

Impact of Practice Facilitation in Primary Care on Chronic Disease Care Processes and Outcomes: a Systematic Review

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BACKGROUND: More than 100 million individuals in the USA have been diagnosed with a chronic disease, yet chronic disease care has remained fragmented and of inconsistent quality. Improving chronic disease management has been challenging for primary care and internal medicine practitioners. Practice facilitation provides a comprehensive approach to chronic disease care. The objective is to evaluate the impact of practice facilitation on chronic disease outcomes in the primary care setting.

METHODS: This systematic review examined North American studies from PubMed, EMBASE, and Web of Science (database inception to August 2017). Investigators independently extracted and assessed the quality of the data on chronic disease process and clinical outcome measures. Studies implemented practice facilitation and reported quantifiable care processes and patient outcomes for chronic disease. Each study and their evidence were assessed for risk of bias and quality according to the Cochrane Collaboration and the Grade Collaboration tool.

RESULTS: This systematic review included 25 studies: 12 randomized control trials and 13 prospective cohort studies. Across all studies, practices and their clinicians were aware of the implementation of practice facilitation. Improvements were observed in most studies for chronic diseases including asthma, cancer (breast, cervical, and colorectal), cardiovascular disease (cerebrovascular disease, coronary artery disease, dyslipidemia, hypertension, myocardial infarction, and peripheral vascular disease), and type 2 diabetes. Mixed results were observed for chronic kidney disease and chronic illness care.

DISCUSSION: Overall, the results suggest that practice facilitation may improve chronic disease care measures. Across all studies, practices were aware of practice facilitation. These findings lend support for the potential expansion of practice facilitation in primary care. Future work will need to investigate potential opportunities for practice facilitation to improve chronic disease outcomes in other

health care settings (e.g., specialty and multi-specialty practices) with standardized measures.

KEY WORDS: primary care; practice facilitation; chronic disease; systematic review; quality improvement.

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INTRODUCTION

Chronic disease is one of the primary causes of morbidity and mortality in the USA.¹ In 2012, 117 million people in the USA had at least one chronic disease, and 86% of health care expenditures were attributable to chronic conditions in 2010.^{2,3} In the USA, treatment of chronic disease has been limited by fragmented efforts, lack of care coordination, and reduced quality.⁴⁻⁶

The Agency for Healthcare Research and Quality (AHRQ) defines practice facilitation as “a supportive service provided to a primary care practice by a trained individual or team of individuals. These individuals use a range of organizational development, project management, quality improvement, and practice improvement approaches and methods to build the internal capacity of a practice to help it engage in improvement activities over time.”⁷ This intervention is not limited to quality improvement, but includes practice management, coaching, and organizational management delivered on site (or virtually) in the primary care practice. In 2013, AHRQ established guidelines for developing and implementing practice facilitators in primary care settings. In 2015, AHRQ also launched the EvidenceNOW consortium, a national initiative to test whether on-site practice facilitation and coaching improve heart health, specifically the “ABCS” (aspirin use by high-risk individuals, blood pressure control, cholesterol management, and smoking cessation), within the primary care setting.⁸⁻¹¹

With the growth and development of practice facilitation across North America, prior literature reviews on this subject were limited to studying the overall effect on process improvement and patient outcomes or were limited to reporting

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changes in practice processes, but lacked results in chronic disease measures.^{12, 13} The purpose of this systematic review is to summarize the evidence on the effect of practice facilitation in primary care settings on chronic disease processes and outcomes for patients with the most prevalent chronic conditions.

METHODS

Search Strategy

We searched PubMed, EMBASE, and Web of Science for original research articles, letters to the editor, and graduate theses on practice facilitation from database inception through August 2017. We developed a search strategy using key concepts including practice facilitation, quality improvement coaches, practice coaches, practice enhancement assistants, chronic disease, and chronic disease measurement. The full search strategy of the terms is provided in Appendix 1. Our protocol was developed using PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines with guidance from the National Academies’ Standard for systematic reviews.^{14–16}

Article Selection

The primary reviewer and three secondary reviewers reviewed all titles and abstracts independently, and disagreements were resolved by consensus based upon a modified Delphi methodology. We selected studies for inclusion if they met the following criteria: (1) the study implemented practice facilitation in a primary care setting, regardless of study design; (2) the study reported the impact of practice facilitation on specific chronic disease measures; and (3) the study provided quantitative changes in specific chronic disease measures.¹⁷ We excluded studies that reported aggregated measures, which would prevent interpretation of the change in chronic disease measures.^{18–21} After screening the abstracts, we screened the full-text articles of the studies, which were limited to adult populations, conducted in North America (USA and Canada), and published in English. In addition, we reviewed all relevant citations in each eligible study.

