background: NR	11 Colorado primary care residency practices (no eligibility criteria reported)	Duration: 6 years Coaching role: practice facilitator Practice facilitators attended monthly practice QI meetings, providing training, guidance, support, and resources for practice transformation; practices were also invited to attend twice-yearly Learning Collaboratives, where residents, faculty, and staff convened to learn from national and local speakers & share lessons learned	Barriers: - Adaptability - Design Quality & Packaging - Knowledge and Beliefs about Intervention/Process - Individual and Team Stages of Change/Process - Other Personal Attributes - Implementation Climate - Culture Facilitators: - Executing - Relative Advantage - Adaptability - Design Quality & Packaging - Individual and Team Stages of Change/Process - Other Personal Attributes - Culture	Clear aim: Yes Methods: Yes Appropriate design: Yes Recruitment: Yes Data Collection: Yes Research Relationship: Yes Ethical: Yes Rigorous Analysis: Yes Clear Findings: Yes Valuable Research: Yes
Chase, 2015[67] USA 6 practices Qualitative VA: No Commonwealth Fund and American Academy of Family Physicians	Individual interviews, field observation Primary data: Coach (3), Other (6 practices) Team background: NR	Family practices that completed an online application to receive support in a new, advanced PCMH model of care.	Duration: 2 years Coaching role: facilitator Three facilitators from diverse, nonclinical backgrounds help practices implement the TransforMED model of care. This model asked	Barriers: - Planning - Other Personal Attributes Facilitators: - Executing - Adaptability - Design Quality & Packaging - Other Personal Attributes	Clear aim: Yes Methods: Yes Appropriate design: Yes Recruitment: Can't tell Data Collection: Yes Research Relationship: Can't tell Ethical: Yes Rigorous Analysis: Yes Clear Findings: Yes

Study Country # Enrolled Study Design VA- based? Funding Source	Methods Used Source of Primary Data (N) Team Background (N)	Eligibility	Intervention Duration Name of coaching role Intervention Description	CFIR Findings	Risk of Bias
			practices to adopt a checklist of technological, management and care delivery components. Facilitators interviewed practice members, observed work flow and modelled new meeting styles. They also engaged in daily or weekly email and telephone contact with practice leaders and members. Depth and breadth of contact varied by facilitator.		Valuable Research: Yes
Due, 2017[61] Denmark 13 practices Qualitative VA: No Danish Research Foundation for General Practice; Health Foundation; Research Foundation for Primary Care in the Capital Region of Denmark	Individual interviews, focus groups, field observation Primary data: Coach (7) Team background: GP (38), Nurse (14) Secretary (6) Healthcare assistant (1) GP in training (9), Temporary GP (1)	All general practices in the Capital Region of Denmark were invited to participate in the intervention, but participation was voluntary. Individual semi-structured interviews were conducted among seven facilitators who took part in the	Duration: up to 3 visits over one year Coaching role: facilitator The facilitation intervention was carried out in general practice in the Capital Region of Denmark. This was to support the implementation of chronic disease management programs for type 2 diabetes and chronic obstructive	Barriers: - Planning - Executing - Reflecting & Evaluating - Adaptability - Design Quality & Packaging - Readiness for implementation Facilitators: - Planning - Executing - Relative Advantage - Adaptability - Design Quality & Packaging	Clear aim: Yes Methods: Yes Appropriate design: Yes Recruitment: Can't tell Data Collection: Yes Research Relationship: Yes Ethical: Yes Rigorous Analysis: Yes Clear Findings: Yes Valuable Research: Yes

Study Country # Enrolled Study Design VA- based? Funding Source	Methods Used Source of Primary Data (N) Team Background (N)	Eligibility	Intervention Duration Name of coaching role Intervention Description	CFIR Findings	Risk of Bias
		observed facilitation.	pulmonary disease in general practice. The facilitators were 14 GPs who were hired on a consultancy basis. The facilitators' educational program consisted of a one-weekend seminar and 10 three- hour meetings over 4 months. All practices in the region were eligible to participate but this was voluntary.		
Due, 2018[19] Denmark 13 practices Qualitative VA: No Danish Research Foundation for General Practice; Health Foundation; Research Foundation for Primary Care in the Capital Region of Denmark	Focus groups, field observation Primary data: team (20 group interviews); other (30 facilitation visits at 13 practice settings) Team background: GP (38), Nurse (14) Secretary (6) Healthcare assistant (1) GP in training (9), Temporary GP (1)	General practices were strategically sampled to ensure variation in multiple factors (*eg*, geography, size)	Intervention: up to 3 visits over 1 year Coaching role: practice facilitator or peer facilitator The facilitation intervention was one of the initiatives developed and implemented by the Capital Region of Denmark. Fourteen GPs were hired as facilitators who were differed concerning age, gender, and practice type. The overall aim of the intervention was to	Barriers: - Executing - Relative Advantage - Adaptability - Design Quality & Packaging - Knowledge and Beliefs about Intervention/Process - Individual and Team Stages of Change/Process - Other Personal Attributes - Implementation Climate - Readiness for implementation Facilitators: - Relative Advantage - Adaptability - Design Quality & Packaging	Clear aim: Yes Methods: Yes Appropriate design: Yes Recruitment: Yes Data Collection: Can't tell Research Relationship: Yes Ethical: Yes Rigorous Analysis: Yes Clear Findings: Yes Valuable Research: Yes

Study Country # Enrolled Study Design VA- based? Funding Source	Methods Used Source of Primary Data (N) Team Background (N)	Eligibility	Intervention Duration Name of coaching role Intervention Description	CFIR Findings	Risk of Bias
			support the implementation of chronic disease management programs for type 2 diabetes and COPD in general practice.	- Individual and Team Stages of Change/Process - Readiness for implementation	
Fernald, 2014[65] USA 51 primary care practices Mixed methods VA: No Office of the National Coordinator for Health Information Technology; DHHS	Individual interviews, focus groups, monthly narrative, reports from practices Primary data: Team (13), Coach (1), Leader (1) Team background: NR	Primary care practices enrolled in the Colorado Beacon Consortium in western Colorado	Duration: NR Coaching role: QI advisor The QI advisor was embedded in activities as part of a consortium. Participating primary care practices received support from the QI advisors, collaborative learning sessions, and a clinical systems advisors who helped regarding the EHR. Practice facilitation supported redesign and QI efforts around meaningful use attestation and the subsequent use of clinical data in patient care and QI.	Barriers: - External Policies and Incentives - Implementation Climate - External Policies and Incentives - Implementation Climate - Readiness for implementation Facilitators: - Planning - Relative Advantage - Adaptability - Design Quality & Packaging	Clear aim: Yes Methods: Yes Appropriate design: Yes Recruitment: Yes Data Collection: Can't tell Research Relationship: Can't tell Ethical: Can't tell Rigorous Analysis: Can't tell Clear Findings: Yes Valuable Research: Can't tell
Godfrey, 2014[68] USA	Individual interviews, focus groups, survey	Not clear how collaboratives were chosen but	Duration: 3 or 2 years depending on arm	Barriers: - Design Quality & Packaging	Clear aim: Yes Methods: Yes Appropriate design: Yes

Study Country # Enrolled Study Design VA- based? Funding Source	Methods Used Source of Primary Data (N) Team Background (N)	Eligibility	Intervention Duration Name of coaching role Intervention Description	CFIR Findings	Risk of Bias
2 national improvement collaboratives Mixed methods VA: No Jo¨nko¨ping University, School of Health Sciences, County Council; Qulturum and Futurum, Jo¨nko¨ping, Sweden; Dartmouth Institute for Health Policy and Clinical Practice	Primary data: Team (382), Coach (9), Leader (30) Team background: NR	leaders from The Cystic Fibrosis Foundation (CF) centers or Vermont Oxford Network Intensive Care Nurseries (ICN) teams had to apply to participate; national leaders assigned coaches to clinical teams "with consideration of physical location and time zones."	Coaching role: coach Coaches assigned to clinical teams; provided telephone, face-to-face, and email coaching to help teams develop their improvement capabilities; telephone coaching initially occurred weekly then decreased over time to monthly; email communication with coach was frequent; ICN collaborative had 3 site visits and CF arm had no site visits; CF coaches from within the CF community and ICN coaches from outside the ICN community	- Individual and Team Stages of Change/Process - Other Personal Attributes Facilitators: - Cost - Relative Advantage - Adaptability - Design Quality & Packaging - Other Personal Attributes	Recruitment: Can't tell Data Collection: No Research Relationship: Can't tell Ethical: Can't tell Rigorous Analysis: Can't tell Clear Findings: Yes Valuable Research: Can't tell
Hemler, 2018[64] USA 1500 practices Qualitative VA: No AHRQ	Individual interviews, field observation, online diaries Primary data: Coach (33) Team background: NR	Interviewees were from a cooperative that participated in EvidenceNOW, a collaboration of public and private healthcare organizations that enrolled	Duration: 9- 15 months Coaching role: practice facilitator All cooperatives used practice facilitation as their main intervention strategy to help practices improve delivery of the ABCS: aspirin use in	Barriers: - Cost - Design Quality & Packaging - Knowledge and Beliefs about Intervention/Process - Individual and Team Stages of Change/Process - Readiness for implementation Facilitators: - Executing	Clear aim: Yes Methods: Yes Appropriate design: Yes Recruitment: Can't tell Data Collection: Yes Research Relationship: Yes Ethical: Yes Rigorous Analysis: Yes Clear Findings: Yes Valuable Research: Yes

Study Country # Enrolled Study Design VA- based? Funding Source	Methods Used Source of Primary Data (N) Team Background (N)	Eligibility	Intervention Duration Name of coaching role Intervention Description	CFIR Findings	Risk of Bias
		over 1500 practices including approximately 5000 clinicians. Focused on small to medium sized primary care practices (15 or fewer clinicians).	high-risk individuals, blood pressure control, cholesterol management, and smoking cessation counseling.	- Adaptability - Design Quality & Packaging - Individual and Team Stages of Change/Process	
Huston, 2006[71] Canada 53 primary care practices Qualitative VA: No Funding NR	Survey, coach narrative report progress log Primary Data: Team (65), Coach (5) Team background: MD (143; 3 physicians average per practice), Office staff (NR)	All family physician practices in Ottawa were invited to participate in the study.	Duration: 5 weeks Coaching role: nurse facilitator Public health nurses were trained as facilitators to disseminate the intervention for respiratory infection guidelines to family physician practices - a toolkit was used that included an outline of control guidelines, masks, wipes, alcohol gel pumps, *etc*. The intervention involved audit feedback, goal setting, and tailoring of	Barriers: - Planning - Readiness for implementation Facilitators: - Planning - Cost - Adaptability - Design Quality & Packaging - External Policies and Incentives	Clear aim: Yes Methods: Yes Appropriate design: Can't tell Recruitment: Can't tell Data Collection: Yes Research Relationship: No Ethical: Can't tell Rigorous Analysis: No Clear Findings: Yes Valuable Research: Yes

