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Provider Interventions to Increase Uptake of Evidence-Based Treatment for Depression

A Systematic Review

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Preface

Over the past two decades, the Department of Defense (DoD) has invested unparalleled resources into developing effective treatments for military-related psychological health conditions. Systematic reviews are a key component in the knowledge translation process and function to translate research into evidence-based health care guidelines that promote optimal clinical care. Although a few government agencies, including the Department of Veterans Affairs (VA) and the Agency for Healthcare Research and Quality (AHRQ), have established evidence synthesis centers, there is no similar center within the DoD that can synthesize research evidence on psychological health issues of interest. The Southern California Evidence-Based Practice Center, housed at the RAND Corporation, was awarded a three-year contract to synthesize research on psychological health interventions important to military populations. This document details a systematic review that was performed during year one of this three-year project. The review is of interest to military health policymakers and practitioners who oversee or implement provider interventions for the treatment of depression.

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Introduction

Depression is a burdensome disorder that affects millions worldwide. It is among the most common mental health disorders but also one of the most treatable. Nonetheless, not all individuals struggling with depression receive high-quality, evidence-based care. Clinical practice guidelines for the care of depressed patients in outpatient settings have been established, as well as evidence-based care practices to provide better diagnoses, treatment, and referral for these patients both within primary care settings and within specialty care settings. In many health care systems, however, guideline implementation has not reached acceptable levels in routine care settings, leading to under-, over-, and incorrect treatment of depression.

Interventions to increase the uptake of clinical practice guidelines and guideline-concordant practices aim to bridge the gap between what is known empirically about effective treatment, as summarized in evidence-based clinical practice guidelines, and what is being practiced in the community. These interventions aim to encourage clinician adherence to guidelines through educational, behavioral, financial, regulatory, staffing, or other organizational changes.

This review evaluates approaches that focus on changing health care provider behavior in clinical practice without additional organizational system-redesign efforts or added resources, such as care managers supporting patients. The review is aimed, in particular, at policymakers helping to decide which strategies should be used when new treatment guidelines are available for dissemination. It is intended to help providers and administrators make decisions about which intervention strategies can be most helpful to adopt within organizations to increase the use of evidence-based care for depression. The effect on health care provider behavior on guideline adherence was the primary outcome of interest. We aimed to evaluate the effect of provider interventions to increase uptake of evidence-based treatment for depression. We further set out to determine which interventions are more effective than others, how interventions function across different provider types and different care settings, and which interventions affect patients' health. We restricted the review to randomized controlled trials (RCTs), a robust research design that supports confident evidence statements.

The following key question and subquestions guided this review:

Key Question 1. What are the effects of interventions to increase provider uptake of evidence-based treatments for depression on health care professional behavior compared to no-intervention, wait-list control, usual care, or other provider interventions?

Key Question 1a: Do the effects vary by type of intervention?

Key Question 1b: Do the effects vary by type of provider?

Key Question 1c: Do the effects vary by setting?
Key Question 1d: Are effects on providers associated with patient outcomes?

Methods

We searched PubMed, PsycINFO, the Cumulative Index of Nursing and Allied Health Literature (CINAHL), the Cochrane Central Register of Controlled Trials (CENTRAL), and the Cochrane Database of Systematic Reviews (CDSR) from database inception through January 2017, as well as bibliographies of existing systematic reviews and included studies, to identify English-language reports of RCTs that evaluated the effects of provider interventions. We used a variety of specific provider intervention as well as more general knowledge transfer search terms to identify health care provider interventions for the uptake of evidence-based treatment for depression.

To be eligible, studies had to evaluate interventions aiming to increase the uptake of treatment guidelines for depression in outpatient settings. Studies describing interventions aimed solely at increasing diagnosing or referral behaviors in the absence of improving treatment were excluded. We included interventions aimed at changing provider behavior in clinical practice but excluded organizational system redesign and different staffing models. To be included, studies had to report provider behavior change outcomes. Two reviewers independently screened publications using predetermined eligibility criteria, abstracted data from those studies that met the inclusion criteria, and assessed their risk of bias. Critical appraisal included the Cochrane Risk of Bias tool and the Quality Improvement Minimum Quality Criteria Set (QI-MQCS), addressing internal validity as well as study-design independent criteria for interventions aiming to improve health care.

Meta-analysis used the Hartung-Knapp method for random effects models summarizing odds ratios (OR), standardized mean differences (SMD), and incidence rate ratios (IRR) together with the 95 percent confidence interval (CI) where applicable. We conducted pre-planned subgroup analyses, assessed potential effect modifiers in meta-regressions, and conducted sensitivity analyses to assess the robustness of study results as the data allowed. We assessed the quality of evidence (QoE) for key outcomes using the Grades of Recommendation, Assessment, Development, and Evaluation (GRADE) approach and differentiated high, moderate, low, and very low to characterize our confidence in individual evidence statements.

The review is based on a registered systematic review protocol (PROSPERO record CRD42017060460).

Results

In total, 22 RCTs met inclusion criteria. These studies took place in nine countries and included 2,149 providers and 239,477 patients. Interventions ranged from simply disseminating depression guidelines to education strategies such as academic detailing and multi-component

implementation strategies that involved reminders or implementation strategies tailored to individual providers. The methodological rigor of the included studies varied.

Key Question 1: Effects of Provider Interventions

Analyses comparing provider interventions with usual clinical practice did not indicate a statistically significant difference in guideline adherence across studies reporting on categorical outcomes (OR 1.60; CI 0.76, 3.37; 13 RCTs; I^2 82%; moderate QoE). Pooled analyses for continuous outcomes also did not show a statistically significant difference (SMD 0.17; CI –0.16, 0.50; 9 RCTs; I^2 86%; low QoE). Four studies reported data as an incidence risk ratio (IRR 1.16; CI 0.63, 2.15; 4 RCTs; I^2 91%; low QoE); the difference between intervention and control groups was also not statistically significant. However, all analyses showed substantial heterogeneity. For example, effect estimates for continuous outcomes ranged from SMD –0.44 (CI –0.68, –0.20) for a guideline distribution only study favoring the comparator to SMD 0.89 (CI 0.59, 1.18) associated with an intervention that evaluated education plus other components.

Regarding more specific changes in provider behavior, there was some evidence that interventions improved medication prescribing compared to usual clinical practice. The intervention improved medication prescribing measured categorically (OR 1.42; CI 1.04, 1.92; 11 RCTs; I^2 53%; low QoE), but the intervention effect was not statistically significant in other analyses (SMD 0.15; CI –0.48, 0.79; 3 RCTs; I^2 37%; low QoE; IRR 1.02; CI 0.44, 2.36; 3 RCTs; I^2 90%; low QoE). Other outcomes, including increased recommended contacts with patients, intervention adherence as specified in individual interventions, or the offering of mental health referrals to patients did not show statistically significant differences across studies.

We identified three studies comparing the intervention to practice redesign. The comparison did not show statistically significant differences in the main adherence indicator (OR 0.81; CI 0.30, 2.19; 3 RCTs, I^2 20%; moderate QoE) or other outcomes but the direction of effect favored practice redesign efforts in most studies.

Key Question 1a: Effects by Type of Intervention

Interventions evaluated unique strategies to increase the update of guidelines and guideline-consistent practices. We broadly categorized the interventions and differentiated studies that included simple dissemination of guidelines with no formal education component (guideline distribution), formal education and training of providers with minimal follow-up (education only), and formal education plus additional components, such as outreach to providers, follow-up consultations, or continued evaluation of providers' progress throughout the intervention period (education plus other components):

Guideline Distribution

- Mailing general or targeted guidelines to providers, emphasizing the importance of adhering to depression treatment guidelines
- Distributing guidelines to providers and making tailored implementation recommendations to overcome personal barriers to adopting depression treatment guidelines, such as confidence in abilities
- Sending letters to clinicians that reported patients' depression score interviews along with recommended care for initiating, managing, and monitoring antidepressant medications in elderly patients
- Distributing the American Psychiatric Association's practice guideline for the treatment of Major Depressive Disorder (MDD)
- Distributing World Health Organization (WHO) depression guidelines
- Providing clinicians with reminders of patients' depression diagnosis, with or without specific details for how to treat the patient

Education Only

- Training session based on the Dutch depression guideline, with education and information, drug therapy guidelines, and supportive contacts
- Provider education and distribution of the Agency for Healthcare Research and Quality (AHRQ) practice guidelines for major depression in primary care
- Guideline distribution with outreach visits from pharmaceutical advisers to encourage implementation, offer recommendations, and provide feedback
- Outreach sessions from pharmacists with educational handouts and academic detailing to encourage routine first-line use of tricyclic antidepressants (TCA) and selective serotonin reuptake inhibitors (SSRI) for second-line use
- Depression education training sessions based on AHRQ's clinical practice guidelines for depression in primary care
- Training in the use of WHO depression guidelines
- Pharmacotherapy education group meetings consisting of feedback and interactive problem-oriented educational material to improve diagnostic strategies and to increase prescribing of antidepressants