Data Extraction and Quality Assessment

The primary investigator and three secondary reviewers conducted the data extraction. We used a data extraction template that included publication date, study design, chronic disease, and type of measures to assess the effect of the intervention. We subsequently arranged the study by chronic disease group, study design, and date of publication. We categorized changes in chronic disease measures as having improved, decreased, or no change.

We categorized chronic disease measures related to asthma, cardiovascular disease, cancer, chronic kidney disease, and diabetes into two categories—process or

outcome—based on measure types established in the Quality Measures Inventory by the Centers for Medicare and Medicaid (CMS).²² Measures from the studies may have a corresponding measure in the Quality Measures Inventory. In order to provide specificity, we subcategorized the process measures into clinical measures (e.g., immunizations, prescriptions, counseling) or screenings/diagnoses measures (e.g., physical exams, assessments, lab/imaging orders) and outcome measures into hospitalization, control of lab values, control of blood pressure, and patient-reported outcomes.

The primary investigator and three secondary reviewers assessed the studies for risk of bias following guidelines provided by the Cochrane’s Handbook for Systematic Reviews of Interventions using Review Manager Version 5.3.²³ The primary investigator independently assigned a risk level of high, low, or unclear for each of six domains: selection bias, performance bias, detection bias, attrition bias, reporting bias, and other bias.^{23, 24} Additionally, the study quality was assessed using the GRADE collaboration tool with the software GRADEpro GDT.^{25, 26} The primary investigator, with validation by the secondary reviewers, assigned an evidence quality rating of very serious, serious, or not serious in the

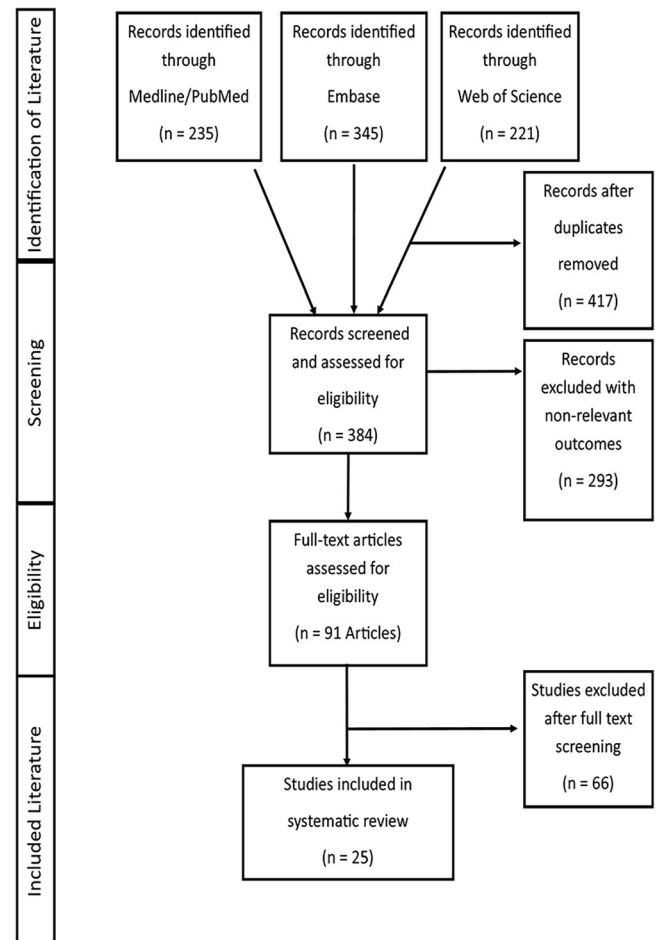


Fig. 1 Flow chart of study selection.

following areas: study design, risk of bias, consistency and limitations in the methods, data reporting, directness of the data, and publication bias. The overall quality rating for each study ranged from high, moderate, low, to very low. The

number of patients in each study and the relative and absolute confidence intervals were excluded in this quality assessment. A meta-analysis was also excluded due to heterogeneity across studies and their designs.