Study Country # Enrolled Study Design VA- based? Funding Source	Methods Used Source of Primary Data (N) Team Background (N)	Eligibility	Intervention Duration Name of coaching role Intervention Description	CFIR Findings	Risk of Bias
			intervention to local circumstances.		
Kotecha, 2015[70] Canada 7 family healthcare teams Qualitative VA: No Ontario Ministry of Health and Long Term Care	Individual interviews, field observation Primary data: Team (7) Coach (15) Team background: MD (NR)	Recruitment was aimed at all of the 16 practice facilitators that were using the quality control program that was being evaluated. A purposeful sampling strategy was used to select participating primary healthcare teams for interviews.	Duration: 14- 16 months Coaching role: facilitator The facilitator's job was to work with the assigned primary healthcare teams, conduct administrative tasks, ongoing facilitator training and education, maintain communication with the intervention team, and to support the healthcare team development and application of QI knowledge into practice.	Barriers: - Planning - Cost - Relative Advantage - Design Quality & Packaging - Individual and Team Stages of Change/Process - Other Personal Attributes Facilitators: - Cost - Relative Advantage - Adaptability - Design Quality & Packaging - Individual and Team Stages of Change/Process	Clear aim: Yes Methods: Yes Appropriate design: Yes Recruitment: Yes Data Collection: Yes Research Relationship: Yes Ethical: Yes Rigorous Analysis: Yes Clear Findings: Yes Valuable Research: Yes
Lessard, 2016[69] Canada 4 family medicine groups Qualitative VA: No MSSS-FRQS-Pfizer; Laval Health and Social Services Centers	Individual interviews, focus groups, case audit documentation Primary data: Team (32), Coach (8), case audit (37 meeting minutes and logs, 55 external facilitator field notes) Team composition: family physician (1), case manager nurse (NR),	Primary care clinics that were registered as family medicine groups in the greater Quebec area.	Duration: 1 year Coaching role: facilitator The study involved four family medicine groups, each represented by an interprofessional internal facilitator team (IFT). Each IFT was expected to fulfill 4 key responsibilities: (1) to act as a liaison to encourage	Barriers: - NR Facilitators: - Relative Advantage - Adaptability - Design Quality & Packaging	Clear aim: Yes Methods: Yes Appropriate design: Yes Recruitment: Yes Data Collection: Yes Research Relationship: Can't tell Ethical: Yes Rigorous Analysis: Yes Clear Findings: Yes Valuable Research: Yes

Study Country # Enrolled Study Design VA- based? Funding Source	Methods Used Source of Primary Data (N) Team Background (N)	Eligibility	Intervention Duration Name of coaching role Intervention Description	CFIR Findings	Risk of Bias
	Admin(~1) Pharmacist (1) Kinesiology, psychologist or nutritionist (1)		each discipline to take ownership of change, (2) to select at least 1 of 6 interventions to be implemented in the family medicine group (*ie*, coordination of interprofessional follow-up by primary care nurse-case manager; case manager referrals to public group classes or private health professionals; clinicians' training and usage of motivational interviewing; utilization of patient- health booklet; application of collective prescriptions; utilization of internet based directory of community and health resources), (3) to develop action plans accordingly, and (4) to translate knowledge and disseminate change across the family medicine group and other external health specialists.		

Study Country # Enrolled Study Design VA- based? Funding Source	Methods Used Source of Primary Data (N) Team Background (N)	Eligibility	Intervention Duration Name of coaching role Intervention Description	CFIR Findings	Risk of Bias
Liddy, 2014[60] Canada 84 primary care practices Multi-methods VA: No CIHR; University of Toronto, Comprehensive Research Experience for Medical Students	Individual interviews Primary data: Coach (4) Team background: NR	Practice facilitators who worked with primary care practices enrolled in the Improved Delivery of Cardiovascular Care program. All primary care practices in the regional health authority in Eastern Ontario were eligible to participate, excluding walk-in clinics.	Duration: 2 years Coaching role: practice facilitator As part of the Improved Delivery of Cardiovascular Care program, trained facilitators worked with practices to incorporate elements of the chronic care model into daily practice routine. Facilitation included audit and feedback, consensus building, regular meetings with the practices, and interactive collaborative meetings.	Barrier: - Individual and Team Stages of Change/Process - Other Personal Attributes - External Policies and Incentives - Implementation Climate - Culture Facilitator: - Relative Advantage - Adaptability - Design Quality & Packaging - Individual and Team Stages of Change/Process - Other Personal Attributes - Culture	Clear aim: Yes Methods: Yes Appropriate design: Yes Recruitment: Yes Data Collection: Yes Research Relationship: Can't tell Ethical: Can't tell Rigorous Analysis: Yes Clear Findings: Yes Valuable Research: Yes
Liddy, 2016[59] Canada 83 primary care practices Survey VA: No Primary Health Care Services program of Ontario Ministry of Health and Long- Term Care; Pfizer	Survey Primary data: Team (95) Team background: MD (95)	Primary care physicians enrolled in the Improved Delivery of Cardiovascular Care program. All primary care practices in the regional health authority in Eastern Ontario	Duration: 1- 2 years Coaching role: facilitator Facilitators helped primary care providers improve cardiovascular disease care using the Chronic Care Model. After a chart audit, facilitators and physicians engaged in	Barriers: NR Facilitators: - Executing - Relative Advantage - Adaptability - Design Quality & Packaging - Individual and Team Stages of Change/Process - Readiness for implementation	Clear aim: Yes Methods: Yes Appropriate design: Yes Recruitment: Yes Data Collection: Yes Research Relationship: Can't tell Ethical: Yes Rigorous Analysis: Yes Clear Findings: Yes Valuable Research: Yes

Study Country # Enrolled Study Design VA- based? Funding Source	Methods Used Source of Primary Data (N) Team Background (N)	Eligibility	Intervention Duration Name of coaching role Intervention Description	CFIR Findings	Risk of Bias
Canada (indirectly through the Champlain Cardiovascular Disease Prevention Network); CIHR; Ottawa Hospital Academic Medical Organization's Innovation Fund		were eligible to participate, excluding walk-in clinics. One hundred and ninety physicians from 83 primary care practices participated in the study.	consensus building to identify areas needing improvement and set goals. Facilitators used a variety of methods to aid physicians in achieving their goals, including evidence-based decision support, delivery system redesign support, patient self-management tools, guideline documents, flow sheets and information regarding available community resources.		
McHugh, 2018[63] USA 27 teams Qualitative VA: No AHRQ	Individual interviews Primary data: Team (17), Coach (10) Team background: NR	Practices were eligible for the larger study if they had fewer than 20 primary care clinicians and were located in Indiana, Illinois, or Wisconsin. Out of the 4 waves of the study, the qualitative interviews were completed on Wave 2.	Duration: 1 year Coaching role: practice facilitator The practice facilitator met with the practices as often as requested, ideally once per month. Facilitators had a broad menu of quality improvement strategies from which practices could choose related to the 4 ABCS. Strategies included audit and feedback, clinical	Barriers: - Planning - Executing - Reflecting & Evaluating - Cost - Relative Advantage - Design Quality & Packaging - Individual and Team Stages of Change/Process - Other Personal Attributes - Implementation Climate Facilitators: - Planning - Executing - Relative Advantage	Clear aim: Yes Methods: Yes Appropriate design: Yes Recruitment: Yes Data Collection: Yes Research Relationship: Yes Ethical: Yes Rigorous Analysis: Yes Clear Findings: Yes Valuable Research: Yes

Study Country # Enrolled Study Design VA- based? Funding Source	Methods Used Source of Primary Data (N) Team Background (N)	Eligibility	Intervention Duration Name of coaching role Intervention Description	CFIR Findings	Risk of Bias
			decision support within the electronic health record, standing orders, workflow improvements, and patient education and outreach.	- Adaptability - Design Quality & Packaging - Individual and Team Stages of Change/Process - Readiness for implementation - Culture	
McKeever, 2014[15] USA 30 health departments Multi-methods VA: No RWJF	Survey, Progress Reports, QI Coaching Logs and QI Coach Meeting Notes Primary data: Team (85), Coach (9), Other (30 sites) Team background: NR	Health department specific eligibility not specified. Health departments were participants in a QI Award Program that provides small grants and distance-based QI coaching to state, local, tribal, and territorial health departments.	Duration: NR Coaching role: QI coaches Coaches worked with health departments on their QI projects to provide support and technical assistance. QI coaches helped practices to engage in QI projects that addressed local priorities across all accreditation standards and measures. Coaches were able to do 1 in-person visit with the QI team lead at a twice-annual conference with up to 15 hours of remote coaching via phone, email, webinars, and video conferencing.	Barrier: - Planning - Design Quality & Packaging - Knowledge and Beliefs about Intervention/Process - Cosmopolitanism Facilitators: - Executing - Adaptability - Design Quality & Packaging	Clear aim: Yes Methods: No Appropriate design: Can't tell Recruitment: Yes Data Collection: Can't tell Research Relationship: Can't tell Ethical: Can't tell Rigorous Analysis: No Clear Findings: Yes Valuable Research: Yes
Mekki, 2017[72] Norway 12 nursing homes	Individual interviews, Focus groups, field observation	Nursing homes in a specific geographic area	Duration: 7 months	Barriers: - Planning - Relative Advantage	Clear aim: Yes Methods: Yes Appropriate design: Yes

Study Country # Enrolled Study Design VA- based? Funding Source	Methods Used Source of Primary Data (N) Team Background (N)	Eligibility	Intervention Duration Name of coaching role Intervention Description	CFIR Findings	Risk of Bias
Mixed Methods VA: No Research Council of Norway	reflection notes & workshops Primary data: Coach (8) Leader (12) Other (18 single- blinded raters) Team background: NR	were recruited if they: had residents with dementia; leaders from NH agreed to 1) collaborate with facilitators and pay cost, 2) participate at sessions with staff, 3) collaborate in organizing research at the institution.	Coaching role: external facilitator Two external facilitators delivered 2-day seminars + 6 months of coaching for all staff/leaders in each nursing home with the goal to reduce use of restraints and psychotropic drug use in patients with dementia; staff brought an actual patient situation to each coaching session	- Other Personal Attributes - Culture Facilitators: - Cost - Adaptability - Individual and Team Stages of Change/Process - Other Personal Attributes	Recruitment: No Data Collection: No Research Relationship: No Ethical: Can't tell Rigorous Analysis: No Clear Findings: No Valuable Research: Can't tell
Rogers, 2019[62] USA 19 practices Qualitative VA: No AHRQ	Individual interviews Primary data: Team (19 clinicians) Team background: MD (18) Other (1)	A purposeful sampling approach was used to identify and recruit interviewees on 3 criteria: study wave (from 4 waves), geographic region (the 5 NYC boroughs), and baseline ABCS (aspirin, blood pressure, cholesterol, smoking	Duration: 1 year Coaching role: practice facilitator Intervention consisted of 13 in-person visits by a practice facilitator (employed by the project) for 1 year. Facilitators had completed the University of Buffalo's Practice Facilitator Certificate Program and in-house study training. Facilitators reviewed	Barriers: - Other Personal Attributes - Readiness for implementation - Cosmopolitanism Facilitators: - Adaptability - Design Quality & Packaging - Individual and Team Stages of Change/Process - Readiness for implementation	Clear aim: Yes Methods: Yes Appropriate design: Yes Recruitment: Yes Data Collection: Yes Research Relationship: Yes Ethical: Yes Rigorous Analysis: Yes Clear Findings: Yes Valuable Research: Yes

Study Country # Enrolled Study Design VA- based? Funding Source	Methods Used Source of Primary Data (N) Team Background (N)	Eligibility	Intervention Duration Name of coaching role Intervention Description	CFIR Findings	Risk of Bias
		cessation) performance (high, medium, low).	baseline data with the practice and they prioritized the order they wanted to work on each measure. Facilitators implemented QI strategies, set performance targets and goals, provided performance feedback, provided data support, trained clinicians and staff on evidence- based practices for addressing each ABCS measure, and assessing and redesigning office workflow.		