Education Plus Other Components

- Outreach visits to providers with tools to diagnose and manage elderly patients with depression, such as online courses with treatment recommendations
- Academic detailing, educational sessions led by opinion leaders, and follow-up sessions from pharmacists
- Education plus practice with a computerized support decision system based on the Texas Medication Algorithm Project algorithm for MDD
- Education with group interactive discussion, role-play, academic detailing, feedback, and review of patient progress with a psychiatric consultant
- Continuing medical education focused on treatment and differential diagnosis of depression disorders based on provider's reported stage of change

- Providers' receipt of detailed patient reports after initial prescription with patient data and treatment recommendations based on a computerized algorithm
- Training and consultations from experts based on Dutch College of General Practitioners' guidelines for depression and anxiety addressing barriers to implementing the guidelines
- Group-based or individual-based academic detailing session emphasizing the unique therapeutic difficulties of treating older people and problems of anticholinergic side effects, followed by review of group- or individual-based performance
- Workshops based on the Canadian Medical Association's clinical practice guidelines for depression, with follow-up psychiatrist consultations
- Education and a set of tools to facilitate diagnosis, follow-up, and management of postpartum depression

Comparative effectiveness data from studies that compared two different provider interventions directly were only available in unique dyads of interventions and comparators. No two studies reported on a similar intervention and comparator in head-to-head comparisons. An indirect comparison across interventions indicated that effects may be associated with the intensity of the intervention ($p = 0.03$), favoring more complex interventions over passive guideline distribution interventions.

We did not identify intervention types that showed consistently statistically significant provider effects across studies. Interventions that involved simple distribution of treatment guidelines had no statistically significant effect on categorical outcomes (OR 1.28; CI 0.75, 2.19; 3 RCTs; I^2 0%) or continuous outcomes (SMD –0.44; CI –0.68, –0.20; 1 RCT); however, this latter effect was observed only in a single study with high risk of bias. Analyses of educational interventions displayed conflicting results, showed wide confidence intervals, and did not indicate a systematic intervention effect (OR 3.04; CI 0.01, 756.17; 3 RCTs; I^2 96%; SMD 0.15; CI –0.48, 0.79; 3 RCTs; I^2 37%). The subgroup analysis of interventions that included education plus other components also did not indicate a statistically significant effect across studies (OR 1.17; CI 0.62, 2.18; 7 RCTs; I^2 44%; SMD 0.37; CI –0.16, 0.90; 5 RCTs; I^2 80%), and only one of the individual studies reported a statistically significant difference between groups. Results for individual outcomes varied across studies within and across subgroups.

Key Question 1b: Effects by Type of Provider

Included studies reported on primary care physicians, nurses, mental health care providers such as psychiatrists, and general practitioners. We did not identify studies that directly compared intervention approaches in different health care provider groups. Rather, we used indirect comparisons to explore differences between team and sole provider interventions. Two studies evaluated an intervention that targeted different members of staff in the health care organization, such as primary care physicians and nurses, while the other interventions targeted only the individual health care provider. We did not identify robust evidence that intervention effects varied by targeted provider group. A meta-regression was statistically

significant (p = 0.034) but, since only one study contributed to the team intervention category, results should be interpreted with caution.

Key Question 1c: Effects by Setting

We did not identify studies that compared effects of interventions across different settings. Overall, 20 studies took place in primary care settings, and two were conducted in specialty care. Primary care settings were academically affiliated primary care practices, general practices (solo practices, group practices, or health centers), family medicine research network practices, family practice research networks, general practices in health authorities, primary care trusts, and primary care clinics in a federally qualified community health care system. Specialty care settings included managed behavioral health care organizations and a private psychiatry practice. The review was limited to interventions for outpatient care settings.

Indirect comparisons did not indicate systematic effect differences by setting (p = 0.385). However, since only two studies provided data on specialty care settings, the analysis was unlikely to have sufficient statistical power to adequately address the review question.

Key Question 1d: Effects on Patients' Health

Fourteen studies reported on patient outcomes in addition to provider outcomes. Results were mixed across studies and outcomes. Significant effects were found for the number of patients responding to depression treatment (OR 1.12; CI 1.04, 1.21; 6 RCTs; I^2 0%; moderate QoE), such that patients under the care of providers in intervention conditions were more likely than those in usual clinical practice to report a meaningful change in their depression at follow-up. We did not detect statistically significant effects for depression rating scale scores, depression remission, or treatment adherence.

Conclusions

The available evidence on provider interventions to increase the uptake of evidence-based treatment for depression includes interventions that distribute guidelines, education approaches such as academic detailing, and complex interventions with multiple components such as training and follow-up feedback on performance or exploring individual barriers to implementing guidelines. The interventions did not result in statistically significant effects across indicators of guideline adherence, but there was some evidence for improvement in individual outcomes such as medication prescribing. Indirect comparisons indicated that more complex interventions (i.e., interventions that go beyond the dissemination of guidelines or educating providers) may be associated with larger intervention effects. However, the result was based on very low QoE and we did not identify types of interventions that were consistently associated with improved adherence to depression guidelines across studies. The low QoE and lack of replication of specific intervention strategies across studies limit the conclusions that can be

drawn from the literature. Intervention approaches and outcomes varied widely and complicated the synthesis. More research is needed to identify interventions that effectively promote provider uptake of depression treatment guidelines and guideline-concordant practices in routine clinical care. Research should be supported by a framework of provider interventions that allows for more structured assessments. More research is also needed to compare interventions targeting multidisciplinary teams with those targeting individual health care providers and research in specialty care settings.

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Abbreviations

AHRQ	Agency for Healthcare Research and Quality
APA	American Psychiatric Association
ASTROPU	Age, Sex, and Temporary Resident Originated Prescribing Units
CDSR	Cochrane Database of Systematic Reviews
CENTRAL	Cochrane Central Register of Controlled Trials
CES-D	Center for Epidemiological Studies Depression Scale
CI	Confidence Interval
CINAHL	Cumulative Index of Nursing and Allied Health Literature
CME	Continuing medical education
CPGs	Clinical Practice Guidelines
CQI	Continuous Quality Improvement
DCoE	Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury
DoD	U.S. Department of Defense
DSM-IV	Diagnostic and Statistical Manual of Mental Disorder, 4th edition
EMR	Electronic Medical Record
EPC	Evidence-Based Practice Center
EPOC	Effective Practice and Organisation of Care
GRADE	Grades of Recommendation, Assessment, Development, and Evaluation
HSCL	Hopkins Symptom Checklist
ICD-10	International Statistical Classification of Diseases and Related Health Problems–10th revision
IRR	Incidence Rate Ratio
MDD	Major Depressive Disorder
N/A	Not Applicable
NR	Not Reported

OR	Odds Ratio
PICOTSS	Participants, Interventions, Comparators, Outcomes, Timing, Settings, and Study Design
QI-MQCS	Quality Improvement Minimum Quality Criteria Set
QoE	Quality of Evidence
RCT	Randomized Controlled Trial
SCL	Symptom Checklist
SMD	Standardized Mean Difference
SP	Standardized Patient
SSRI	Selective Serotonin Reuptake Inhibitors
TCA	Tricyclic Antidepressant
VA	Veterans Affairs
WHO	World Health Organization

1. Introduction

Background

Depression is one of the most common mental health disorders in the United States and worldwide. Data from the 2015 National Survey on Drug Use and Health indicate that 16.1 million adults age 18 and older in the United States (nearly 7 percent of the population) had at least one major depressive episode in the past year; 64 percent indicated that the episode caused severe impairment (i.e., unable to manage well at home or work or have good relationships with others) (Center for Behavioral Health Statistics and Quality, 2016)." (Center for Behavioral Health Statistics and Quality, 2016). Similar data are reported for the European Union; in 2011, about 7 percent of adults in member states met criteria for a depressive disorder (Wittchen et al., 2011). Major Depressive Disorder (MDD) is associated with poor quality of life and significantly decreased psychosocial functioning (Papakostas et al., 2004); high societal costs related to patient care, unstable or unproductive employment, marital and relationship disruption (Kessler, 2012; Wade and Haring, 2010; Mrazek et al., 2014); and mortality (Chesney, Goodwin, and Fazel, 2014; Wulsin, Vaillant, and Wells, 1999). Early detection and treatment of depression is, therefore, a major public health priority.