Table 1 Chronic Disease Measures and Improvement Changes

Disease groups	Measures (N=211)	Specific measures (N)	Change % mean (SD)
Asthma	18		
Process measures	16	Assessment of asthma, environmental triggers, or level of control (5) Asthma action plan, controller medication, or follow-up visits (7) Flu vaccination (2) Smoking counseling (1) Use of spirometry (1)	15.1% (13.1)
Outcome measures	2	ER visits due to asthma Hospitalizations due to asthma	1.3% (6.0)
Cancer	37		
Breast cancer process measures	19	Breast examination or self-examination (4) Chest radiography (1) Mammograms offered, mentioned, screening, or reports (10) Teaching breast exam (1) Unspecified breast cancer screening (3)	8.0% (7.8)
Cervical cancer process measures	6	Cervical cytology or pap smear (3) STD screening (1) Unspecified cervical cancer screening (2)	4.9% (3.5)
Colorectal cancer process measures	12	Digital rectal examination or sigmoidoscopy (2) Genetic screen for colorectal cancer (1) Increased fiber recommendation (1) Reduced fat recommendation (1) Smoking cessation counseling (1) Stool occult blood screening (1) Unspecified colorectal cancer screening (5)	5.0% (5.0)
Cardiovascular disease	66		
Process measures (cerebrovascular disease, hypertension, myocardial infarction, and unspecified)	56	Blood pressure screening or monitoring (3) BMI, waist screening, weight control, weight control referral (4) Cholesterol screening or treatment (2) Folic acid supplement (2) Framingham Risk Score calculated (1) Influenza vaccination (2) Nicotine replacement therapy (1) Screening of aspirin or prescription of ACE/ARB and/or statin (3) Screening or intervention in alcohol use, diet and nutrition, physical activity, or tobacco use (36) Unspecified treatment of hypertension (2)	10.3% (13.1)
Outcome measures (cerebrovascular disease, coronary artery disease, dyslipidemia, hypertension, peripheral vascular disease, and unspecified)	10	Control or improvement in blood pressure (5) Control or improvement in cholesterol (3) Framingham Risk Score improved (1) Hospitalization rates improved (1)	10.0% (9.9)
Chronic kidney disease	21		
Process measures	16	Anemia diagnosis (1) CKD diagnosis (1) Medication use (ACE inhibitor, ARB use or prescribed, aspirin, metformin, NSAID) (6) Screening of cholesterol, HbA1c, hemoglobin, urine, proteinuria, or vitamin D (8)	6.1% (17.6)
Outcome measures	5	Blood pressure improved (2) Cholesterol improved (1) GFR mean improved (1) HbA1c improved (1)	0.2% (1.1)
Diabetes, type 2	69		
Process measures	49	ACEI for hypertension or if proteinuria (2) Blood pressure, cholesterol, HbA1c, Triglycerides, microalbumin screening (14) Blood sugar/glucose monitoring or screening (3) Eye, retinal exam, or foot exam (13) Flu vaccination or pneumovax screening (4) Nephropathy or neuropathy screening (5) Nutrition counseling (1) Prescription of ACE inhibitor, antiplatelet therapy, statin (3) Self-management goals and support (2) Urinalysis for proteinuria (1)	10.1% (8.9)
Outcome measures	20	Blood pressure controlled and improved (6) Cholesterol controlled or improved (6) HbA1c controlled or improved (8) Triglyceride controlled (1)	4.9% (3.9)

Data Analysis

Measures for asthma included level of asthma control, severity, symptoms, and medication adherence.^{27, 28} Measures for cancer (breast, cervical, and colorectal) included mammograms, pap smears, colonoscopies, and other screenings.²⁹ Measures for cardiovascular disease (cerebrovascular disease, coronary artery disease, dyslipidemia, hypertension, myocardial infarction, and peripheral vascular disease) included alco-

hol consumption, blood pressure, cholesterol, obesity, smoking, diet, and physical activity.³⁰ Measures for chronic kidney disease included broad screening measures for cardiovascular disease and diabetes, as well as glomerular filtration rates.³¹ Measures for diabetes included HbA1c, blood pressure, cholesterol, screening for neuropathy, and eye and foot exams.³² Measures for management of chronic illness care were patient-reported outcomes of the delivery of care.²²