Abbreviations: AHRQ=Agency for Healthcare Research and Quality; CF=cystic fibrosis; CIHR=Canadian Institutes of Health Research; COPD=chronic obstructive pulmonary disorder; DHHS=Department of Health and Human Services; EHR=electronic health record; GP=general practitioner; ICN=intensive care nurse; IFT=internal facilitator team; NA=not applicable; NR=not reported; QI=quality improvement; PCMH=patient-centered medical home; RWJF=Robert Wood Johnson Foundation

APPENDIX C. IMPLEMENTATION STRATEGIES TABLE

For full study citations, please refer to the main report's reference list.

Coaching Strategy	Dickinson, 2019[38]	Carroll, 2018[39]	Harris, 2015[55]	Liddy, 2015[52]	Parchman, 2013[43]	Mold, 2014[40]	Meropol, 2014[41]	Dickinson, 2014[42]	Hogg, 2008[53]	Chinman, 2017[44]	van Bruggen, 2008[48]	Goodwin, 2001[18]	Lemelin, 2001[54]	Rask, 2001[45]	Lobo, 2002[51]	Due, 2014[49]	Engels, 2006[50]	Margolis, 2004[46]	Ornstein, 2004[47]
Develop a formal implementation plan	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Audit and provide feedback	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X
Develop/distribute educational materials			X	X	X	X	X		X	X	X	X	X	X	X			X	X
Conduct educational outreach visits		X	X		X	X	X			X	X		X	X	X	X		X	X
Provide ongoing consultation/ purposely reexamine the implementation	X	X			X			X	X	X			X			X	X	X	
Revise professional roles	X		X	X	X			X	X			X						X	
Provide local technical assistance/	X	X		X	X					X		X	X						

Coaching Strategy	Dickinson, 2019[38]	Carroll, 2018[39]	Harris, 2015[55]	Liddy, 2015[52]	Parchman, 2013[43]	Mold, 2014[40]	Meropol, 2014[41]	Dickinson, 2014[42]	Hogg, 2008[53]	Chinman, 2017[44]	van Bruggen, 2008[48]	Goodwin, 2001[18]	Lemelin, 2001[54]	Rask, 2001[45]	Lobo, 2002[51]	Due, 2014[49]	Engels, 2006[50]	Margolis, 2004[46]	Ornstein, 2004[47]
centralize technical assistance																			
Conduct local need assessment	X				X		X	X				X				X	X		
Conduct cyclical small tests of change/develop and implement tools for quality monitoring/ develop and organize quality monitoring systems		X		X		X	X	X									X	X	
Create a learning collaborative		X		X				X					X						X
Develop resource sharing agreements	X		X	X	X														
Organize clinician implementation team meetings		X			X										X				
Build a coalition/conduct local consensus discussions/		X											X						

Coaching Strategy	Dickinson, 2019[38]	Carroll, 2018[39]	Harris, 2015[55]	Liddy, 2015[52]	Parchman, 2013[43]	Mold, 2014[40]	Meropol, 2014[41]	Dickinson, 2014[42]	Hogg, 2008[53]	Chinman, 2017[44]	van Bruggen, 2008[48]	Goodwin, 2001[18]	Lemelin, 2001[54]	Rask, 2001[45]	Lobo, 2002[51]	Due, 2014[49]	Engels, 2006[50]	Margolis, 2004[46]	Ornstein, 2004[47]
obtain and use patients/ consumers and family feedback																			

APPENDIX D. EXCLUDED STUDIES

KEY QUESTION 1

	Exclusion Reason						
Study	**Not full publication/ OECD**	**Not eligible setting**	**Not population of interest**	**Not eligible intervention**	**Not eligible comparator**	**Not eligible outcome/ timing**	**Not eligible design**
Ansari, 2003[1]				X			
Aspy, 2008[2]			X				
Asselin, 2017[3]							X
Baskerville, 2001[4]	X						
Bitton, 2014[5]	X						
Bucknall, 2017[6]				X			
Calo, 2019[7]				X			
Chakrabarty, 2014[8]	X						
Clapp, 2015[9]	X						
Connolly, 2018[10]							X
Courtlandt, 2016[11]							X
Deane, 2014[12]				X			
Dorr, 2015[13]	X						
Due, 2017[14]							X
Echevarria, 2016[15]				X			
Eriksson, 2013[16]	X						
Filardo, 2009[17]				X			
Finkelstein, 2002[18]				X			
Ford, 2017[19]		X					
Fox, 2011[20]	X						
Gannon, 2011[21]							X
Garrard, 2006[22]							X
Gepts, 2018[23]	X						

	Exclusion Reason						
Study	**Not full publication/ OECD**	**Not eligible setting**	**Not population of interest**	**Not eligible intervention**	**Not eligible comparator**	**Not eligible outcome/ timing**	**Not eligible design**
Grunfeld, 2013[24]			X				
Halladay, 2014[25]				X			
Harris, 2017[26]				X			
Horn, 2010[27]							X
Huguet, 2018[28]			X				
Hulscher, 2003[29]	X						
Hulscher, 1997[30]							X
Jefferies, 2012[31]			X				
Jenkins, 2008[32]	X						
Jennings, 2017[33]				X			
Kaplan, 2018[34]				X			
Katz, 2014[35]				X			
Kirchner, 2014[36]				X			
Knierim, 2019[37]				X			
Korner, 2018[38]	X						
Lannon, 2013[39]							X
Leamy, 2011[40]	X						
Leonard, 2017[41]							X
Lindsay, 2015[42]			X				
McCormack, 2019[43]	X						
McNally, 2006[44]			X				
Meurer, 2011[45]							X
Michaels, 2017[46]				X			
Midboe, 2018[47]	X						
Modell, 1998[48]				X			
Mullen, 2009[49]			X				
Naccarella, 2016[50]				X			

	Exclusion Reason						
Study	**Not full publication/ OECD**	**Not eligible setting**	**Not population of interest**	**Not eligible intervention**	**Not eligible comparator**	**Not eligible outcome/ timing**	**Not eligible design**
Nagykaldi, 2005[51]	X						
Nowalk, 2016[52]			X				
Parchman, 2019[53]				X			
Parchman, 2008[54]	X						
Pearlman, 2002[55]		X					
Persson, 2013[56]	X						
Petro-Nustas, 1996[57]	X						
Rakhmanova, 2016[58]	X						
Rantz, 2017[59]				X			
Roderick, 2017[60]					X		
Ruhe, 2005[61]							X
Salbach, 2014[62]	X						
Sarin, 2018[63]			X				
Schiff, 2017[64]				X			
Schmidt, 1998[65]				X			
Siman, 2018[66]	X						
Smith, 2019[67]				X			
Solberg, 1998[68]				X			
Starkey, 2016[69]			X				
Steiner, 2010[70]	X						
Thom, 2016[71]			X				
Trott, 1999[72]	X						
Verreault, 2018[73]				X			
Vos, 2010[74]				X			
Wray, 2018[75]	X						
Zimmerman, 2017[76]				X			

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KEY QUESTION 2

	Exclusion Reason					
Study	**Not OECD country**	**Not eligible evaluation**	**Not eligible sample**	**Not phenomenon of interest**	**Not eligible design**	**Not eligible research type**
Ali, 2014[1]		X				
Ammentorp, 2010[2]		X				
Andersen, 2015[3]		X				
Asselin, 2017[4]		X				
Baskerville, 2001[5]					X	
Bauer, 2019[6]		X				
Bauer, 2016[7]		X				
Bender, 2011[8]		X				
Bennell, 2017[9]		X				
Boamah, 2018[10]		X				
Bradd, 2018[11]				X		
Bridges, 2013[12]		X				
Brooker, 2016[13]		X				
Brouwers, 2016[14]		X				
Brunette, 2008[15]		X				
Budhoo, 2011[16]		X				
Cable, 2018[17]			X			
Calo, 2019[18]				X		
Campbell, 2012[19]		X				
Chan, 2010[20]		X				
Chreim, 2010[21]				X		
Chuang, 2014[22]		X				
Cicirello, 2005[23]		X				
Cranley, 2017[24]					X	
Cummings, 2014[25]				X		
Devers, 2013[26]		X				

	Exclusion Reason					
Study	**Not OECD country**	**Not eligible evaluation**	**Not eligible sample**	**Not phenomenon of interest**	**Not eligible design**	**Not eligible research type**
Dickinson, 2014[27]		X				
Dietrich, 1992[28]		X				
Dimas, 2016[29]		X				
Dobbins, 2019[30]		X				
Donahue, 2013[31]		X				
Donaldson, 2008[32]			X			
du Toit, 2019[33]				X		
Duff, 2013[34]		X				
Echevarria, 2016[35]		X				
Edwards, 2018[36]		X				
Eiff, 2016[37]		X				
Fearing, 2014[38]				X		
Felder, 2017[39]		X				
Fernald, 2019[40]		X				
Fernald, 2013[41]		X				
Fox, 2013[42]		X				
Gandhi, 2000[43]		X				
Gannon, 2011[44]		X				
Garbutt, 2018[45]		X				
Garrard, 2006[46]				X		
Gastala, 2018[47]		X				
George, 2015[48]	X					
Gingold, 2016[49]		X				
Gold, 2015[50]		X				
Gonzalo, 2019[51]		X				
Gordon, 2013[52]		X				
Grandes, 2017[53]		X				
Grant, 2017[54]		X				

	Exclusion Reason					
Study	**Not OECD country**	**Not eligible evaluation**	**Not eligible sample**	**Not phenomenon of interest**	**Not eligible design**	**Not eligible research type**
Greenberg, 2018[55]			X			
Greiver, 2019[56]				X		
Hackshaw, 2016[57]			X			
Hall, 2019[58]		X				
Halladay, 2016[59]		X				
Halladay, 2017[60]		X				
Hälleberg Nyman, 2019[61]		X				
Hallett, 1997[62]		X				
Harris, 2018[63]		X				
Harvey, 2012[64]				X		
Harvey, 2018[65]			X			
Hill, 2015[66]		X				
Hill, 2015[67]		X				
Hogg, 2008[68]		X				
Hogg, 2008[69]					X	
Homa, 2008[70]		X				
Houle, 2017[71]		X				
Huguet, 2018[72]		X				
Iyasere, 2016[73]			X			
Jansen, 2008[74]		X				
Jefferies, 2012[75]		X				
Jinks, 2009[76]		X				
Johnson, 2011[77]			X			
Johnson, 2014[78]		X				
Jones, 1992[79]		X				
Jortberg, 2014[80]		X				
Kaplan, 2013[81]		X				
Katz, 2014[82]		X				

	Exclusion Reason					
Study	**Not OECD country**	**Not eligible evaluation**	**Not eligible sample**	**Not phenomenon of interest**	**Not eligible design**	**Not eligible research type**
Kavanagh, 2010[83]		X				
Kjaerbeck, 2014[84]		X				
Klop, 2017[85]		X				
Korner, 2018[86]				X		
Kotecha, 2015[87]		X				
Lazorick, 2008[88]		X				
Lefebvre, 2019[89]		X				
Liddy, 2017[90]		X				
Liddy, 2018[91]		X				
Lipman, 2016[92]		X				
Loeb, 2019[93]		X				
Luig, 2018[94]		X				
Mader, 2016[95]		X				
Madsen, 2016[96]				X		
Mahloch, 1993[97]		X				
Malik, 2016[98]		X				
McCullough, 2017[99]			X			
McGloin, 2015[100]		X				
McIntosh, 2009[101]		X				
McNamara, 2014[102]		X				
Meurer, 2011[103]		X				
Mignogna, 2014[104]					X	
Miller, 2018[105]		X				
Mold, 2008[106]		X				
Moriarty, 2007[107]		X				
Morley, 2018[108]		X				
Mulcahy, 2018[109]		X				
Mutabdzic, 2015[110]		X				