Data between 2009 and 2012 from the Centers for Disease Control and Prevention indicate that nearly 8 percent of Americans age 12 or over reported moderate or severe depression in the previous two weeks on a screening measure of depression symptoms, yet only about one-third of those screening for depression reported having contact with a mental health professional in the previous year (Pratt and Brody, 2014). Similarly, between 2012 and 2013, it was estimated that 8 percent of adults in the United States screened positive for depression, of which only 29 percent received any depression treatment (Olfson, Blanco, and Marcus, 2016). As such, the majority of individuals struggling with depression do not receive any care despite the availability of high-quality, evidence-based effective care for depression. Recent primary research suggests that early recognition and treatment of depression can lead to prolonged positive outcomes (Arroll et al., 2009; Bortolotti et al., 2008; Hoifodt et al., 2011; Cuijpers et al., 2009). A recent meta-analysis favored psychological intervention over no treatment or usual care; however, there was little clinical difference in how different interventions affected patient depression outcomes (Linde et al., 2015b). Other reviews found that pharmacological interventions are effective for treating depression in primary care (Wolf and Hopko, 2008; Linde et al., 2015a). However, there is evidence of both under- and overprescribing drugs in these settings (Mojtabai and Olfson, 2011; Mark, Levit, and Buck, 2009; Mojtabai and Olfson, 2014).

Most randomized controlled trials (RCTs) evaluating treatments for depression are conducted in psychiatric settings with psychiatrists and other mental health professionals (Laoutidis and

Mathiak, 2013; Barth et al., 2013; Cuijpers et al., 2011; Khan et al., 2012). However, among patients in any care setting, depression is most often identified by practitioners in primary care settings (Wittchen, Holsboer, and Jacobi, 2001; Bijl and Ravelli, 2000). Yet it is least often treated in these settings; depression is most often treated in mental health treatment settings with a psychiatric or other mental health professional (Olfson, et al., 2016). This underscores the importance of implementing evidence-based treatment in primary care settings where depressed patients are most likely to present. How to incentivize adoption of these interventions in practice outside of specialty mental health care settings is an important issue. Yet the gap between care that is delivered and care that the psychiatric research community knows is effective also appears in specialty mental health settings (Shidhaye, Lund, and Chisholm, 2015). Therefore, clinical practice guidelines for the care of depressed patients in outpatient settings have been established, as well as evidence-based care practices to provide better diagnoses, treatment, and referral for these patients both within primary care settings and within specialty care settings. Guideline implementation, however, has not reached acceptable levels in routine care settings, leading to under-, over-, and incorrect treatment of depression (Lugtenberg et al., 2009; O'Connor et al., 2009; Solberg, Trangle, and Wineman, 2005). Interventions are needed in both settings to improve use of evidence-based care.

Frameworks for Changing Provider Behavior

The Cochrane Effective Practice and Organisation of Care (EPOC) group classifies interventions to change provider and organizational behavior as educational, behavioral, financial, regulatory, and organizational (Cochrane Effective Practice and Organisation of Care Group, 2013). These interventions are based on knowledge transfer or transfer of research into clinical practice. The transfer process seeks to reduce the gap between research on evidence-based interventions and the use of these interventions in practice by generating, sharing, and applying research knowledge in practice (Pentland et al., 2011).

Researchers have outlined implementation strategies that help facilitate adoption of research findings. For example, Damschroder's Consolidated Framework for Implementation Research helps to guide formative evaluations of implementation by listing 37 constructs within five major domains: intervention characteristics, outer setting (e.g., peer pressure, external policies and incentives), inner setting (e.g., networks and communication, leadership engagement), characteristics of the individuals involved, and process of implementation (Damschroder et al., 2009). In addition, 68 strategies for implementing evidence-based treatments into health and mental health settings published by Powell and colleagues have been grouped according to six key implementation processes: planning, education, financing, restructuring, managing quality, and attending to policy context (Powell et al., 2012).

Within these implementation strategies, much work has focused on frameworks for changing provider behavior. Provider behavior change strategies are thought to be the active ingredients of interventions intended to achieve a specific goal, such as the adoption of evidence-based practice

guidelines in clinical practice. Several frameworks for implementing evidence-based practices in health care settings and taxonomies characterizing different types of interventions have been published. They aim to structure and organize interventions that include strategies and techniques for changing provider behavior (Grimshaw et al., 2001; Grol and Grimshaw, 2003; Eccles et al., 2005; Colquhoun et al., 2014). Terms referring to these behavior change techniques are identified in systematic reviews of provider behavior change interventions across health care topics (Grimshaw et al., 2001).

Another approach to organizing interventions is exemplified in Michie's Behavior Change Wheel (Michie, van Stralen, and West, 2011), which encompasses nine areas of intervention for behavior change: education, persuasion, incentivization, coercion, training, restriction, environmental restructuring, modeling, and enablement. The Behavioral Change Technique Taxonomy version 1 (Michie et al., 2015; Michie et al., 2013) is an example of a taxonomy in which behavioral change techniques have been sorted into a hierarchical structure encompassing 93 behavioral change techniques, subsumed under 16 theoretical clusters: scheduled consequences, reward and threat, repetition and substitution, antecedents, associations, covert learning, natural consequences, feedback and monitoring, goals and planning, social support, comparison of behavior, self-belief, comparison of outcomes, identity, shaping knowledge, and regulation.

Many behavioral change strategies have been proposed to encourage providers to adopt evidence-based treatments for depression. The strategies are intended to improve professional practice and delivery of health services. They may include various forms of continuing education; quality improvement projects; and financial, organizational, or regulatory interventions that can affect the ability of health care professionals to deliver services more effectively and efficiently. Published evaluations of interventions include both educational components, such as distributing educational materials to providers and using clinical reminders to help recall patient information; and organizational changes, such as those that revise a provider's professional role to include new tasks or those that form multidisciplinary teams where providers work together to care for patients (Gilbody et al., 2003). Interventions may include case-based training for primary care providers and their practices through a mentor-mentee relationship with a specialty care coach often located off-site from the primary care provider (Kirsh et al., 2015). Similarly, interventions may use a designated provider (or a designated psychiatric consultant) in primary care settings to improve the care of depressed patients through case review, medication consultation, and provider education about evidence-based treatments such as cognitive behavioral therapy (Raney, 2015; Unützer and Park, 2012; Katon et al., 2010).

The Need to Focus on Provider Behavior Change

Existing reviews of provider interventions have concentrated on screening for depression, addressed specific care delivery changes such as collaborative care (Coventry et al., 2014; Sighinolfi et al., 2014; Williams et al., 2007; Chaney et al., 2011), or addressed a single clinical topic such as health disparities (Chin et al., 2007; Simpson et al., 2007). In 2003, Gilbody

and colleagues (Gilbody et al., 2003) reviewed studies on organizational and educational interventions targeted at primary care providers treating depressed patients. These interventions included simple methods such as telephone medication counseling and multi-faceted approaches that included screening, providing patient education, and professional roles realignment. Effective strategies included collaborative care, quality improvement aimed at recognizing and managing depression, case management, pharmacist-provided prescribing information and patient education, and guideline implementation strategies embedded in both complex interventions and system-redesign efforts. A review by Sikorski and colleagues (Sikorski et al., 2012) confirmed earlier findings from Gilbody and colleagues that provider training alone, such as offering short educational courses, does not seem to improve depression care. The review excluded other provider or organizational interventions to increase uptake of evidence-based depression treatments.

Reviews are important to help close the gap between research and practice; they can identify strategies that may promote change in specific settings and increase understanding of strategies that are not effective (Grimshaw et al., 2001). A focus on provider behavior change as an outcome could help in these efforts because many large-scale system-redesign efforts include some form of provider training or education about the use of a new guideline or tool. Without specifically focusing on changes in provider behavior, it is difficult to determine whether system redesign alone or redesign plus provider behavior change interventions drive improvements in patient outcomes. As providers are the ones treating patients directly, it is intuitive that interventions directly targeted toward changing provider behaviors would lead to provider behavior change, which as a result would help improve adherence to guidelines and, thus, improve patient outcomes. Such intervention efforts targeting providers directly are more practical than efforts designed to change entire organizations or care systems, and they represent an important knowledge area for policymakers, administrators, and providers themselves to increase the use of evidence-based care for depression.

Objective

In this systematic review, we synthesize estimates of the effects of provider interventions to promote uptake of evidence-based treatments for depression with a specific focus on provider behavior change as an outcome.

We focused on observable, objective changes in provider behavior because changes in knowledge, attitudes, and satisfaction may not directly translate to observable change in behaviors or policies. To determine the effect of provider behavior change strategies, we excluded studies that primarily assessed the effects of large system-redesign efforts, such as collaborative care efforts where new clinics are established or care is reorganized (e.g., implementing dedicated care managers) and where training of existing providers is only a minor component of the larger intervention. Given the focus on provider interventions for

treatment (including pharmacological and psychological treatments), we did not focus on studies of provider interventions that seek solely to improve screening/assessment or referral behavior alone in the absence of improving uptake of evidence-based treatment. Furthermore, we restricted the review to RCTs. We aimed to identify the presence and absence of evidence from this robust research design, which allows the confident evidence statements required for policy changes.

In subgroup analyses, we evaluated whether effects vary by intervention or by type of provider. We assessed whether interventions involving distribution of guidelines only, education only, or education plus other components had effects on provider behavior. We also assessed whether targeting teams fared better than those targeting single providers. Furthermore, we investigated whether provider setting modifies effects and, specifically, whether outcomes in primary care differ from those in specialty care.