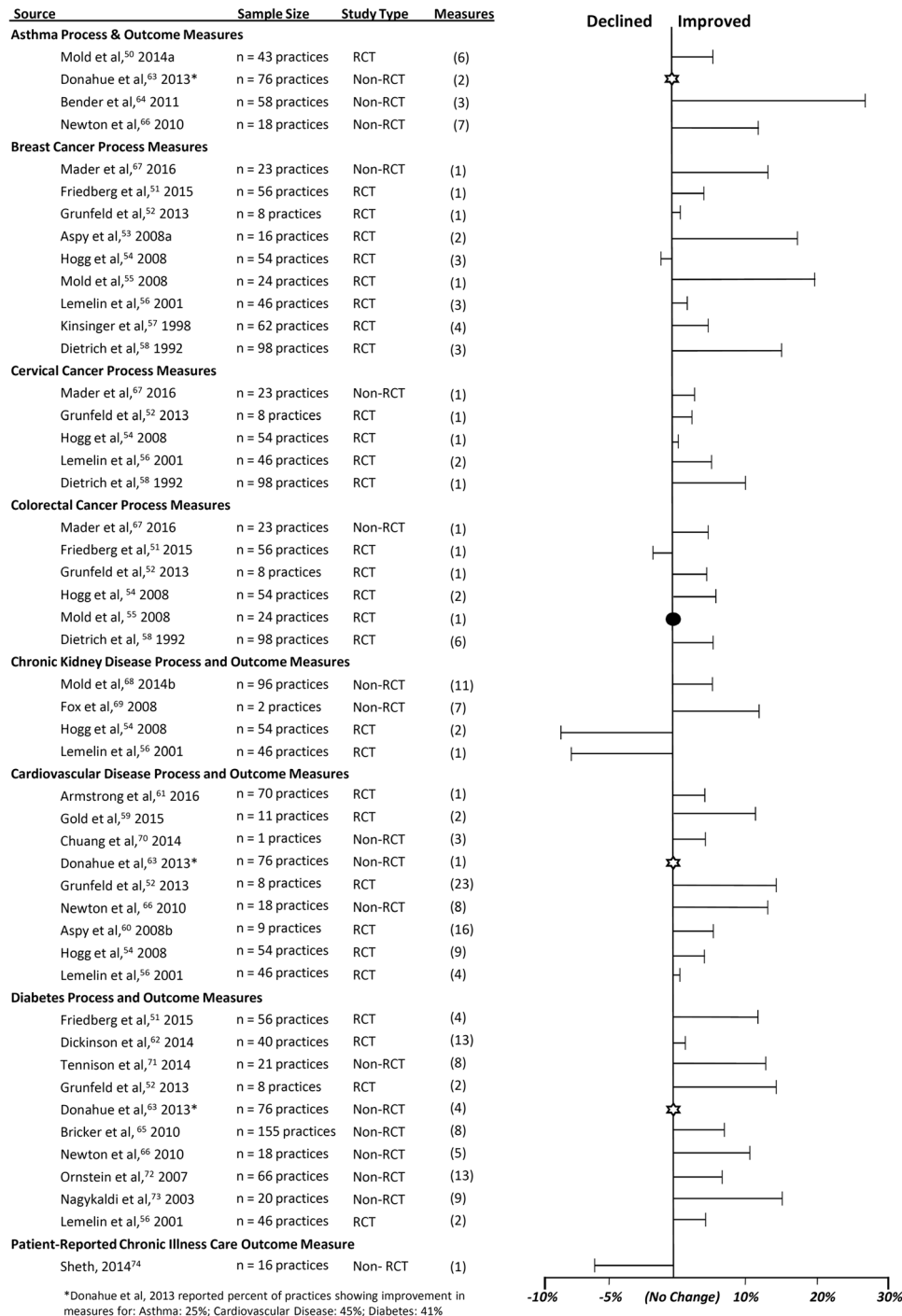


Fig. 2 Average absolute percent change in measures across studies by disease.

RESULTS

The literature search initially yielded 801 eligible articles (Fig. 1). After removing 417 duplicate articles, we reviewed the abstracts and titles of 384 articles and eliminated 293 articles that were not relevant to the systematic review. Among the remaining 91 articles, 44 articles remained for full-text review while 47 articles were excluded for not reporting disease-specific process and outcome measures. After considering the 44 articles, we identified 25 articles as having reported quantifiable chronic disease measures. After reviewing the reference lists of the final 25 retrieved articles, we included no additional articles. All 25 articles were assessed for the effect of practice facilitation on process and outcome measures across eight types of chronic disease: asthma, cardiovascular disease, cancer screening, chronic kidney disease, diabetes, and chronic illness.