	Exclusion Reason					
Study	**Not OECD country**	**Not eligible evaluation**	**Not eligible sample**	**Not phenomenon of interest**	**Not eligible design**	**Not eligible research type**
Naik, 2015[111]		X				
Nease, 2008[112]		X				
Noel, 2013[113]		X				
O'Malley, 1992[114]		X				
Owen, 2013[115]		X				
Palmer, 2019[116]		X				
Pandhi, 2019[117]		X				
Paquette-Warren, 2014[118]		X				
Parchman, 2016[119]		X				
Parchman, 2013[120]		X				
Pérez-Escamilla, 2014[121]		X				
Piers, 2017[122]		X				
Pimentel, 2019[123]		X				
Ploeg, 2010[124]			X			
Pollak, 2016[125]		X				
Prenkert, 1997[126]		X				
Rafferty, 2015[127]		X				
Richters, 2018[128]		X				
Ritchie, 2017[129]		X				
Rivers, 2011[130]		X				
Rodenbach, 2019[131]		X				
Salsbury, 2018[132]		X				
Sathe, 2013[133]		X				
Schiff, 2017[134]		X				
Schiff, 2017[135]		X				
Shunk, 2014[136]				X		
Starkey, 2016[137]		X				
Stetler, 2006[138]		X				

	Exclusion Reason					
Study	**Not OECD country**	**Not eligible evaluation**	**Not eligible sample**	**Not phenomenon of interest**	**Not eligible design**	**Not eligible research type**
Stover, 2014[139]	X					
Tabak, 2018[140]		X				
Tafvelin, 2014[141]		X				
Tatla, 2017[142]		X				
Thomas, 2014[143]		X				
van Berkel, 2019[144]			X			
van Dongen, 2018[145]				X		
Volker, 2017[146]		X				
Waldrop, 2019[147]			X			
Watts, 2014[148]		X				
Weiner, 2017[149]		X				
Weng, 2015[150]		X				
Westcott, 2016[151]			X			
Wilkie, 1995[152]		X				
Woloschuk, 2012[153]		X				
Wray, 2018[154]		X				
Young, 2007[155]		X				

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APPENDIX E. CONSOLIDATED FRAMEWORK FOR IMPLEMENTATION RESEARCH (CFIR) CONSTRUCTS

	Construct	Short Description	Operationalization for Transformational Coaching
I. Intervention Characteristics/Transformational Coach			Intervention is the coaching itself and the characteristics that make transformational coaching more or less implementable (*eg*, modality, the coach as an individual, the act of coaching or how the coach actually interacted with the team members, who is being coached and relevant stakeholders)
C	**Relative Advantage**	Stakeholders' perception of the advantage of implementing the intervention versus an alternative solution	Stakeholders' view on why implementing transformational coaching instead of another intervention would be beneficial
D	**Adaptability**	The degree to which an intervention can be adapted, tailored, refined, or reinvented to meet local needs	How easily the transformational coaching can be tailored, changed, or adapted to meet the needs of the local interdisciplinary team
G	**Design Quality & Packaging**	Perceived excellence in how the intervention is bundled, presented, and assembled	How others view the quality and presentation of transformational coaching intervention
H	**Cost**	Costs of the intervention and costs associated with implementing the intervention including investment, supply, and opportunity costs	How much it costs to implement the coaching intervention
II. Outer Setting			Any level outside the transformational coach and the team receiving the coaching (*eg*, health care policy, health care system in which a team sits, social drivers such as rates of homelessness in patient population served)
B	**Cosmopolitanism**	The degree to which an organization is networked with other external organizations	The extent to which the team or larger practice is networked with other organizations
D	**External Policy & Incentives**	A broad construct that includes external strategies to spread	The external policies and incentives to engage with coaching and QI efforts

	Construct	Short Description	Operationalization for Transformational Coaching
		interventions, including policy and regulations (governmental or other central entity), external mandates, recommendations and guidelines, pay-for-performance, collaboratives, and public or benchmark reporting	
III. Inner Setting			The team unit and clinic level in which the transformational coaching widget is operating (*eg*, proximal influences of the widget, leaders not a part of the team being coached)
C	**Culture**	Norms, values, and basic assumptions of a given organization	The workings of an organization in which the interdisciplinary team sits
D	**Implementation Climate**	The absorptive capacity for change, shared receptivity of involved individuals to an intervention, and the extent to which use of that intervention will be rewarded, supported, and expected within their organization	How well implementation of new ideas is accepted and put into a practice
E	**Readiness for Implementation**	Tangible and immediate indicators of organizational commitment to its decision to implement an intervention	Indicators that show that the organization is ready and able to change
IV. Characteristics of Individuals and Team			The individual or team who is receiving the transformational coaching widget (*eg*, the individual team members being coached)
A	**Knowledge & Beliefs about the Intervention**	Individuals' attitudes toward and value placed on the intervention as well as familiarity with facts, truths, and principles related to the intervention	How individuals feel about transformational coaching and the value placed on it
C	**Individual Stage of**	Characterization of the	The stage of change the person is in with respect

	Construct	Short Description	Operationalization for Transformational Coaching
	Change	phase an individual is in, as he or she progresses toward skilled, enthusiastic, and sustained use of the intervention	to engagement with transformational coaching and QI
E	**Other Personal Attributes**	A broad construct to include other personal traits such as tolerance of ambiguity, intellectual ability, motivation, values, competence, capacity, and learning style	The personal traits of the person(s) receiving the coaching.
V. Process/QI Strategy			How the transformational coaching program was put into place within practice (implementation process, not coaching process)
A	**Planning**	The degree to which a scheme or method of behavior and tasks for implementing an intervention are developed in advance, and the quality of those schemes or methods	How well a protocol of transformational coaching implementation is developed
C	**Executing**	Carrying out or accomplishing the implementation according to plan	Actually doing the transformational coaching implementation as planned
D	**Reflecting & Evaluating**	Quantitative and qualitative feedback about the progress and quality of implementation accompanied with regular personal and team debriefing about progress and experience	Looking back about the progress that was made and if the transformational coaching intervention worked

APPENDIX F. CERQUAL EVIDENCE PROFILE

For full study citations, please refer to the main report's reference list.

Summary of Review Finding	Studies Contributing to Review Finding	Methodologic limitations	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Assessment
External policy and incentives (context: inner and outer setting)							
Barriers: External policy not aligned with the ongoing effort When the external policies governing practice level activities were not consistent with requirements of a QI project, this was problematic. For example, practices expressed the need for payment reform to align with the ongoing time and effort they are committing to improving quality of care.	Fernald, 2014[65]	Significant methodological limitations	No concerns (only 1 study)	Significant concerns about adequacy (only 1 study)	No concerns about relevance	Very low confidence	This finding was graded as very low confidence because of significant concerns regarding methodological limitations and significant concerns regarding adequacy.
Barriers: Unanticipated competing demands shift focus on QI When teams were faced with unexpected events from outside the practice, their focus on coaching and QI could	Liddy, 2014[60]	Moderate methodological limitations	No concerns (only 1 study)	Significant concerns about adequacy (only 1 study)	No concerns about relevance	Low confidence	This finding was graded as low confidence because of significant concerns about adequacy moderate concerns regarding methodological limitations.

Summary of Review Finding	Studies Contributing to Review Finding	Methodologic limitations	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Assessment
be derailed. For example, practices working on QI activities during the H1N1 influenza outbreak found it difficult to retain momentum.							
Facilitators: Project alignment with Government guidelines Coaching was more successful when QI project activities were aligned with guideline-identified best practices. For instance, the Ministry of Health distributed guidelines for respiratory infection control in community settings which were consistent with the QI intervention to improve respiratory infection control.	Huston, 2006[71]	Significant methodological limitations	No concerns issues	No concerns (only 1 study)	Significant concerns about relevance (only 1 study)	Low confidence	This finding was graded as moderate confidence because of significant concerns about adequacy.
Relative advantage (transformational coaching/intervention characteristics)							
Barriers: Lack of engagement by practice When practices were not invested in activities related to their QI	McHugh, 2018[63] Due, 2018[19] Kotecha 2015[70] Mekki, 2017[72]	Minor methodological limitations (2 studies with no limitations, 1 with moderate and one with	No concerns (data are reasonably consistent)	Moderate concerns about adequacy	No concerns about relevance (differences in clinical setting [*ie*, PC and nursing home]	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations and

Summary of Review Finding	Studies Contributing to Review Finding	Methodologic limitations	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Assessment
projects or transformational coach, it was difficult for coaches to deliver the intended QI project. Examples of lack of engagement included when teams did not prioritize the planned QI intervention and when practices had limited resources allotted for transformational coaching and QI activities. Coaches found that when lack of engagement occurred, they had to "push" practices along and, at times, had difficulty finding a role for themselves within a busy practice.		minor methods limitations)			and country setting)		moderate concerns about adequacy.
Facilitators: Active engagement by practice Examples of practice engagement included teams having protected time and a convenient location for coaching activities, and the support of practice leadership. When	McHugh, 2018[63] Due, 2018[19] Due, 2017[61] Fernald, 2014[65] Buscaj, 2016[66] Lassard, 2016[69] Liddy, 2016[59] Kotecha, 2015[70] Liddy, 2014[60] Godfrey, 2014[68]	Moderate methodological limitations (7 studies with any limitations, 2 studies with significant limitations)	No concerns (data are reasonably consistent)	No concerns about adequacy	No concerns about relevance	Moderate to high confidence	This finding was graded as moderate to high confidence because of moderate concerns regarding methodological limitations.

Summary of Review Finding	Studies Contributing to Review Finding	Methodologic limitations	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Assessment
engaged, coach presence and the coach's actions helped practices be accountable during the QI project to making a change.							
Cost (intervention characteristics/transformational coaching)							
Barriers: High workload for coach Coaches found it burdensome when, in addition to their planned QI support role, they had to compensate for data problems such as needing to collect data directly. Other sources of additional workload came from administrative tasks and a constantly changing daily routine.	McHugh, 2018[63] Hemler, 2018[64] Kotecha, 2015[70]	Minor methodological limitations	No concerns (data are reasonably consistent)	Moderate concerns about adequacy	No concerns about relevance	Moderate confidence	This finding was graded as moderate confidence because of minor concerns regarding methodological limitations and moderate concerns about adequacy.
Facilitators: Investing in training coaches It was beneficial when coaches had adequate initial and ongoing training to help them with the QI process and understanding their role as a coach. One way to	Kotecha, 2015[70] Godfrey, 2014[68] Mekki, 2017[72] Huston, 2006[71]	Significant methodological limitations (1 study with moderate limitations, 1 with significant limitations)	No concerns (data are reasonably consistent)	Moderate concerns about adequacy	No concerns about relevance	Low confidence	This finding was graded as low confidence because of significant concerns regarding methodological limitations and moderate concerns about adequacy.