Finally, we reviewed secondary outcomes of whether the effects on health care providers translated into effects on patients. We reviewed reported effects on depression symptoms, number of treatment responders, number of patients in remission, and treatment adherence.

Key Questions

The following questions guided this systematic review:

- *Key Question (KQ) 1*. What are the effects of interventions to increase provider uptake of evidence-based treatments for depression on health care professional behavior compared to no-intervention, wait-list control, usual care, or other provider interventions?
  - *KQ 1a*: Do the effects vary by type of intervention?
  - *KQ 1b*: Do the effects vary by type of provider?
  - *KQ 1c*: Do the effects vary by setting?
  - *KQ 1d*: Are effects on providers associated with patient outcomes?

2. Methods

We conducted a systematic review to identify RCTs that tested the effects of provider interventions to promote uptake of evidence-based treatments for depression. The review is based on a registered protocol (PROSPERO record CRD42017060460).

Search Strategy

We conducted a systematic search of Medline (OVID), PsycINFO, the Cumulative Index of Nursing and Allied Health Literature (CINAHL), the Cochrane Central Register of Controlled Trials (CENTRAL), and the Cochrane Database of Systematic Reviews (CDSR) for English-language RCTs that meet eligibility criteria. We searched databases from inception through January 2017. References included in studies were mined. Studies included in relevant systematic reviews were also screened. We also consulted with content experts to identify relevant studies.

The search strategy was developed by a librarian specializing in systematic reviews, informed by existing systematic reviews on the topic, prior work, and results of feasibility scans conducted for this project. The feasibility scans demonstrated that this topic is conceptually very challenging. Provider interventions may be unique from study to study, embedded in additional intervention components directed at patients or delivered as part of a larger quality improvement initiative. Even descriptions of known interventions, such as academic detailing, are diverse, and solid content expertise was needed to identify relevant studies. Thus, the strategy combined searches for known provider interventions and knowledge translation, strings for quality improvement and organizational interventions, and terms more generally referencing adoption or implementation of an intervention in practice.

We used search terms around four constructs. Part one used general terms for knowledge transfer and organizational quality improvement developed in previous research in the context of depression treatment (e.g., “knowledge translation”) (Hempel et al., 2011). Part two was based on a search filter for EPOC provider interventions, augmented by terms for clinical practice guidelines and implementation strategies used in two large health care systems (Veterans Health Administration and military health system). Part three used a variety of approaches for continuous quality improvement (CQI) and continuous professional education. Part four utilized behavior change terms (e.g., “persuasion”) based on three published intervention taxonomies and frameworks (Michie, van Stralen, and West, 2011; Michie et al., 2013; Leeman, Baernholdt, and Sandelowski, 2007; Michie et al., 2015). The search strategy is described in Appendix A.

Before conducting the search, we learned from content experts that many RCTs found in the search would likely highlight patient rather than provider outcomes. We did not limit the search

to citations referring to provider outcomes. Instead, we retrieved and screened full texts of RCTs of the provider interventions to determine whether relevant outcomes were reported in the publication. Experts suggested we might find large-scale system-redesign efforts that include some form of provider training or education. It was not possible to develop search strings that would remove these system-redesign RCTs; thus, we did not restrict the search to citations that did not include a system-redesign effort. We retrieved and screened full texts of RCTs of the provider interventions to determine whether the provider intervention itself was a main component of the study rather than simply a component of a larger system-redesign effort.

Eligibility Criteria

Inclusion and exclusion criteria can be summarized in the following "PICOTSS" framework (participants, interventions, comparators, outcomes, timing, settings, and study design). Only English-language publications were eligible for inclusion in the review. Studies reported in abbreviated formats such as conference abstracts were not included.

- *Participants*: Studies with health care providers responsible for patient care in the outpatient setting were eligible for inclusion. These included primary care physicians, psychiatrists, doctoral and master's level psychologists and other mental health professionals (e.g., marriage and family therapists), nurse practitioners, other general practitioners (e.g., pediatricians), clinicians, and physician assistants. Studies exclusively targeting students in training (e.g., medical residents) were excluded unless these students provided depression treatment to patients. We excluded studies involving pharmacists, midwives, and allied health professionals such as dietitians, medical technologists, occupational therapists, physical therapists, or speech language pathologists only in the absence of the specified health care providers.
- *Interventions:* Studies evaluating provider interventions, including continuing education, quality improvement projects, financial, organizational, or regulatory interventions were eligible. Provider behavior change interventions could use any knowledge translation strategy, including academic detailing and audit and feedback. Interventions must have aimed to affect the use of evidence-based treatment for depression. The rationale or quality of the evidence base for the treatment strategy was not evaluated, but interventions must have been directed at using evidence-based practice guidelines or implementing changes to improve the quality of care for patients. We excluded studies that only reported on alternative models of care delivery, such as care delivered through pharmacists, studies that focused on more cost-effective strategies to deliver care, or studies that entailed practice redesign interventions. Interventions must have targeted depression treatment; interventions exclusively targeting screening or diagnostic criteria for depression were excluded.
- *Comparators:* Studies were not limited by comparator. We included studies that compared the intervention arm to a control arm of no-intervention, wait-list control, usual care practice, or other provider interventions.
- *Outcomes*: Studies must have reported health care professional behavior or performance measures. Eligible measures may have assessed the adherence of providers to guidelines

or to guideline-concordant intervention protocols in clinical care, or assessed the frequency of an intervention used in practice. They may also have included the percentage of patients treated according to medication guidelines; an increase in the proportion of providers delivering evidence-based treatments as specified by the intervention; improved adherence with medication prescribing protocols; or uptake of a specific targeted patient intervention, such as cognitive behavioral therapy. Studies that reported solely on outcomes of provider knowledge, provider attitudes, provider satisfaction, or perceived changes (including perceived provider changes) were excluded. Studies were not limited further by the type of reported outcome or metric, but data needed to correspond to a denominator (e.g., proportion of providers with the outcome of interest in the study sample). We excluded studies that described provider outcomes of screening, diagnoses, and referral behaviors in the absence of outcomes related to provider adoption of treatment. Studies that reported only patient outcomes in the absence of provider outcomes were also excluded.

- *Timing*: Studies could involve any intervention duration and any follow-up period with the exception of studies involving only brief introductory presentations for novel treatment approaches, such as the introduction of a new therapy manual.
- *Setting:* Studies were included if they were conducted in an outpatient health care delivery facility (e.g., hospitals, health care centers) or physician practice settings (e.g., community clinics, private practice settings). This included both primary care and specialty care settings. We excluded studies that focused exclusively on health care providers delivering inpatient care. We also excluded studies that were conducted in schools, psychiatric hospitals, and nursing homes or other long-term care facilities.
- *Study Design*: Studies were limited to RCTs, randomized by either individual participant (provider or patient) or practice site, such as those involving whole teams, units, or sites.

Inclusion Screening

Following a pilot session to ensure similar interpretation of the inclusion and exclusion criteria, two reviewers (the project lead, who is an experienced clinical psychologist with both professional depression intervention expertise and prior systematic review experience, and a RAND research associate with experience in systematic reviews) independently screened all titles and abstracts of retrieved citations. Citations judged as potentially eligible by one or both reviewers were obtained as full text.

The two reviewers then screened full text publications against the specified inclusion and exclusion criteria; disagreements were resolved through discussion within the review team.

Studies on the same participants were counted as one study regardless of the number of publications in which results were presented. All publications, including study protocols, were considered and used for data extraction.

Data Extraction

The two reviewers abstracted study-level data in an electronic database (Distiller systematic review software). The project lead designed data collection forms with input from the project

team. The reviewers pilot-tested the data collection forms on two studies to ensure agreement of interpretation. We added reviewer instructions to avoid ambiguity and to ensure standardized data extraction. For categorical data, the two reviewers extracted study-level data in duplicate. Free text data were extracted by one reviewer and checked by the lead reviewer. Discrepancies were resolved through discussion within the review team. A RAND Evidence-Based Practice Center (EPC) biostatistician extracted outcome data, and extraction accuracy was checked by the project lead on a random sample of studies.