In total, 211 total chronic disease process and outcome measures were extracted among the 25 studies (Table 1). We categorized process measures ($n = 178$) into screening, diagnosis ($n = 102$), and clinical process ($n = 76$). We categorized outcome measures ($n = 33$) into laboratory results ($n = 19$), blood pressure ($n = 11$), and hospitalization ($n = 2$), and patient-reported outcome for chronic illness care ($n = 1$). Across the 25 studies, process measures improved on average by 8.8% and outcome measures improved on average by 5.4%. Among the outcome measures, laboratory results and

blood pressure improved the most, and among the process measures, screening and diagnosis improved the most.

Among the 25 reviewed studies, 12 studies (48%) reported process measures, 3 (12%) reported outcome measures, and 10 (40%) reported both process and outcome measures. The designs for the 25 studies included 12 (48%) randomized controlled trials (stepped wedge cluster and cluster randomized designs) and 13 (52%) prospective cohort studies. All changes in chronic disease process and outcome measures were identified as an average of absolute percent changes across relevant measures within each study (Fig. 2). Across the studies, measures improved for asthma, cancer (breast, cervical, and colorectal), cardiovascular disease, and diabetes measures. In contrast, measures decreased among studies evaluating chronic kidney disease and patient-reported outcomes of chronic illness care, although, across most studies, chronic disease process and outcome measures improved (Table 1).

Among the studies that implemented practice facilitation in the practices, asthma process measures improved in assessments of asthma levels (13%), action plans (1.5 and 21%), and medication use (4%). Process measures for breast cancer (mammography, mammograms, clinical breast examinations, and breast self-examinations) improved on average of 8.0%, cervical cancer (cervical cytology, cervical cancer screening, and pap smears) improved on average of 4.9%, and colorectal cancer (colorectal screening, digital rectal examinations, stool