Summary of Review Finding	Studies Contributing to Review Finding	Methodologic limitations	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Assessment
support ongoing training for coaches was the creation of a network of other coaches to learn from during coaching activities.							
Knowledge and beliefs about the intervention (individual or team characteristics)							
Barriers: Lack of knowledge Team level lack of knowledge regarding the coaching process, QI project details, and technical aspects of electronic medical records as they relate to QI data collection was a barrier to coaching success.	Hemler, 201 [64] Due, 2018[19] Buscaj, 2016[66] McKeever, 2014[15]	Significant methodological limitations (3 studies with any limitations, 1 study with very significant limitations)	No concerns (data are reasonably consistent)	Moderate concerns about adequacy	No concerns about relevance	Low confidence	This finding was graded as low confidence because of significant concerns regarding methodological limitations and moderate concerns regarding adequacy.
Barriers: Lack of ability to work with data Coaches experienced challenges when teams were not comfortable or readily able to work with QI data.	Hemler, 2018[64]	Moderate methodological limitations	No concerns (Only 1 study)	Significant concerns about adequacy (only 1 study)	No concerns about relevance	Very low confidence	This finding was graded as very low confidence because of significant concerns regarding adequacy and moderate concerns regarding methodological limitations.
Reflecting and evaluating (QI project)							
Barriers: Data obstacles	McHugh, 2018[63] Due, 2017[61]	Minor methodological limitations	No concerns (data are	Moderate concerns	No concerns about relevance	Moderate confidence	This finding was graded as moderate confidence because

Summary of Review Finding	Studies Contributing to Review Finding	Methodologic limitations	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Assessment
Teams often had trouble acquiring the needed data for a given QI project which interfered with evaluating projects as planned. This led to team frustration and an inability of the coaches to execute relevant coaching implementation activities.			reasonably consistent)	about adequacy			of minor concerns regarding methodological limitations and moderate concerns about adequacy.

APPENDIX G. PEER REVIEW COMMENTS AND RESPONSE TABLE

Question Text	Reviewer Number	Comment	Section of report	Response
Are the objectives, scope, and methods for this review clearly described?	1	Yes		Acknowledged
	2	Yes		Acknowledged
	3	Yes		Acknowledged
	4	Yes		Acknowledged
	5	No - This Review was commissioned to systematically examine quality improvement (QI) studies employing team-based quality improvement coaching interventions. Thus, findings from this synthesis should provide VA operational partners with a better understanding regarding how to assess process and clinical outcomes of VA transformational coaching (TC) approach and, to understand relevant contextual factors (barriers and facilitators) influencing coaching effectiveness.		We appreciate the reviewer's thoughtful consideration of this report. The scope of this project, as co-developed by the nominating operations partners, was to focus on particular types of team-based QI innovations that are similar to the model of Transformational Coaching used within the VA system. We address and synthesize the evidence on: the effects of coaching on process outcomes (KQ 1b), the types of outcomes assessed (KQ 1a) and barriers and facilitators to the uptake of transformational coaching-like interventions (KQ 2).
	5	To paraphrase p. 11, lines 21-22, for the results of this project to be relevant to other health care organizations, a number of major and minor points warrant further consideration by the authors: Major Points 1. Pages 1, 9-10. The Introductory sections of this Report may be confusing to some reader because it is written from a perspective that assumes reader familiarity with a variety of concepts. Specifically, the clarity and logic flow of these sections could be significantly improved by defining key terms, providing a rationale for	Topic Development section of Executive Summary Introduction of Executive Summary	Thank you for this recommendation. We have significantly revised introductory sections to clarify key terms, improve clarity, and logic flow.

Question Text	Reviewer Number	Comment	Section of report	Response
		selecting (or omitting) specific concepts, and provider strong justification for linking relevant theoretical constructs to TC. Some specific points:		
	5	a. What is a working definition of quality or process improvement? It is implied but never stated. In one section, QI is linked to characteristics of high-reliability organizations (p. 1) and as a strategy to achieve the health system quality outcomes outlined by the IOM (p. 9). It would be appropriate to operationally define how QI achieves these aims in both places or to use one clear consistent rationale. Similarly, a brief definition of facilitation is not provided in either section although a definition of practice facilitators is defined on p. 9, lines 21-24. Finally, what is a high reliability organization?	Intro of Exec Sum Intro of full report, second paragraph Intro of exec sum, first paragraph	A reference for the Institute for Healthcare Improvement (IHI) definition for QI has been included. Operational definition of QI has been added to Intro, Exec Summary, as well as a new table (Table 1) to further clarify where QI fits within various scientific approaches to improvement activities. Facilitation definition added. References in the introduction to high-reliability organizations have been removed. In the discussion, high reliability organization has been defined and the potential relationship to transformational coaching has been clarified (see page 85).
	5	b. It is unclear why the authors chose to focus on “one method” (p. 1, lines 12-13) of providing process improvement/quality improvement support (i.e., facilitation) versus other methods that are included in search criteria (e.g., improvement coaching/improvement advisor). For both VA and non-VA readers, it might be helpful to acknowledge some common approaches to leading team-based QI improvement projects including improvement coaching/advising or, coaching by expert staff trained in Lean, Six Sigma, or other systems redesign methodologies. These approaches actually compete with TC within VHA and it seems odd for them not be formally acknowledged.		Thank you for this observation. Other commonly used team-based QI coaching strategies have been acknowledged in the Introduction. As Transformational Coaching is not a term commonly used in the peer-reviewed literature, we cast a very wide net in our search logic to obtain a variety of QI support upon which to compare to the model of interest, Transformational Coaching.

Question Text	Reviewer Number	Comment	Section of report	Response
	5	c. The sequence of logically linking QI to facilitation as well as "practice" facilitation to TC is somewhat in unclear in both sections. The logic in the Executive Summary is pretty hard to follow for readers with less familiarity with implementation science and quality improvement jargon. It does not seem necessary to even address facilitation in the Exec Summary provided that there's an acknowledgement of the range of approaches to QI coaching that would be familiar to readers and similar to TC. The imprecision of terminology in these two sections may be off-putting to implementation science researchers and serve to undermine the report's credibility for some potential users.		We have significantly revised these sections to improve clarity and reduce jargon. Further, we have added clarification that there is a wide-range of approaches to team-based QI coaching strategies.
	5	d. For p. 9, a clearer rationale for focusing on AHRQ's model of facilitation vs. VA QUERI's would be helpful. There is a strong difference between the two facilitation approaches but the nuances may not be evident for many readers.	Intro of executive summary and Topic development section of full report	Thank you for this recommendation. We have included VA QUERI and AHRQ's definitions of facilitation and have acknowledged that there are multiple conceptualizations of facilitation.
	5	Study question KQ 1a, 1b. (p. 1, 11). It would be enhance the Report if these key questions used the same terminology as Figure 1 and explicitly state the focus of 1a is "process" outcomes and 1b is "clinical" outcomes for TC-like assessments.	Study selection section of executive summary, third paragraph. (Note: KQ 1a and b have been switched in the final report.)	We have aligned the terminology in Figure 1 and adjusted the wording of the key questions to clarify as suggested. Note that for KQ 1a, we did not limit outcomes to "clinical outcomes" but describe all outcomes included in studies meeting KQ 1 eligibility criteria. Figure 1 shows KQ 1a in both the process and clinical outcomes bubbles. This has been clarified in the methods section.
	5	Page 2, lines 42-47. Please provide clarification in the methods as to why the authors did not include quantitatively assessed barriers and facilitators to transformational coding (e.g. surveys, assessment instruments). The KQ2 question on p. 1 does not indicate that determinant assessment would rely solely on qualitative data.	Data synthesis and analysis section of executive summary	Our eligibility criteria (as outlined in SPIDER page 23), did allow for studies which used quantitative methodologies for assessment of barriers and facilitators (*eg*, surveys, observational). In fact, 1 included study was a survey that used open-ended questions

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				(Liddy C, Singh J, Guo M, et al. Physician perspectives on a tailored multifaceted primary care practice facilitation intervention for improvement of cardiovascular care. Fam Pract. 2016;33(1):89-94). This has been clarified in the methods and results sections. Of note, we did identify multiple studies in our search that assessed the barriers and facilitators for the effectiveness of the QI project itself, but not the adoption of the coach-like role, so were thus excluded.
	5	4. Page 3, Data Synthesis and Analysis. It is unfortunate that this synthesis missed a significant opportunity to evaluate K1 metrics with respect to recommendations by the American College of Physicians to assessing the importance, appropriateness, clinical evidence, specifications, feasibility and applicability of potential performance metrics (Maclean, Kerr, Qaseem, 2018; NEJM) – most measures fail these criteria. Furthermore, numerous AHRQ studies pertaining to QI initiatives in primary care practice settings find a bias toward utilization and access metrics preferred by senior operational leaders that are neither meaningful or actionable by frontline providers, the people actually doing the QI work (e.g., Gray, Yakir, Hung, 2018). Helping teams and clinical leaders to selecting the appropriate ensemble of K1 measures is difficult for many primary care QI initiatives. In interpreting findings from this synthesis, the authors should		We agree that specific outcome metrics used to measure the success of a QI project and/or performance measure should be chosen thoughtfully and be valid for the context in which they are used. The scope of investigation and choice of outcomes for this review was informed by preferences from our operational partners and with guidance from our technical expert panel and multidisciplinary investigator team. Unfortunately, conducting a formal assessment of the outcomes identified in KQ 1a using criteria such as those put forth by the ACP in the identified article is out of scope for this current review. We agree that such an evaluation would be an important next step in building an understanding of how to best measure the impact of transformational coaching, and is a step that could be paired with improved stakeholder engagement to

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		acknowledge this limitation or else err in summarizing meaningless measures.		ensure the use of relevant and valid metrics. We have noted this in the discussion and limitations.
	5	5. Page 18, KQ 1b. Mapping outcomes at multiple levels should be mentioned earlier in report.	Data synthesis section of the full report, KQ 1b (KQ 1a in final report) paragraph	Descriptions of mapping at multiple levels has been emphasized in the executive summary and methods of main report.
	5	Page 54. KQ 2 findings. This section seems to conflate organizational barriers and facilitating contextual factors with TC implementation strategies/actions to mitigate B&Fs; these are two distinctly different evaluative questions. Consequently, framing of results in this section is flawed by mixing these two conceptually different constructs. As noted below in Minor suggestions, optimizing the selection of a practice-based determinants framework (e.g., Tailored Implementation for Chronic Disease framework (Flottorp, Oxman, Krause, et al., 2013 Implem Sci) would like have been more intuitive for readers and for use in categorizing determinants accurately without conflating implementation strategies with enabling factors.	KQ 2 results section of main report	We acknowledge that both organizational facilitators and coaching-initiated facilitators were included in the results for KQ 2. Both were included in our definition of facilitators. This was an intentional inclusion given the nature of transformational coaching. We felt it was important to identify all facilitators within each of the domains including those introduced by a coach. The coach-initiated facilitators directly impacted the domain for which they were included. We acknowledged this in the methods and limitations of the report. We acknowledge that there are multiple frameworks that could have been chosen as the core of our best fit framework approach to KQ 2, and that other choices could have led to different findings. We have added this consideration to our limitations section. In addition, we have clarified our rationale for the selection of CFIR as the core framework for this analysis in the methods section.
	5	7. Minor: 1. Page 2, line 33. Define EPOC upon first use.	Study selection section of Exec Sum, second paragraph	Thank you. The suggested edit has been made.