The following information was extracted from individual studies:

- Study detail
  - Study identification (parent study and supporting references)
  - Setting: geographic region/country where study was conducted, clinical setting
  - Randomization: by provider, site/team/practice, or patient
  - Inclusion criteria, exclusion criteria
- Sample size (number randomized; if not available, number analyzed), reported power calculation
- Participants
  - Site: number of sites included
  - Providers: number of providers, provider type (e.g., nurse practitioners, primary care physicians, psychiatrists, and other mental health providers)
  - Patients: number of patients, depression diagnoses (in studies reporting on patient outcomes)
  - Provider target category: sole provider intervention target, multiple provider team, or practice intervention target
- Intervention
  - Strategy for changing provider behavior: content and format, implementation strategy (e.g., how the intervention was incorporated into the organization, if applicable beyond the content of the intervention itself)
  - Guideline: content and format of guidelines, scope of the guidelines that the intervention promoted
  - Categorization of intervention: educational only versus education plus components (e.g., those involving clinical reminders and patient follow-up calls in addition to education, follow-up performance feedback to providers after an initial training) versus distributing guidelines (e.g., mailing guidelines to providers)
- Comparators
  - Type and description of comparator (e.g., wait-list control, treatment as usual, usual clinical practice)
- Outcomes
  - Providers: outcome type (provider outcomes of adherence to guidelines or care protocols; proportion of providers within a setting delivering evidence-based treatments as specified by the intervention; frequency of an intervention used in practice; percentage of patients treated according to medication guidelines; improved adherence to medication prescribing protocols; and uptake of a specific targeted patient intervention), assessment method, metric of data expression (e.g., means,

proportions), results for intervention and control groups (point effect estimates, together with measure of dispersion [mean, SD]), and adverse events or unintended consequences associated with the intervention
    - Patients: outcome type; assessment method; metric of data expression; results for intervention and control group for scores on depression symptom measures (e.g., Center for Epidemiologic Studies Depression Scale [CES-D]; Hamilton Rating Scale for Depression [HRSD]); number of treatment responders; number of patients in remission; and medication adherence
- Timing
    - Duration of all intervention components; time-points of outcome assessment from end of the guideline implementation phase.

When several reports of outcomes for the same study existed, we compared descriptions of participants to ensure that data from the same study populations were included in the analysis and synthesis only once. We relied on published data but did not include conference abstracts and dissertations. No inquiries were made to authors or sponsors.

For participants, we included provider and patient numbers as randomized to condition. In many instances, inclusion and exclusion criteria were not reported for the providers or patients if they were not the unit of randomization. Primary care physicians were called general practitioners in the European studies, but for clarity we called them primary care physicians when it was clear from the description that they functioned in the same role as primary care physicians in the United States.

For the comparators, in some instances, the control group specified by the original study authors was the intervention of interest for our review. For example, our search identified a study where the providers in the control group were given guidelines for treating depression and the intervention group providers were trained to deliver a specific treatment modality to enhance treatment (i.e., Motivational Interviewing) with outcomes specifically focused on whether or not they used the therapeutic style post-intervention. In other instances, the group specified as the control group by study authors included a system-redesign effort (an exclusion criterion for our purposes) but contained a study author-defined control group that fit our inclusion criteria or contained an alternate intervention group of a provider intervention without system redesign. These system redesigns, which are often referred to as quality improvement interventions, may include a provider-directed intervention, but they are a single component of a much larger intervention bundle. As such, the effect of the provider intervention component is difficult to tease apart from the effects of the system redesign. In both instances, the system-redesign condition was specified as the comparator for the purposes of this review.

We used reported intention-to-treat data where possible. In the absence of intention-to-treat data, we used the analyzed number of participants. If the analyzed number of participants was not reported, we used the number randomized to intervention group as the denominator. All studies were analyzed using the latest reported follow-up if studies included more than one

follow-up point; however, studies reporting follow-up only from treatment responders were not considered.

In accordance with data-sharing conventions, the raw data can be obtained from the review authors.

Critical Appraisal

The two reviewers independently performed the critical appraisal using the Cochrane Risk of Bias tool (Higgins and Green, 2011), the Quality Improvement Minimum Quality Criteria Set (QI-MQCS) (Hempel et al., 2015), and the criteria used by the U.S. Preventive Services Task Force (U.S. Preventive Services Task Force, 2008).

Using the Cochrane Risk of Bias tool, the following sources of biases were assessed: *random sequence generation* (selection bias), *allocation concealment* (selection bias), *blinding of participants and providers* (performance bias), *blinding of outcome assessors* (detection bias), *completeness of reporting outcome data* (attrition bias), *selective outcome reporting* (reporting bias), and *cross-over/contamination* (contamination bias). For each study, each dimension was assessed as low, high, or unclear risk of bias.

In addition, we applied the QI-MQCS, which assesses features specific to quality improvement, knowledge translation, and organizational changes. The tool complements the risk of bias assessment and includes 16 critical appraisal domains. *Organizational motivation* assesses whether the motivational context of the organization in which the intervention was introduced was addressed. *Intervention rationale* assesses whether a rationale was given that suggests why the intervention may produce improvements in the outcome. *Intervention description* requires a detailed description of the change in the structure or organization of health care, including personnel involved. *Organizational characteristics* assesses whether key demographics of the setting are provided, enabling readers to assess the generalizability to their organization. *Implementation* addresses temporary activities used to introduce the permanent change in clinical practice. Given the nature of this review, and to be consistent with the same standards applied across reviews, all studies met criteria in the Implementation domain. *Study design* assesses whether the evaluation design to determine whether the intervention was successfully identified. *Comparator* assesses whether the control condition was sufficiently described given that health care contexts are continually evolving and "standard of care" changes. *Data source* considers how data were obtained for the evaluation and whether the primary outcome was defined. *Timing* addresses the clarity of the timeline in relation to the evaluation of the intervention; for example, when a complex change was fully implemented and when it was evaluated, to determine the follow-up period. For this domain, study authors needed to make it clear when the implementation period began after the completion of the intervention (e.g., when did providers start implementing the guidelines after receiving training in how to use them in practice?). *Adherence/Fidelity* addresses compliance with the intervention. As all

included studies contained provider outcomes as inclusion criteria, these outcomes were typically adherence/fidelity outcomes. However, in some cases, outcomes did not include adherence/fidelity and, thus, these studies did not meet the criterion for this domain. *Health outcomes* considers whether patient health outcomes are part of the evaluation. *Organizational readiness* refers to the QI culture and resources present in the organization, which helps to assess the transferability of results. *Penetration/Reach* assesses what proportion of eligible units participated. *Sustainability* addresses whether information on the sustainability of the intervention is available. *Spread* addresses the ability of the intervention to be spread to or replicated in other settings. *Limitation* assesses whether limitations of the evaluation of the intervention were disclosed. We rated each of the 16 areas as met/not met for each study considered.

We also considered criteria used by the U.S. Preventive Services Task Force (The Lewin Group and ECRI Institute, 2014; U.S. Preventive Services Task Force, 2008). The criteria differentiate good-quality, fair-quality, and poor-quality studies. *Good quality* is defined as comparable groups initially assembled and maintained throughout the study with at least 80 percent follow-up; reliable, valid measurement is used and applied equally to all groups; interventions are clearly described; all important outcomes are considered; appropriate attention is given to confounders in analysis; and intention-to-treat analysis is used. *Fair quality* describes studies where one or more of the following issues is found in the study: some though not major differences between groups exist at follow-up; measurement instruments are acceptable but not ideal, though are generally applied equally; some but not all important outcomes are considered; some but not all potential confounders are accounted for in analyses. Intention-to-treat analysis must be done. *Poor-quality* studies are those with one or more of the following "fatal flaws": initially assembled groups are not comparable or maintained throughout the study; unreliable or invalid measurements are used or applied unequally across groups; key confounders are given little to no attention in analyses; intention-to-treat analysis is not used.

Finally, each study included in the review was appraised as overall good, fair, or poor. We applied an algorithm based on the most important critical appraisal items for studies of provider interventions and focused on the potential for biased study results. For example, when deciding on the overall appraisal, we did not factor in whether studies contained high risk for blinding of participants and providers (performance bias); this was because providers could not be blind to the condition to which they were assigned. However, selection bias, detection bias, attrition bias, reporting bias, and contamination bias were more heavily considered. For this latter area, studies that randomized by practice were considered low risk. Those that randomized by municipality or that mailed guidelines to providers and did not discuss contamination bias were marked as unclear risk. Contamination bias was particularly important given its implications for the review of provider behavior outcomes within practice. We used the critical appraisal results for sensitivity analyses where applicable.

Data Synthesis

The purpose of the systematic review was to synthesize RCT-based estimates of how interventions to improve provider uptake of evidence-based depression care affected the primary outcome of provider behavior. Secondary outcomes were effects on patients in the studies that also reported provider outcomes.

For all studies, we converted continuous outcomes to standardized mean differences (SMDs) together with 95 percent confidence intervals (CIs). Categorical data were summarized as odds ratios (ORs) because some studies only reported ORs and no other data that would support computing risk ratios or other metrics. Some studies reported incidence risk ratios (IRRs), and these were used for individual- as well as multiple-study comparisons.

The studies assessed a variety of outcomes. However, the reported outcomes were often study-specific indicators to determine whether the intervention was effective. Where possible, we analyzed outcome categories such as 'medication adherence' that were reported in more than one study. To facilitate comparison of study results, we also selected a dichotomous and a continuous variable as the main indication of adherence to guidelines or care protocols per study. These outcomes were often study-specific, but represented a clear indicator whether the intervention had the intended effect on providers. The project lead reviewed the intervention content and selected the key outcome from a list of all reported outcomes in the study. A content expert checked the selection. The specific outcomes were selected before the intervention effects were computed to avoid bias. KQ1 and KQ1a through KQ1c focus on provider outcomes. KQ1d reports patient outcomes.