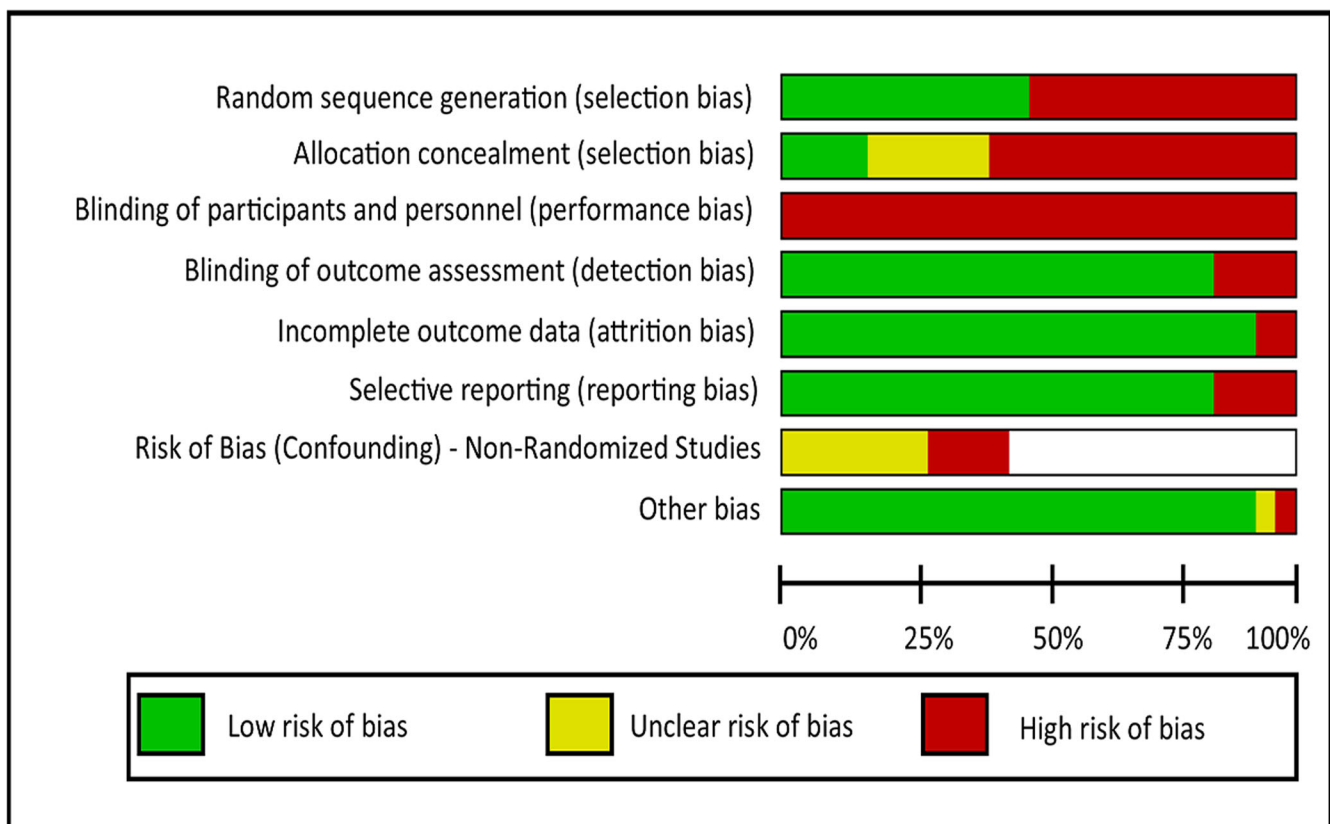


Fig. 3 Summary of the risk of bias by domain.

Table 2 Quality Assessment by Disease Area and Study Design

Chronic disease area	Study design	Studies	Total number of patients	Quality
Asthma—process measures	Randomized controlled trial	Mold et al. 2014a ³³	1016	⊕⊕⊕○ Moderate
Asthma—process and outcome measures	Prospective cohort studies	Newton et al. 2010 ³⁴ Bender et al. 2011 ³⁵ Donahue 2013 ³⁶	8000 15,508 Not reported	⊕○○○ Very low
Cancer—process measures (breast, cervical, colorectal)	Randomized controlled trials	Dietrich et al. 1992 ³⁷ Kinsinger et al. 1998 ³⁸ Lemelin et al. 2001 ³⁹ Aspy et al. 2008a ⁴⁰ Hogg et al. 2008 ⁴¹ Mold et al. 2008 ⁴² Grunfeld et al. 2013 ⁴³ Friedberg et al. 2015 ⁴⁴ Mader et al. 2016 ⁴⁵	2595 2874 4000 332 3049 150 789 17,363 Not reported	⊕⊕⊕○ Moderate
Cancer—process measures (breast, cervical, colorectal)	Prospective cohort study			⊕○○○ Very low
Cardiovascular disease—process measures (cerebrovascular disease, hypertension, myocardial infarction, and unspecified)	Randomized controlled trials	Lemelin et al. 2001 ³⁹ Aspy et al. 2008b ⁴⁶ Hogg et al. 2008 ⁴¹ Grunfeld et al. 2013 ⁴³ Gold et al. 2015 ⁴⁷ Newton et al. 2010 ³⁴	4000 150 3049 789 2070 8000	⊕⊕○○ Low
Cardiovascular disease—process measures (unspecified)	Prospective cohort study			⊕○○○ Very low
Cardiovascular disease—outcome measures (cerebrovascular disease, coronary artery disease, dyslipidemia, hypertension, peripheral vascular disease)	Randomized controlled trials	Grunfeld et al. 2013 ⁴³ Armstrong et al. 2015 ⁴⁸	789 54,085	⊕⊕⊕⊕ High
Cardiovascular disease—outcome measures (hypertension and unspecified)	Prospective cohort studies	Newton et al. 2010 ³⁴ Chuang et al. 2014 ⁴⁹	8000 40	⊕○○○ Very low
Diabetes, type 2—process measures	Randomized controlled trials	Lemelin et al. 2001 ³⁹ Grunfeld et al. 2013 ⁴³ Dickinson et al. 2014 ⁵⁰ Friedberg et al. 2015 ⁴⁴ Nagykaldi et al. 2003 ⁵¹	4000 789 821 17,363 595	⊕⊕○○ Low
Diabetes, type 2—process measures	Prospective cohort studies	Ornstein et al. 2007 ⁵² Bricker et al. 2010 ⁵³ Newton et al. 2010 ³⁴ Donahue et al. 2013 ³⁶ Tennison et al. 2014 ⁵⁴ Dickinson et al. 2014 ⁵⁰	24,250 1,000,000 8000 Not Reported 10,000 821	⊕○○○ Very low
Diabetes, type 2—outcome measures	Randomized controlled trials			⊕⊕⊕○ Moderate
Diabetes, type 2—outcome measures	Prospective cohort studies	Ornstein et al. 2007 ⁵² Bricker et al. 2010 ⁵³ Newton et al. 2010 ³⁴ Donahue et al. 2013 ³⁶ Tennison et al. 2014 ⁵⁴	24,250 1,000,000 8000 Not Reported 10,000	⊕○○○ Very low
Chronic kidney disease—process and outcome measures	Randomized controlled trials	Lemelin et al. 2001 ³⁹ Hogg et al. 2008 ⁴¹	4000 3049	⊕○○○ Very low
Chronic kidney disease—process and outcome measures	Prospective cohort studies	Mold et al. 2014b ⁵⁵ Fox et al. 2008 ⁵⁶	1890 181	⊕○○○ Very low
Patient-reported chronic illness care—outcome measure	Randomized controlled trial	Sheth et al. 2014 ⁵⁷	1411	⊕○○○ Very low