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	5	2. Page 2, lines 47-49. Be mindful of undefined jargon such as “influencers” and “determinants.”	Study selection section of Exec Sum, third paragraph	We have rewritten throughout the report to reduce jargon and clarify definitions.
	5	3. Page 3. Line 28; p. 17. No rationale is provided for using the ERIC strategy taxonomy versus common QI frameworks like “change strategies” (i.e., The Improvement Guide by Langley, Moen, Nolan, Norman & Provost, 2009 that defined a 70+ traditional QI strategies).	Data synthesis and analysis of Exec Sum, first paragraph	We have added the rationale or our choice of ERIC strategy taxonomy to the methods section.
	5	4. Page 3 lines 54-60 and page 18. What is a “best fit framework” and why was CFIR selected as the organizational determinants framework? It is not checklist designed to assess primary care practice settings unlike the Tailored Implementation for Chronic Disease framework which was designed specifically for individual and organizational practice determinants.	Data synthesis and analysis of Exec Sum, third paragraph and Data synthesis section of main report, KQ 2 section	Thank you. We have now explicated the description of the best fit framework in the main methods section and executive summary for clarification. Further, we provide more justification for the choice of CFIR.
	5	5. Page 4, lines 26-28. Search term list seems incomplete versus Appendix B and Table 3 (p.17). Given VA’s longstanding relationship with IHI on major care initiatives, it seems appropriate to cite their terminology (quality improvement coach or advisor) which has been employed for nearly the last 25 years in VHA.	Results section of exec sum, KQ 1a (KQ 1b in final report) section, first paragraph	We appreciate the need for clarification on these lists. The full list of terms used for our literature search are included in full in Appendix A. This collection of terms was identified from existing systematic reviews and exemplar papers, as well as with input from our operational partners and technical expert panel. After execution of the search, we identified additional terms that were searched for independently (see methods section, page 23.) These approaches together include those terms from IHI as the reviewer mentioned. Table 4 and Appendix B list the terms used by the authors of the included articles that met our eligibility criteria.

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	5	Page 9, paragraphs 1 and 2. It is unclear what is to be evaluated – it seems to be facilitation or practice facilitation. Seems like introducing TC earlier would be helpful and to acknowledge there are many terms and models for doing team-based coaching. For example, there are close similarities between TC and AHRQ's practice facilitation including…	Introduction of main report, first two paragraphs	The introduction has been significantly revised to better provide a rational for the focus on Transformational Coaching. Further, we have multiple definitions for facilitation and have added a table to show the breadth of relevant terms we identified for this review.
	5	Page 9, line 32. Please refer to VA facilitation as "implementation facilitation." A more appropriate and current reference would be the Implementation Facilitation guide (ver. 2.0) on the VA QUERI website.	Introduction of main report, third paragraph	Thank you for this information. We have made this revision and included this citation.
	5	8. Page 9, line 51. Rather than "facilitation methods" it would be preferable to be more precise such as "methods for facilitating team-based QI. "	Introduction of main report, fourth paragraph	Thank you for this suggestion. We have reworded this paragraph and no longer use this terminology.
	5	9. Page 11, TC definition, line 57. Use of external is confusing as used here relative to prior discussion about facilitators being internal or external to a team or healthcare system. Page 12 description on line 46 seems to contradict early discussion that TC/facilitation can be internal or external to a team (p. 9, line 40). Unclear here or elsewhere how TCs "catalyze and build capacity for sustained change" such as through what common principles, methods, skills, framework, etc.? TC seems like a black box intervention and not a well operationalized role and skill set.	Definition and conceptual model section of main report, first paragraph and third paragraph Introduction of main report, third paragraph	We appreciate that this topic requires clarity around language used given the overlapping fields of study and practice related to this subject matter. Because the definition of transformational coaching is something directly informed by, and developed with, the VA operations partners, we did not make further changes. However, we clarify the meaning of 'external' in the methods. We agree that the wording was confusing and have corrected it for consistency.
	5	10. Pages 10-11. The language pertaining to the use of the words "process (es)" and "outcome(s)" is used broadly. Greater precision and specificity would be welcome to help clarify term use in	Topic development section of main report	As noted above, we appreciate the importance of clarity around wording and have refined the definitions and language as suggested.

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		specific context (i.e., operationally defining these terms for purposes of this report).		
	5	11. Page 12, lines 48-49. New use of processes of care and clinical outcome terms without clear definition.	Definition and conceptual model of main report, fourth paragraph	Definitions and wording choices have been aligned.
	5	12. Page 12, lines 55-56. "…multiple determinants to the 'adoption' of TC…" It seems like KQ2 from the proceeding page mentioned the implementation and adoption of TC (order of terms should likely be reversed). These terms are being used imprecisely to describe the process of implementing a QI process/initiative. The authors are cautioned about using terms that refer to specific sequential steps in an implementation process, loosely. It seems like "adoption" in this report is a term borrowed from program evaluation frameworks like RE-AIM but which is different than its use in other implementation science contexts.	Definition and conceptual model of main report, fourth paragraph	Thank you. The model does focus on the overall uptake of transformational coaching, so the statement was amended to reflect this.
	5	13. Page 14, lines 8-9. "not necessarily" seems like imprecise wording for inclusion criteria (see Table 2 use as well). The Intervention exclusion criteria do not seem consistently applied. Many of the studies examined for K1 seem to be complex, multicomponent interventions per definition by the UK's MRC (e.g., guideline implementation) and there is reference to studies that used learning collaboratives (pp. 25). Not defining these terms precisely in this table seems to have created lapses in criteria being used consistently, affecting results. Outcomes on Table 1 seem outlined for K1a only and do not mention clinical outcomes of interest. How are constructs like self-efficacy and team member knowledge defined?	Study eligibility criteria table, intervention (and phenom. of interest) item 1. Table 4. transformational coaching activities	We have revised the inclusion criteria language to note that individuals in the coaching-like role were not required to be an expert on the clinical topic of relevance to a given QI project, though they could be. We acknowledge that transformational coaching is a complex intervention and thus the eligible studies included in this review were also complex interventions. We aimed to identify those studies which were consistent with transformational coaching as defined by the review's operational partners without including those studies which had significant co-delivered interventions which would preclude isolation of effect due to the

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				coaching-like intervention. While we sought to develop clear rules to support making this distinction (eg, excluding longitudinal learning collaboratives vs including one-time learning collaboratives). We recognize that this may have excluded studies that potentially relevant information and have acknowledged this in the limitations. Definitions for self-efficacy and team member knowledge have been added to Table 2.
	5	14. Page 17. Please explain the cause of the discrepancy in term use between K1 and K2 in Table 3.	Table 3. Other terms for transformational coaching	Table 4. shows the terms for the coach-like role used by the studies included in KQ 1 versus KQ 2. Because there were different studies included for each KQ, the terms are different as well. We have adjusted the title for this table for clarity
	5	15. Page 17, KQ1, line 43. Why were ERIC strategies used describe the methods use to make a QI process or clinical improvement rather than "other commonly used terms to enact change on sources of waste, inefficiency, barriers, etc. such as countermeasures, redesigns, change strategies, drivers, etc.? Given the lack of clarity about what a TC does with teams to help coach them to QI change, it's hard to determine whether ERIC is appropriate or not.	Data Synthesis of main report, KQ 1b section, first paragraph	We chose to use the ERIC strategies to show the range of implementation activities that the coaches were involved with and to align with other facilitation research. We have added language to the methods to outline our rationale for choosing this particular taxonomy.
	5	16. Page 19, lines 49-59. Use of term over-read is awkward. Could less jargon be employed here for readability? Also, how many coders were needed to achieve consensus on codes/themes?	Data Synthesis of main report, KQ 2 section, third paragraph	We have refined the language here as recommended and clarified expectations for consensus.
	5	17. Pages 24-25, Table 4. It would be more intuitive to list implementation strategies by likely first use over the chronological timespan of a	Table 4. Transformational Coaching Activities	We have reordered this table (now Table 5) as suggested.

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		typical QI project. It is unclear if "operationalized definition" comes from ERIC studies, recent AHRQ evaluation by Perry, Damschroder et al., or an internal definition developed by this ESP team.		Clarification that the operationalized definitions were modified from the ERIC study has been added as a footnote.
	5	18. Page 25, lines 55-57. As noted by the AHRQ evaluators of EvidenceNow effort, audit and feedback are two distinctly separate strategies. See Perry, Damschroder, Hemler et al., 2019 Implem Sci.	Transformational Coaching Activities, KQ1 results, main report, second paragraph	We have acknowledged that these are distinct strategies, however list them together as that is the way they were typically described in the included studies.
	5	19. Page 29m Bottom Line. Was the ultimate problem that a clear performance benchmark was never set at the beginning of a QI project so that improvement relative to a goal was difficult to ascertain? See importance of distinguishing between audit and feedback for monitoring and accountability. Is this an issue of knowledge, literacy and proficiency in collecting the right data or being able to analyze it and digest in a manner to support systematic, iterative improvements in key goal targets for improvement?	Goal attainment section of main report, Detailed findings KQ 1b, bottom line box	We agree that this is an important question; however, we are unable to adequately address it based on the 2 studies with relevant outcomes for this section. We have noted the importance of thoughtful selection of valid and relevant outcomes for tracking success as noted in a previous response.
	5	20. Page 30, lines 10-11. Implementation of national preventive guidelines seems like a complex, multi-component intervention which should have been excluded per study criteria.	Adoption of Targeted Process of Care Activities, National preventative care guidelines, Detailed Findings KQ 1b	We recognize that the term "multi-component' was unclear and have removed it from the inclusion criteria. Transformational coaching is a complex intervention, thus the included intervention were complex. However, we excluded those interventions which included co-delivery of strategies that are not part of the definition of transformational coaching and which would preclude the isolation of treatment effect for the coach-like intervention component.
	5	21. Page 30, line 29. Spell out number 1.	National preventative care guidelines,	Thank you for your comment.

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			Detailed Findings KQ 1b, second paragraph	
	5	22. Page 33. There is a considerable amount of jargon in this section – organizational structures, continuous QI framework, practice management, etc. As in defining reach on (line 49), it would be helpful to define less commonly understood terms like organization structures.	Organizational Process of Care, third paragraph	Thank you for this recommendation. We have removed unnecessary jargon and defined the remaining terms (continuous QI framework, practice management).
	5	23. Page 35, line 11. How did studies with learning collaboratives get included in the Results if learning or quality improvement collaboratives are considered an exclusion criterion?	Appropriate documentation, first paragraph	We have clarified that learning collaboratives were only a cause for exclusion if the effect of coaching was not able to be isolated. We agree that exploring the effect of coaching with learning collaboratives could be helpful; however, this was not within the scope of the key questions for this review.
	5	24. Page 54, 3rd bullet. While this point seems evident, the language is so broad here that it is difficult to interpret what “knowledge of the change processes required to implement QI…” is relative to expert credentials or skills needed by a TC.	KQ2 results section, Key Points	We have revised this statement and address the coach outcomes for the team to be successful.
	7	Yes		Acknowledged
Is there any indication of bias in our synthesis of the evidence?	1	No		Acknowledged
	2	No		Acknowledged
	3	No		Acknowledged
	4	No		Acknowledged
	5	No		Acknowledged
	7	No		Acknowledged
Are there any published or unpublished	1	No		Acknowledged
	2	Yes - See comment regarding exclusion of studies that used a collaborative improvement process		We have clarified that learning collaboratives were only a cause for

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studies that we may have overlooked?				exclusion if the effect of coaching was not able to be isolated. We agree that exploring the effect of coaching with learning collaboratives could be helpful; however, this was not within the scope of the key questions for this review
	3	Yes - As I said in the other e-mail, I believe the search term "Transitional Coaching" do not have a standard definition. I suspect that Performance Improvement Literature with the associated roles of an improvement advisor, or facilitator, or PI coach, etc. have a huge overlap with this role. In addition, I wonder if the transitional coaching role emphasizes the people part of improvement more (I think it does) and the PI tools less (not sure). I wonder if T.C. is a VA term, or if it is really spread outside of VA. While I don't have a lot of insight into that (nor specific articles to suggest), just wanted to express that as a potential concern here. thank you		The reviewer is correct that transformational coaching is a VA term for a role that is conceptualized in similar ways outside of the VA. For the purposes of this report, we worked with our operational partners to develop a definition of transformational coaching - against which we could compare and identify similar interventions in the published literature.
	4	No		Acknowledged
	5	No		Acknowledged
	7	No		Acknowledged
Additional suggestions or comments can be provided below. If applicable, please indicate the page and line numbers	1	Thank you for the opportunity to review this ESP report on transformational coaching. This was an ambitious undertaking with potential important findings. I would say my main recommendation is to distill results down considerably and carefully align tables and text. This is very challenging to work through and the flow can be improved. I've provided suggestions here.		Acknowledged
	1	Executive Summary	KQ2 results section, exec sum, third paragraph	We have clarified this language in the executive summary.