We presented the study results in a narrative synthesis. When sufficient data were available, we performed meta-analysis to pool effects across included studies for each of the outcomes of interest. Meta-analysis increases statistical power compared to individual studies and is a useful tool to detect trends. We used the Hartung-Knapp-Sidik-Jonkman method for random effects meta-analysis (Hartung, 1999; Hartung and Knapp, 2001; Sidik and Jonkman, 2006). This approach may be preferred when the number of studies pooled is small and when there is evidence of heterogeneity (IntHout, Ioannidis, and Borm, 2014). The synthesis presented study results in forest plots, which allow a clear overview of the individual studies; facilitate comparison of study effects; show consistency as well as outliers; and present the size of the study, point estimates, and confidence intervals in a visual overview. We presented pooled results for all analyses, together with a discussion of study diversity and statistical heterogeneity.

Tests of heterogeneity were performed using the I^2 statistic. The measure indicates the proportion of the variance in observed effects and reflects variance in true effects rather than sampling error (Borenstein et al., 2017). Values of the I^2 statistic closer to 100 percent represent higher degrees of heterogeneity, with an I^2 of 30 percent to 60 percent possibly representing moderate heterogeneity, 50 percent to 90 percent substantial heterogeneity, and 75 percent to 100 percent considerable heterogeneity (Higgins et al., 2003). We used common indices for

interpreting the size of clinical effects: SMD of 0.2 or OR of 0.60 for a small clinical effect; SMD of 0.5 or OR of 0.29 for a medium clinical effect; and SMD of 0.8 or OR of 0.15 for a large clinical effect (Chen, 2010).

For all pooled analyses, we grouped studies by comparator, differentiating between passive and active comparators. We grouped those studies that compared a provider intervention to no intervention, interventions not aimed at depression treatment, or interventions that distributed a treatment guideline with no other training or practice component. Active comparators included studies that compared a provider intervention to practice redesign interventions, where structural changes such as introducing a care manager had been introduced into care delivery procedures. Finally, all studies reporting on the comparative effectiveness of two eligible provider interventions, such as comparing different provider training approaches, were analyzed separately.

When sufficient data were available, we described results of head-to-head comparisons of interventions to answer the subquestions KQ1a, KQ1b, and KQ1c. In the absence of head-to-head comparisons, we indirectly compared effects in meta-regressions. We conducted pre-planned subgroup analyses for different intervention types, provider types, and settings. If indirect analyses indicate that results systematically vary by subgroup that required separate evidence statements, we presented subgroup results. All analyses were based on studies comparing the intervention to usual clinical care practice.

For *intervention types* (KQ1a), we presented the results of individual studies describing the intervention in the included studies in detail. In addition, two authors independently reviewed the interventions and created broad categories for subgroup analyses. We categorized interventions as distributing guidelines, education only, and education plus other components. *Distributing guidelines* interventions were conceptualized as interventions where guidelines were distributed to providers but the guidelines were not accompanied by any training or feedback. This could also include tailored guidelines where there was no formal instruction/training for providers beyond receipt of the guidelines. *Education only interventions* were conceptualized as interventions where providers received training in the use of guidelines, informational materials, or instruction in appropriate medication use. All materials were typically presented during a single session or multiple sessions in a group or individual format with no follow-up after the implementation period once the intervention began. Education could also include feedback, role-plays, and group discussion. This category also included the distribution of guidelines that was followed by an educational session, such as an academic detailing visit from a pharmacist. *Education plus other components* was conceptualized as interventions that included aspects of education only interventions but also included follow-up material, such as clinical reminders that presented in patients' charts after an education session, patient follow-up calls in addition to education, follow-up performance feedback to providers after an initial training, or follow-up feedback about treatment recommendations based on a patient's initial prescription. Often these interventions lasted more than just an initial training or two, with reviews of patient progress

within discussion groups over the implementation period or the availability of a psychiatrist consultant over the course of implementation. These interventions could also include tools tailored to the individual provider or to an individual patient to help providers diagnose and treat patients.

Furthermore, we rated the intensity of the intervention to quantify the differences in interventions across studies. We used a scale ranging from least, moderate, and most intensity for meta-analytic analyses using a continuous variable.

We also differentiated unidimensional versus multi-component interventions by conducting analyses in which we examined the intervention types by increasing intensity (i.e., distributing guidelines, education only, and education plus other components).

A subgroup analysis for *intervention provider type* (KQ1b), specifically, compared multi-provider approaches ("teams") such as those involving primary health care provider, psychologists, and nurse practitioners with approaches that targeted only a single provider group.

A subgroup analysis for *intervention setting* (KQ1c) compared interventions delivered in primary care settings with those delivered in other settings, such as specialty mental health settings (e.g., outpatient mental health clinic) and behavioral health organizations. We conducted sensitivity analyses to assess the robustness of study results as data allowed; for example, excluding studies with high risk of bias or excluding clear outliers. Individual study results were highlighted throughout the report to emphasize results of unique intervention approaches.

Quality of Evidence

The quality of the body of evidence was assessed for key outcomes using the GRADE approach (Balshem et al., 2011). The following domains were considered: study limitations (low, medium, or high risk of bias), indirectness (direct or indirect), inconsistency (consistent, inconsistent, or unknown), imprecision (precise or imprecise), and reporting bias (likely present or not applicable).

The quality of the body of evidence was downgraded in the following instances: results were primarily based on studies with substantial limitations (study limitations); results were inconsistent across individual studies, the pooled effect estimate indicated substantial heterogeneity, or the result was based on only a single study without replication in an independent research study so that inconsistency could not be assessed (inconsistency); conclusions were based on indirect evidence, such as effects shown in meta-regressions in the absence of head-to-head comparisons (indirectness); pooled results were imprecise estimates of the treatment effect with wide confidence intervals spanning effect sizes supporting different clinical conclusions (imprecision); or the Begg or the Egger test indicated the potential for publication bias (publication bias).

We graded the quality of evidence using four categories:

- *High* indicates that the review authors are very confident that the effect estimate lies close to the true effect for a given outcome.
- *Moderate* indicates that the review authors are moderately confident 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* indicates that the review authors have limited confidence in the effect estimate. The true effect may be substantially different from the estimated effect.
- *Very low* indicates that the review authors have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect.

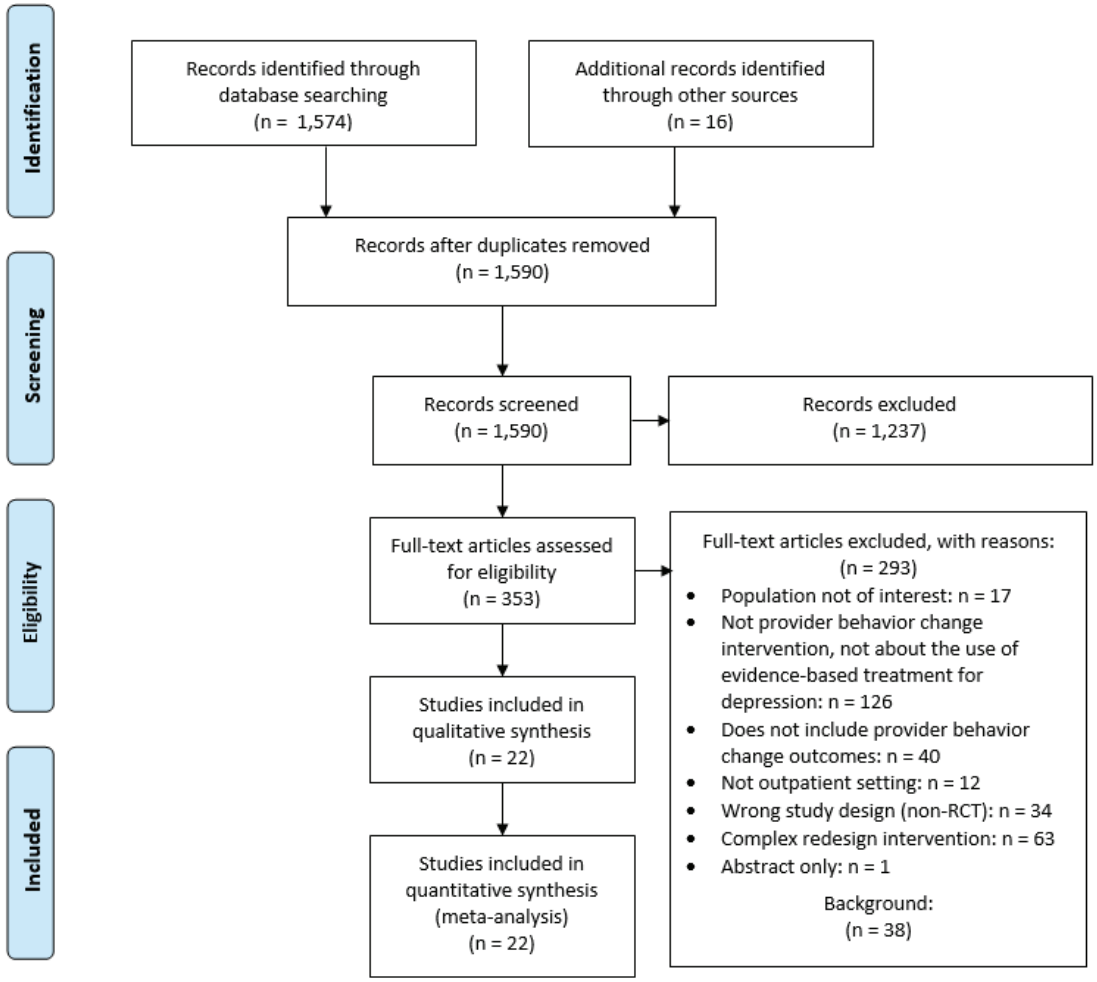
3. Results

Results of the Search

The literature search results are documented in a PRISMA (Moher et al., 2009) literature flow diagram (see Figure 3.1). We identified 1,574 citations through our electronic search of databases, plus 16 citations through reference mining of included studies. We reviewed 1,590 titles and abstracts. Full texts were obtained for 353 citations identified as potentially eligible by one or both of the reviewers.