occult blood, and sigmoidoscopy) improved on average of 4.7%. Cardiovascular disease outcomes (cerebrovascular disease, coronary artery disease, dyslipidemia, hypertension, myocardial infarction, and peripheral vascular disease) improved with increased control of blood pressure (average of 9.0%) and cholesterol (average of 6.1%), and decreased hospitalizations (4%). Implementation of practice facilitation may have resulted in improved diabetes process measures and outcomes with increased screening (average of 3.6%) and control of HbA1c (average of 4.8%). The findings from this review show potential effects of practice facilitation on the prevention, treatment, and management of chronic diseases.

We summarized the risk of bias for each domain for each study and determined them as having low (green), unclear

(yellow), or high (red) risk of bias in Figure 3. Across all studies, the risk of bias was highest for allocation concealment (selection bias) and the blinding of participants and personnel (performance bias), but low for the other domains: detection, attrition, reporting, and other. Bias for random sequence generation (selection bias) was even across the studies for low and high risk of bias. Among the prospective cohort studies, the risk of bias (confounding) was mostly unclear. Overall, across the prospective cohort studies, the assessment quality was either low or very low (Table 2). Across the randomized controlled trials, the assessment quality ranged from low to high. Studies rated with the highest quality (moderate to high) examined asthma processes measures, cancer process measures, cardiovascular disease outcome measures, and diabetes outcome measures. The risk of bias and quality assessments of

each study including supporting evidence have been provided in the Appendices 2 and 3.

DISCUSSION

Chronic disease is a significant and growing burden on population health.⁵⁸ This systematic review sought to understand the effectiveness of practice facilitation on chronic diseases. In these studies, practice facilitation led clinicians and their primary care practices to adopt changes in chronic disease management resulting in improved disease outcomes. Key findings show the beneficial effect of practice facilitation on outcomes of four major diseases: asthma, cancer, cardiovascular disease, and diabetes. The key findings from this review show the effectiveness of practice facilitation on improving screening rates for breast, colorectal, and cervical cancer. Asthma outcomes improved in several measures while cardiovascular disease outcomes for cerebrovascular disease, coronary artery disease, dyslipidemia, hypertension, myocardial infarction, and peripheral vascular disease improved in areas such as blood pressure control, cholesterol, and adherence to prescription medications and diabetes measures improved in diabetes screening and control of HbA1c. Although a review on chronic kidney disease studies showed that mortality rates declined with more intensive blood pressure control, other studies on chronic kidney disease were conflicting, with randomized controlled trials showing worse outcomes.⁵⁹ Overall, the results demonstrated the comprehensive and collaborative approach of practice facilitation incorporating quality improvement and chronic disease management.⁶⁰