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from the draft report.		● The language around presenting findings in terms of "COE" level is confusing. It may help readers if the authors identified barriers and facilitators and then tagged each parenthetically with COE level. For example, "high workload was a barrier (moderate COE)…" etc.		
	1	Applicability ● Clarify that nearly all studies were in primary care settings (including the one in the VA). Making a blanket statement about applicability to VA is overly broad; it seems that applicability needs to be limited to primary care settings.	Discussion section of exec sum, Applicability section	This qualification has been added as suggested.
	1	Introduction ● Move the KQs to Introduction. The section ends with a paragraph that seeks to summarize the aims but the description here does not quite match the KQs under Methods. E.g., assessing effects on clinical care delivery processes versus effects on team-based goal attainment, etc.	Introduction section, main report, fourth paragraph	The KQs have been moved as recommended.
	1	Methods ● Figure 1: KQ 1a focused on *effects* of TC while KQ 1b focuses on *types* of outcomes– the diagram (and corresponding text) confuses this distinction	Transformational Coaching Conceptual Model	We have adjusted the language in the KQs and the conceptual model description to reflect that KQ 1 was focused on the effect of transformational coaching on process of care outcomes and KQ 2 was focused on the mapping and grouping of all measured outcomes across patient, provider and practice level outcomes.

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	1	Nice Table 1 that really helps the reader understand the operationalization of TC, which is a rather diffusely defined intervention o Combining tables 1 and 2 with an extra column to indicate which KQs apply would be helpful. As is, I must compare the tables to see where the differences are	Study eligibility criteria for KQ1 and 2	We appreciate that these 2 tables may add some confusion. However, they use separate criteria as appropriate for quantitative and qualitative evidence synthesis, they are incompatible for reducing to a single table.
	1	This is a picky point, but the ERIC list comprises strategies, not categories of strategies	Data synthesis KQ 1a section, first paragraph	Thank you, this wording has been changed.
	1	Your definition of "facilitators" seems problematic: You say that your "Key Question was framed around the identification of barriers and facilitators to the implementation of transformational coaching…" but then go on to define facilitators as "as something that the coach does (or existing conditions) that helps to enable the coaching process around QI projects (including what the coach does to overcome barriers)." This is confusing and conflates the function of the THING (transformational coaching) that is being implemented with *facilitators* of that implementation. To put "existing conditions" (these might be true contextual facilitators for implementation) and "what the coach does" also, as a facilitator, blurs the line.	Data synthesis, KQ 2 section, Second paragraph	We have clarified the wording throughout the report and added a table in the introduction to clarify terminology used.
	1	This is a picky comment: by "over-read" do the authors mean that a 2nd reviewer read the article? This should be stated. "Over-read" doesn't convey this idea.	Data synthesis, KQ 2 section, third paragraph	Thank you, this wording has been revised.
	1	Why not rate COE for all 15 CFIR constructs? We have worked with ops partners to ID "high priority" constructs and discovered that though some came	Rating the body of evidence, second paragraph	This topic and our report was driven by our nominating stakeholders' information needs. We routinely survey our

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		to be empirically verified, others turned out not to be high priority and still others were on the empirically derived list that were not ID'd as "high priority" by our partners.		stakeholders to request prioritization of key outcomes for COE across all our reports and this is a routine practice in systematic reviews when it is infeasible due to team capacity to conduct COE for all identified outcomes. Thus, we elected to work with our operational partners who requested this review to select those constructs deemed of greatest relevance to them. We acknowledge that this may not reflect the most important constructs in other contexts or as perceived by other stakeholders. We have added a statement to this effect in the limitations.
	1	Results ● Suggest rearranging this section to provide results for KQ1, including the PRISM diagrams, followed by KQ2 and divide (following PRISM for KQ1a) sections for 1a versus 1b (i.e., p23, move KQ 1b down to a separate subsection	Results, main report	We have moved the literature flow diagram for KQ 2 to the beginning of the KQ 2 section as suggested and separated the KQ 1b into its own subsection.
	1	In Table 4, suggest adding number of studies with documented use of each ERIC strategy	Table 4 Transformational Coaching Activities	The number of studies that used each coaching strategy has been added to Table 5 (formerly Table 4).
	1	Table 5 can be moved to an Appendix	Table 5 Implementation strategies	Thank you for this helpful suggestion. We have moved Table 5 to Appendix C.
	1	For Goal Attainment (p29), the bottom line seems to be that TC doesn't have an effect…though one low ROB study did find a positive effect. The other study with high ROB found no effect.	KQ 1a results section, goal attainment section	For this outcome, 1 study at unclear ROB found a significant improvement in the number of QI projects initiated. The second study at high ROB found no effect. Thus, our conclusion was mixed effect.

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	1	For the "Adoption of Targeted Process of Care Activities" section, Bottom Line states there were 6 trials but the 3rd sentence refers to 7 trials. This summary should highlight that 6 of 7 studies had low/unclear ROB.	KQ 1a results section, Adoption of Targeted Process of Care Activities	Thank you, this section has been clarified.
	1	Suggest significantly distilling this section to consolidate all outcome types to a single Bottom Line. The number of studies within each category are small and the particular topics don't really have meaning because the focus is on TC. Tables 6-11 can be combined into a single table – possibly pushed to an appendix.	Effects of Transformational Coaching on X tables	We have refined the key points for KQ 1a to provide a clearer overall outcome conclusion. However, we have retained the individual tables as the analysis was structured to provide some granularity across types of clinical activities around which a coach might engage with a clinical team. This approach differed from previous analysis of coaching-like interventions and so we believe adds to the existing literature.
	1	Suggest moving the summary of ROB (p45) before sections on outcomes. This way all outcomes are interpreted within context of overall ROB. Likewise, move the COE section (p47) to follow the ROB section.	Quality of Evidence KQ 1a Studies section Certainty of Evidence for Key Question 1a	The order of these sections was maintained to be consistent with ESP standard formatting.
	1	Bottom Line on p33, 2nd sentence is unclear	Organizational Processes of Care	This sentence has been rewritten.
	1	Figure 6 – add n=number of studies	Figure 6. Risk of Bias Assessment Across Included Cohort Studies in KQ 1a	The number of included studies has been added to the figure title.
	1	The above recommended rearrangement is reinforced by the fact that KQ1b then goes into great detail about the types of outcomes. Is it possible to rearrange KQ1a-1b to reverse the order? It would flow better to first ID types of		We have switched the order of KQ 1a and KQ 1b.

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		outcomes (1b flipped into the new 1a) and then provide results on effects across those outcomes (and referring to the detailed table by type of outcome)		
	1	KQ2 o Which studies overlapped with studies ID'd for KQ1a-b?		There are 2 studies in common between KQ 1a and KQ 2. This information has been added to the report in the results section of KQ 2.
	1	Figure 7 seems to provide themes/findings. The title should highlight this	Figure 7. Consolidated Framework for Implementation Research: Context	Thank you. The figures for the section on KQ 2 have been reworked and renamed.
	1	Table 15 should include all B&Fs identified in the text.	Table 15. CERQual Summary of Qualitative Findings Table for KQ 2	This topic and our report was driven by our nominating stakeholders' information needs. We routinely survey our stakeholders to request prioritization of key outcomes for COE across all our reports and this is a routine practice in systematic reviews when it is infeasible due to team capacity to conduct COE for all identified outcomes. Thus, we elected to work with our operational partners who requested this review to select those constructs deemed of greatest relevance to them. We acknowledge that this may not reflect the most important constructs in other contexts or as perceived by other stakeholders. We have added a statement to this effect in the limitations.
	1	It is confusing what is meant by e.g., "we found 1 barrier and no facilitators…an example is…another example is…" What are the examples? Does this mean that more than 1 study	Cosmopolitanism (outer setting)	We revised the language to add clarity that several examples exist under one big barrier for both constructs. The studies supporting each findings are cited in the text.

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		had that single barrier? The language here is unclear.	Implementation climate (inner setting)	
	1	Move ROB section earlier in this section.		The order of these sections was maintained to be consistent with ESP standard formatting.
	1	The text for Table 15 should be prefaced with the fact that it includes only the 5 constructs chosen by the partners. Link these with the corresponding text in the previous sections. A final summary section could perhaps lightly touch on the other constructs but the details can be relegated to an appendix. It seems important, however, to rate COE for the non-chosen constructs as well. ▪ Perhaps it missed it, but a rationale/criteria for choosing the 5 constructs is needed. This seems like a lot of work to do (coding for all the other constructs) and then only focus on 5 without any real empirical evidence.	Table 15. CERQual Summary of Qualitative Findings Table for KQ 2	(Please note that due to other changes, Table 15 is now Table 19). The text prior to Table 19 has been clarified. This topic and our report was driven by our nominating stakeholders' information needs. We routinely survey our stakeholders to request prioritization of key outcomes for COE across all our reports and this is a routine practice in systematic reviews when it is infeasible due to team capacity to conduct COE for all identified outcomes. Thus, we elected to work with our operational partners who requested this review to select those constructs deemed of greatest relevance to them. We acknowledge that this may not reflect the most important constructs in other contexts or as perceived by other stakeholders. We have added a statement to this effect in the limitations.
	2	The ESP Review of Transformation Coaching conducted by the investigators and documented in the report is comprehensive, thorough, detailed and highly valuable to VHA and particularly to those who strive to fully adopt the principles and practices of a high reliability organization. As a member of the TEP, I fully agree with the findings and conclusions reported in the review. I	Results section of the executive summary	Thank you for your contributions to the report as a TEP member and your thoughtful review of the draft report. We appreciate this suggestion and have revised the executive summary as suggested.

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		have several suggestions that I believe will enhance understanding and interpretation of the findings, as well as the limitations that the authors have specified in the report. I suggest the authors consider including more details on the key findings in the executive summary as I believe this will increase the clarity of the findings, especially for those who don't take the time to read the detailed results section of the review.		
	2	For example, in both the Summary of Results for Key Questions (starting on page 4) and the Discussion of Key Findings, starting on page 6, the authors offer fairly high level descriptions of the results. For example, on page 4, line 44, the authors state, "Across outcomes related to adoption of targeted process of care activities, there was very low to low COE that coaching probably has an effect on composite process of care outcomes and ordering of labs and vital signs, and possibly has an effect on changes in organizational process of care and delivery of appropriate counseling. It is uncertain if coaching has an effect on the conduct of specific exams and procedures, and probably does not have an effect on prescription of diagnosis appropriate medications." Though this is accurate, more detail about the positive findings noted would be valuable.	Summary of Results for Key Questions, exec sum, KQ 1a, second paragraph	We have incorporated more detail in the Executive Summary as suggested.
	2	Also, on page 6, in the discussion section, line 36, the authors state, "However, we found that coaching probably has an effect on composite process of care outcomes and ordering of labs and vital signs, and possibly has an effect on changes in organizational process of care and delivery of appropriate counseling. It is uncertain if coaching has an effect on the conduct of specific exams and	Discussion, exec sum, second paragraph	We appreciate these suggestions and have made revisions accordingly.