Of these, 293 publications were excluded at the full-text review stage, either because the population was not of interest (e.g., not providers; n = 17); the study was not about a provider

Figure 3.1. PRISMA Flow Diagram



behavior change intervention or was not about the use of evidence-based treatment for depression (n = 126); the article did not include provider behavior change outcomes (n = 40); the study was not conducted in an outpatient setting (n = 12); the design of the study was not an RCT (n = 34); the study described a system-redesign effort (n = 63); or the information was published in a conference abstract only (n = 1). Thirty-eight publications were retained as background studies that provided additional information on the included studies or were used for reference mining. A list of studies excluded at the full-text review with reasons for exclusions is shown in Appendix B.

Overall, we identified 22 eligible studies reported in 34 publications. Twenty-four publications included outcomes that were extracted for analyses. An additional paper for each of two eligible studies reported outcomes on the same sample. Seven additional studies had supporting references containing information that was used in data extraction, such as of the trial protocols (see Appendix B).

Description of Included Studies

Design

We included RCTs randomized by providers, sites, or patients; all studies assessed outcomes in providers who were targeted by an intervention. Overall, studies included 2,149 providers, ranging in size from 4 providers (Kurian et al., 2009) to 266 (Eccles et al., 2007), with a median sample size of 113 providers per study. Three studies did not indicate how many providers were included (Bosmans et al., 2006; Yawn et al., 2012; Simon et al., 2000). Studies included 239,477 patients, with one study (Eccles et al., 2007) not reporting the number of patients. The total number of sites was 378, ranging from 1 to 73 per study, with five studies not reporting the number of sites (Worrall et al., 1999; Azocar et al., 2003; Gerrity et al., 1999; Linden et al., 2008; Shirazi et al., 2013). Six studies did not report any information about a power calculation, nine studies reported an a priori power calculation with targeted sample size achieved, and seven noted a post hoc analysis indicating insufficient power. Fifteen studies were two-arm RCTs and seven were three-arm RCTs.

Setting

Studies were conducted in 9 countries: 11 studies took place in the United States, 3 in the Netherlands, 2 in the UK, and 1 each in Norway, Germany, England, Sweden, Canada, and Iran. Twenty studies took place in primary care settings, ranging from primary care offices and academically affiliated primary care practices to family medicine research network practices and continuing medical education groups. Two studies took place in specialty care settings: a private psychiatry practice (Linden et al., 2008) and a managed behavioral health care organization

(Azocar et al., 2003). Specific names of the sites as described in the articles can be found in Appendix C.

Participants

All studies included health care providers responsible for patient care in the outpatient setting. Twenty studies focused on a single provider only, and two studies focused on teams of providers. The single provider studies included 16 studies with primary care physicians, two studies with mental health care providers, and two studies with other general practitioners or clinicians.

Interventions

Interventions described in the studies were unique in many regards and are, consequently, described in detail in the evidence table in Appendix C, in Table 3.1, and in the result synthesis. Broadly categorized, seven studies described education interventions, ten studies described interventions with an education component plus other components, and six studies described intervention arms of distributing guidelines. One (Linden et al., 2008) was a three-arm study that described two intervention conditions (education only and distribution of guidelines) compared to usual clinical care practice. More detailed descriptions of the interventions can be found in Appendix C.

Timing of the interventions was also variable. In Appendix C, we provide details of the duration of the intervention, duration of the implementation period, and the time points of outcome assessments from the end of implementation phase. Though several studies did not report duration of the interventions, those that did ranged in initial training sessions from 15 to 20 minutes to four hours, with multiple studies reporting follow-up trainings or contacts with providers such as a follow-up academic detailing session to review progress. Implementation of interventions was not always reported but ranged from 12 weeks to 12 months. Outcome assessments, when reported, ranged from six weeks to 18 months following intervention implementation.

Comparators

In 19 studies, the comparator group received: usual clinical care practice, with a group receiving no intervention or a wait-list control condition; usual care practice combined with notification about or receipt of a guideline and no training or practice component; or a group receiving non-depression guidelines (e.g., hypertension treatment guidelines). Three studies described a comparator that was specified as system redesign, such as introducing nurse care managers (Simon et al., 2000; Nilsson et al., 2001; Datto et al., 2003). One of the 22 studies featured two comparator groups (usual care and system redesign) (Simon et al., 2000).

In four studies (Simon et al., 2000; Goldberg et al., 1998; Keeley et al., 2014; Datto et al., 2003), the comparator for our review's purpose was specified as the intervention group by the

original study authors. These comparators were either organizational system redesigns (Simon et al., 2000; Nilsson et al., 2001; Datto et al., 2003) or an out-of-scope intervention (i.e., training providers in motivational interviewing skills) (Keeley et al., 2014). The comparator for each included study is described in detail in the evidence table (see Appendix C).

Outcomes

To be included, studies needed to report on health care professional behavior or performance measures, such as the adherence of providers to guidelines or to intervention protocols in clinical care. As such, all 22 studies contained an outcome that indicated provider adherence to the intervention (see Table 3.1), with more specified provider outcomes of medication prescribing, contact with patients, general intervention adherence, and referral offered to patients. Three studies reported on adverse patient outcomes or unintended consequences of the intervention.

Each of the 22 included RCTs reported at least one main provider adherence outcome as either a dichotomous or continuous outcome; 15 studies reported a dichotomous outcome, 10 studies reported a continuous outcome, and 4 studies reported a count outcome described as an incidence rate ratio. See Table 3.1 for the main provider adherence to guidelines or care protocols selected for each study.

Table 3.1. Interventions and Main Provider Outcomes

Study	Intervention	Main Dichotomous Outcome	Main Continuous Outcome	Main IRR (Count Data)	Timing of Follow-up Outcome
Aakhus et al., 2016	• Outreach visits to providers • Guidelines not specified	—	Mean adherence to recommendations for the management of depression	—	8 months
Azocar et al., 2003	• General guidelines or targeted guidelines • Guidelines based on United Behavioral Health best practice guidelines (based on APA and AHRQ guidelines)	—	Mean adjusted adherence rating (subjective)	—	4 months
Baker et al., 2001	• Guideline distribution plus tailored implementation • Guidelines developed from existing guidelines and literature reviews	Treated with antidepressant or cognitive therapy	—	—	12 months
Bosmans et al., 2006	• Training session based on the Dutch depression guideline	Received some form of mental health care (antidepressant medication or referral during the follow-up period)	—	—	12 months

Table 3.1. Interventions and Main Provider Outcomes—Continued

Study	Intervention	Main Dichotomous Outcome	Main Continuous Outcome	Main IRR (Count Data)	Timing of Follow-up Outcome
Callahan et al., 1994	• Receipt of patient assessment feedback with recommended care • Recommendations based on literature review and expert panel consensus	Stopped drugs associated with depression	—	—	6 months
Datto et al., 2003	• Provider education and distribution of practice guidelines from the AHRQ practice guidelines for major depression in primary care	Clinician adherence through 12 weeks	—	—	16 weeks
Eccles et al., 2007	• Guideline distribution with outreach visits • Guidelines developed by a multidisciplinary panel	—	Items prescribed per ASTROPU: other TCAs (mean difference between intervention and control)	—	12 months
Freemantle et al., 2002	• Outreach visits for providers • Guidelines developed from techniques by the North of England Guidelines Development Project and literature review	Number of GPs reporting application of content	—	—	6 months
Gerrity et al., 1999	• Depression education training sessions • Guidelines based on AHRQ's CPG for Depression in Primary Care	Physician discussed possibility of depression with standardized patient 1 and standardized patient 2 (combined)	—	—	6 weeks
Goldberg et al., 1998	• Academic detailing and educational sessions based on clinical practice guidelines from the AHRQ's Quick Reference Guide for Clinicians	Percent of eligible unrecognized depressives prescribed antidepressants, all clinics	—	—	12 months
Keeley et al., 2014	• Distribution of practice guideline and recommendations for treatment based on APA's Practice Guidelines for the Treatment of MDD	Prescription for antidepressant medication	—	—	24 months
Kurian et al., 2009	• Education plus practice with a computerized support decision system • Guidelines based on APA practice guidelines and consensus expert opinion	Received an adequate antidepressant dose	Number of treatment visits	—	12 weeks