Results from this review validate the effectiveness of practice facilitation on chronic disease outcomes. The quality assessments also provided further evidence of the effectiveness of practice facilitation as seen in the moderate to high quality of evidence and low risk of bias among the randomized controlled trials. The randomized controlled trials showed stronger evidence of effective practice facilitation compared to the prospective cohort studies. Although a cost-effectiveness analysis of the intervention was excluded in this review, Culler et al. previously found practice facilitation to be cost-neutral while recent work from EvidenceNOW and the Healthy Hearts in the Heartland (H3), Fagnan et al., reported the total average costs of implementation to be \$5529 per practice.^{61, 62} Overall, practice facilitation may further enhance quality improvement initiatives such as the patient-centered medical home (1.3% increase in preventive services) and care coordination (0.2 to 16.4% increase in cancer screening and 0.1 to 8.7% increase in diabetes screening), with electronic health records providing clinical decision support (42% increase in odds of preventive care processes).⁶³⁻⁶⁵ Incorporating quality improvement, practice facilitation has a leading role in the transformation of care quality in primary care.⁶⁶

Studying the implementation of practice facilitation will remain relevant for future decisions in health policy as its implementation grows and develops across the USA through innovation and experimentation funded by CMS and spearheaded by the Affordable Care Act (ACA). For example, the shift from volume to value, reflected through CMS programs such as the Meaningful Use and the Merit-Based Incentive Payment System (MIPS), presents an obstacle in providing efficient care by increasing the amount of administrative tasks and responsibilities related to population health required of providers.^{67, 68} As a result, practice facilitators can assist in the measurement and improvement of population health processes and outcomes, and their efforts will enable a reduction of administrative responsibilities allowing clinicians to focus on clinical care and quality improvement.⁶⁹⁻⁷¹ Future studies examining the effects of practice facilitation may be enhanced by patient-specific outcomes, and electronic health records integrated across care sites, to better portray a complete understanding of patient health outcomes.^{72, 73}

This review has several limitations by including studies with potential biases: interventional self-awareness (practice facilitation in the practice), variability in the quality and methodology of the studies, other internal or external factors influencing process and outcome measures, and reporting of studies with disease-specific quantitative process and outcome measures. The inclusion of studies from the USA and Canada prevents generalizability beyond North America. In addition, the methods in these studies have an inherent weakness due to the awareness of the intervention through the presence of a facilitator. The study results may also have been influenced by the inclusion of patient populations already receiving ongoing treatment for chronic disease. Some of these studies have small sample sizes for the patient population or the number of enrolled practices. Differences in baseline characteristics of primary care practice populations, such as demographics, prevalence of chronic disease, geographical variation, and level of staff engagement and leadership, may have affected outcomes. The study durations ranged from 3 months to 1 year, which may have limited the effects of practice facilitation and understanding of sustainability. In the results, changes in process and outcome measures may have improved because of better documentation or from changes in the process. Practice facilitation faces the durability of change as improvement may have occurred with persistent effect, but results may wane after withdrawal of the implementation. Lastly, our reporting of results is limited because of the exclusion of a meta-analysis.

To overcome these limitations, future research in practice facilitation will need to center on four areas: study designs with durations greater than a 1-year timeframe, practice facilitation in specialty and hospital settings for chronic diseases, interventions in other disease groups, and methodological consistencies when implementing practice facilitation. Conducting studies on practice facilitation with longer time durations and comparing patient-reported outcomes to medical record results may allow for a more

specific and comprehensive understanding of the effects of facilitation on chronic disease measures. Other recommendations for future studies include having standardized implementation of methods with stand-alone and uncombined measures to minimize variation and maximize understanding of the effects.

CONCLUSION

Findings from this review show that practice facilitation was associated with improvements in chronic disease process and outcome measures among patients in primary care practices. Studies implementing practice facilitation and reporting changes in chronic disease process measures (asthma and cancer) and chronic disease outcomes measures (cardiovascular disease and diabetes) were considered effective with moderate to high-quality evidence and a low risk of bias. These studies enrolled from 1 to 155 primary care practices involving 40 patients to a million patients in different parts of the USA and Canada. These studies may not have accounted for variation in care due to regional differences and other quality initiatives. Practice facilitation may also not be effective for clinical care practices. By understanding which aspects of practice facilitation are most effective in improving chronic disease management, this will provide insight into the next stages of its implementation. With recent initiatives such as EvidenceNow and Transforming Clinical Practice Initiative (TCPI), more evidence will be reported on the impact of practice facilitation on value-based care.

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Compliance with Ethical Standards:

Conflict of Interest: The authors declare that they do not have a conflict of interest.

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