Question Text	Reviewer Number	Comment	Section of report	Response
		procedures, and probably does not have an effect on prescription of diagnosis-appropriate medications." Again, more detail regarding the specific outcomes that were achieved by T-coaching might be included here. The Key Points listed on page 23 provide a bit more detail, listing the number of trials for each category of process of care outcomes, though even better yet would be inclusion of at least some of the "Bottom Line findings" for KQ1 which are found in the Detailed Findings section, starting on pg 29. Perhaps the most important results are found in the Bottom Line boxes on page 31, 33, 35 and 37.		
	2	The sections KQ2 results in the Executive Summary might also include additional detail regarding specific findings on barriers and facilitators. Limitations and Research Gaps in the Executive Summary are fine, though I suggest adding some of the points made in the section on Clinical Policy Implications, found on page 74, to the Conclusions section of the Executive Summary to make the link between T-Coaching and the broader effort to become a HRO. The final sentence of the Clinical Policy Implications needs to be in the conclusions, line 5774 – "As we describe in this report, coaches can play a critical role in facilitating access to and use of data and technical resources for QI activities."	Clinical Policy Implications, Discussion of main report	We appreciate these suggestions and have made revisions accordingly (see second paragraph under KQ 2 in results and the conclusions of Executive Summary).
	2	Pg 14 – Table 1 - The exclusion criteria includes "Interventions that focus on learning collaborative as the main component of the intervention or have a longitudinal learning collaborative component. Please clarify why a learning collaborative led to exclusion if one could isolate the T-Coaching component across	Table 1. Study Eligibility Criteria for KQ 1	We have clarified Table 2 (formerly Table 1) to note that learning collaboratives were only a cause for exclusion *if* the effect of coaching was not able to be isolated.

Question Text	Reviewer Number	Comment	Section of report	Response
		intervention and control conditions. This would allow inclusion of trials that utilized a longitudinal collaborative with or without the addition of a T-Coach assigned to assist a team participating in the collaborative. Since collaboratives offer resources which address many of the barriers found in the analysis of data gathered for KQ2, the addition impact of a coach might be even more valuable in this context. How many of the excluded studies were excluded because of this specific exclusion criteria. What impact might this have had on results?	Table 4. Transformational Coaching Activities	We agree that exploring the effect of coaching with learning collaboratives could be helpful; however, this was not within the scope of the key questions for this review.
	2	Pg 18 – line 41 KQ 1b second order outcomes example includes “increased delivery of patient centered evidence based”. Is something missing?	Data synthesis section, main report, KQ 1b	This section has been revised as suggested.
	2	Pg 19 – Figure 2 with CFIR elements is very helpful!	Figure 2. Consolidated Framework for Implementation Research (Adapted)	Thank you.
	2	Pg 30 - line 17; Hogg - Authors reported a mean difference of 2.0. It is not clear what the measure was for this study.	National preventive care guidelines, KQ 1 results, first paragraph	Thank you, this data point has been contextualized.
	2	Pg 30 – line 34; how were “ratio of ratios” calculated?	National preventive care guidelines, KQ 1 results, third paragraph	This language has been updated for clarity.
	2	Pg 31 – line 19 – “Among 40 primary care practices (822 patients), the authors found all 3 arms improved by end of intervention; however, the coaching arm based on reflective	Diabetes process of care, KQ 1 results, second paragraph	Thank you for noticing this error. The continuous quality improvement arm and the reflective adaptive process arms have been switched.

Question Text	Reviewer Number	Comment	Section of report	Response
		adaptive process experienced greater improvement in process of care score (4.54 to 4.85) than either the continuous quality improvement arm (3.58 to 4.91; p<0.0001) or the enhanced usual care arm (3.63 to 4.39; p <0.0001)." The reported change in the coaching arm appears to be less than the change in control arms. Is this an error?		
	2	Pg 73 – line 14; consider organizing listing of barriers and facilitators by COE: moderate and high, low, very low COE	Summary and Discussion section of main report, KQ 2, second paragraph	We appreciate this suggestion and have re-ordered from higher level of evidence to lower level of evidence.
	2	Pg 72 – line 20; "Studies included a median of 5.73 implementation strategies". This piece of data might be included in the executive summary as it reflects the multi-dimensional quality of T-coaching. Thanks, again, for the opportunity to participate on the TEP and to review this excellent review and report!!	Summary and Discussion section of main report, KQ 1a, first paragraph	Thank you for this suggestion. This has been added to the executive summary.
	3	See above and prior e-mail		
	4	None		
	5	See detailed comments above. It is difficult to know if studies were left out or overlooked based on the broad inclusion and exclusion criteria. Most QI studies are not randomized clinical trials so that excludes the majority of the literature. Furthermore, many high quality VA randomized initiatives were likely excluded because they employed a virtual community of care or learning collaborative to foster more rapid learning across participating sites received team-based coaching or facilitation; it is unfortunate to lose those studies.		We made methodologic choices based on the specific key question put forward for this review (*ie*, limiting to EPOC criteria studies best suited to address questions of effectiveness). We acknowledge that the broader literature holds valuable information that was not incorporated into this review due to ineligible study design. We have noted this in the limitations.

Question Text	Reviewer Number	Comment	Section of report	Response
	7	Pages referenced are the actual document pages noted on the bottom, not the pdf page identifier. pg. iii, line 3: Dr. Davies is not the National Director of Systems Redesign, this should be removed from his title.	TEP Acknowledgment	Acknowledgments have been updated.
	7	pg. iv, line 45: question 1a: the a is not capitalized like b is in question B and it is not written as a question, seems to be unfinished?	Table of contents	We have corrected this in the table of contents (abbreviated KQ).
	7	pg. v, line 41: I am not seeing a reference to KQ1 1B	Table of contents	We have corrected this.
	7	pg. 1, line 16: there is a period that does not belong there	Intro of exec sum, first paragraph	The Executive Summary has been updated.
	7	pg. 1, line 51: consistent capitalization or not on the 1 a and 1 b of the questions	Intro of exec sum, KQ 1a and KQ 1b	1a and 1b are lowercase.
	7	6. pg. 7, line 34: strategies decisions is difficult to read, perhaps strategy decisions	Research gaps section of executive summary	We have changed this to “strategic.”
	7	pg. 11, line 55: Final definition for transformational coaching was as follows, should this be "is as follows"?	Definition and conceptual model section, main report, first paragraph	We have corrected this text.

APPENDIX H. GLOSSARY

For full study citations in this appendix, please refer to the report's main reference list.

<table>
<tr><th>Term</th><th>Definition</th></tr>
<tr><td>Certainty of evidence</td><td>We assessed the certainty of evidence using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach[36] for 4 domains:
<table>
<tr><th>Domain</th><th>Rating</th><th>How Assessed</th></tr>
<tr><td>Risk of bias</td><td>Low
Unclear
High</td><td>Assessed primarily through study design and aggregate study quality</td></tr>
<tr><td>Consistency</td><td>Not serious inconsistency
Serious inconsistency
Very serious inconsistency</td><td>Assessed primarily through whether effect sizes are generally on the same side of “no effect,” the overall range of effect sizes, and statistical measures of heterogeneity</td></tr>
<tr><td>Directness</td><td>Not indirect
Serious indirectness
Very serious indirectness</td><td>Assessed by whether the evidence involves direct comparisons or indirect comparisons through use of surrogate outcomes or use of separate bodies of evidence</td></tr>
<tr><td>Precision</td><td>Not serious imprecision
Serious imprecision
Very serious imprecision</td><td>Based primarily on the size of the confidence intervals of effect estimates, the optimal information size and considerations of whether the confidence interval crossed a clinical decision threshold</td></tr>
</table>
Summary certainty of evidence ratings for a body of evidence:
• High—High confidence that the true effect lies close to that of the estimate of the effect.
• Moderate—Moderate confidence in the effect estimate. The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
• Low—Limited confidence in the effect estimate. The true effect may be substantially different from the estimate of the effect.
• Very low—Very little confidence in the effect estimate. The true effect is likely to be substantially different from the estimate of effect.
• Insufficient—Impossible or imprudent to rate. In these situations, a rating of insufficient is assigned.</td></tr>
<tr><td>CERQual (Confidence in the Evidence from</td><td>We assessed confidence in the evidence from using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) CERQual approach[36,37] for 4 domains:</td></tr>
</table>

<table>
<tr><th>Term</th><th>Definition</th></tr>
<tr><td>Reviews of Qualitative Research)</td><td>
<table>
<tr><th>Domain</th><th>Rating</th><th>How Assessed</th></tr>
<tr><td>Methodological Limitations</td><td>No limitations
Minor limitations,
Moderate limitations,
Significant limitations</td><td>The extent to which there are problems in the design or conduct of the primary studies supporting a review finding</td></tr>
<tr><td>Relevance</td><td>No concerns,
Minor concerns,
Moderate concerns,
Significant concerns</td><td>The extent to which the body of evidence from the primary studies supporting a review finding is applicable to the context specified in the review question</td></tr>
<tr><td>Coherence</td><td>No concerns,
Minor concerns,
Moderate concerns,
Significant concerns</td><td>An assessment of how clear and cogent the fit is between the data from the primary studies and the review finding</td></tr>
<tr><td>Adequacy</td><td>No concerns,
Minor concerns,
Moderate concerns,
Significant concerns</td><td>The degree of richness and quantity of data supporting a review finding</td></tr>
</table>
Summary confidence of evidence ratings:

High confidence: It is highly likely that the review finding is a reasonable representation of the phenomenon of interest
Moderate confidence: It is likely that the review finding is a reasonable representation of the phenomenon of interest
Low confidence: It is possible that the review finding is a reasonable representation of the phenomenon of interest
Very low confidence: It is not clear whether the review finding is a reasonable representation of the phenomenon of interest

</td></tr>
<tr><td>Objective outcomes (ie, non–patient-reported outcomes)</td><td>Measures that are not subject to a large degree of individual interpretation and are likely to be reliably measured across patients in a study, by different health care providers, and over time.</td></tr>
<tr><td>Patient-reported outcomes</td><td>Outcomes that are directly reported by the patient without interpretation of the patient's response by a clinician or anyone else and pertains to the patient's health, quality of life, or functional status associated with health care or treatment.</td></tr>
<tr><td>Risk of bias (ROB)</td><td>An assessment of study quality. We used the following guidance in this report.
(1) For KQ 1, we used the Cochrane EPOC ROB tool,[23] which is applicable to randomized and nonrandomized studies:

Randomization and allocation concealment
Comparability of groups at baseline
Blinded outcomes assessment
Completeness of follow-up and differential loss to follow-up
Whether incomplete data were addressed appropriately
Protection against contamination

</td></tr>
</table>

Term	Definition
	• Selective outcomes reporting • Intervention independent from other changes (specific to interrupted time series) • Intervention pre-specified (specific to interrupted time series) • Intervention effect on data collection (specific to interrupted time series) Summary ROB ratings for a study: • Low ROB—Bias, if present, is unlikely to alter the results seriously • Unclear ROB—Bias that raises some doubts about the results • High ROB—Bias that may alter the results seriously (2) For KQ 2, we used the Critical Appraisal Skills Programme (CASP) tool[26]: • Validity of study results (clarity of aims, appropriate methodology/design/data collection) • Nature of the results (ethical consideration, rigorous data analysis, clarity of findings), • Helpfulness of the results (local value). No summary ROB was possible for the CASP.