Table 3.1. Interventions and Main Provider Outcomes—Continued

Study	Intervention	Main Dichotomous Outcome	Main Continuous Outcome	Main IRR (Count Data)	Timing of Follow-up Outcome
Lin et al., 2001	• Education with group feedback • Guidelines based on DSM-IV diagnostic criteria	12 weeks' continuous medication	—	New antidepressant prescriptions / 100 visits	12 months
Linden et al., 2008	• Receipt of depression guideline alone or with training on WHO depression guidelines	—	Prescribed dosages of mirtazapine, mean mg/day	—	12 weeks
Nilsson et al., 2001	• Pharmacotherapy education group • Guidelines based on literature review and recent national and local recommendations on treatment	—	Fractional prescribing rate: TCAs	Prescribed DDDs/1,000 patients per year	12 months
Rollman et al., 2001	• Reminders of patients' depression diagnosis with or without recommendations from AHRQ's Depression Panel's Guideline for the treatment of major depression	Depression mentioned in any contact with usual PCP	Number of contacts with usual PCP[1]	—	6 months
Shirazi et al., 2013	• Continuing medical education course tailored toward self-reported stage of change • Guidelines generated by researchers based on literature review	—	Performance score on appropriate treatment (prescription, lab tests, referrals)	—	2 months
Simon et al., 2000	• Receipt of detailed patient report and treatment recommendations based on a computerized algorithm • Guidelines not specified	Patients who receive adequate pharmacotherapy (low dose, >90 days)	Mental health visits to prescribing provider	—	6 months
Sinnema et al., 2015	• Training and consultations from experts with incorporation of personal barriers to guideline implementation on the Dutch College of General Practitioners' guidelines for depression and anxiety	Prescribing antidepressants	—	Number of consultations	6 months
van Eijk et al., 2001	• Group-based on individual-based academic detailing session and review of group- or individual-based performance • Guidelines not specified	—	—	Rate of incident prescriptions of less anticholinergic antidepressants after intervention	4 months

Table 3.1. Interventions and Main Provider Outcomes—Continued

Study	Intervention	Main Dichotomous Outcome	Main Continuous Outcome	Main IRR (Count Data)	Timing of Follow-up Outcome
Worrall et al., 1999	• Workshop on clinical practice guidelines with follow-up consultations. Guidelines based on Canadian Medical Association's CPGs	No. of patients prescribed an antidepressant on first visit	Mean number of office visits per patient	—	6 months
Yawn et al., 2012	• Education and a set of tools for postpartum depression • Guidelines not specified	Received second call after successful first call (women diagnosed with depression)	—	—	12 months

NOTES: [1]Outcome not able to be included in analyses due to no reported standard deviation.
APA = American Psychiatric Association; ASTROPU = Age, Sex, and Temporary Resident Originated Prescribing Units; TCA = Tricyclic antidepressants; GP = general practitioner; DDD = defined daily doses; PCP = primary care physician; CPG= clinical practice guidelines; SP = standardized patient

Individual provider outcomes were specified as medication prescribing (n = 16 RCTs); recommended contact with patients such as following up with patients by phone or scheduling further appointments (n = 7 RCTs); referral to a specialty care appointment with a psychiatrist (n = 4 RCTs); and general adherence to the intervention as specified by the study authors (n = 11 RCTs; for example, number of patients treated for a specific time period as indicted by the intervention; number of providers applying the guidelines; discussion of depression with patients, treatment offered to patients, or recommendations to patients as indicated by the intervention).

Fourteen studies reported patient health outcomes in addition to provider outcomes.

Critical Appraisal Results

The results of the critical appraisal are documented in Appendix D. Six studies in total received an overall "good" quality rating, ten were judged to be of "fair" quality, and six were rated "poor" quality. The results for all assessed dimensions are described later in more detail.

Random sequence generation. Nine studies had low risk of selection bias and described an adequate random sequence generation as the basis for the random assignment to the intervention and control groups; 13 had an unclear risk of bias.

Allocation concealment. One study had low risk of selection bias and explicitly described a method of concealing allocations to treatment groups; 21 had an unclear risk of bias.

Blinding of participants and providers. All studies were de facto rated high risk of performance bias related to the lack of blinding of intervention providers, because it is generally impossible for a provider to be blinded from delivery of the interventions of interest.

Blinding of outcome assessors. Nine studies had a low risk of detection bias related to blinding of outcome assessors, twelve had an unclear risk of bias, and one had a high risk of bias.

Completeness of reporting outcome data. Eight studies were at low risk of attrition biases related to missing data in the RCT, 11 had an unclear risk of bias, and three had a high risk of bias.

Selective outcome reporting. Four studies had a low risk of reporting bias related to selective outcome reporting, 18 studies had an unclear risk of bias, and no study had a high risk of bias.

Other: Cross-over/Contamination. Thirteen studies had a low risk of reporting bias related to selective outcome reporting, six studies had an unclear risk of bias, and three studies had a high risk of bias.

Organizational motivation. All 22 studies met this criterion and described the organizational motivation that prompted the intervention.

Intervention rationale. All 22 studies met this criterion and presented a rationale for why the specific evaluated intervention was selected, but reported details of the evidence base for the intervention varied.

Intervention description. Twenty studies met this criterion and described the intervention in sufficient detail; two studies did not meet this criterion.

Organizational characteristics. Twenty studies met this criterion and described basic organizational characteristics important to understand the context in which the study was conducted; two studies did not meet this criterion.

Implementation. Not surprising, all 22 studies met this criterion. The review included only studies that described an intervention aiming to encourage providers to adopt treatment guidelines in practice.

Study design. All 22 studies met this criterion and described the study design used to evaluate the intervention effects.

Comparator. Seventeen studies met this criterion and provided information on the comparator, describing how the intervention effects were being compared; five studies did not meet this criterion.

Data source. Twenty studies met this criterion and described the data source; two studies did not meet this criterion.

Timing. Nine of the included studies met this criterion and clearly described the follow-up relative to the start and end of the intervention; 13 studies did not meet this criterion.

Adherence/Fidelity. Fourteen studies met this criterion and addressed adherence to the intervention; eight studies did not meet the criterion.

Health outcomes. Thirteen studies met this criterion and reported effects on patients' health; nine studies did not meet this criterion.

Organizational readiness. Half of the included studies (n = 11) met this criterion and described the context and organizational readiness for quality improvement, while the other half (n = 11) did not meet this criterion.

Penetration/Reach. Twelve studies met this criterion and described the number of providers or departments that participated in the study compared to the number of available and potentially eligible participants or departments, while ten studies did not meet this criterion.

Sustainability. One study addressed the sustainability of the intervention, meeting this criterion; the remaining 21 studies did not meet this criterion.

Spread. Three studies met this criterion and described initiatives to spread the intervention or addressed the potential for or barriers to spread; 19 studies did not meet this criterion.

Limitations. All 22 studies met this criterion and addressed any limitation of the described evaluation.

KQ1: What Are the Effects of Interventions to Increase Provider Uptake of Evidence-Based Treatments for Depression on Health Care Professional Behavior versus Any Comparator?

We identified 22 RCTs that reported data on provider behavior. Studies evaluated a wide range of provider interventions:

- Conducting outreach visits to providers with tools to diagnose and manage elderly patients with depression, such as online courses with treatment recommendations (Aakhus et al., 2016)
- Mailing clinicians general guidelines or targeted guidelines emphasizing importance of adhering to depression guidelines (Azocar et al., 2003)
- Distributing guidelines to providers, plus tailored implementation recommendations to overcome personal barriers to adopting guidelines (Baker et al., 2001)
- Providing training session based on the Dutch depression guideline, with education and information, drug therapy guidelines, and supportive contacts (Bosmans et al., 2006)
- Providing clinicians with letters describing patients' depression score interviews along with recommended care for the initiation, management, and monitoring of antidepressant medications in elderly patients (Callahan et al., 1994)
- Providing clinician education and distributing AHRQ practice guidelines for major depression in primary care (Datto et al., 2003)
- Distributing guidelines to clinicians, complemented with outreach visits from pharmaceutical advisers to encourage implementation, offer recommendations, and provide feedback (Eccles et al., 2007)
- Providing outreach sessions from pharmacists with educational handouts and academic detailing to encourage the routine first-line use of TCAs and SSRIs for second-line use (Freemantle et al., 2002)
- Providing training sessions for clinicians, based on the AHRQ's clinical practice guidelines for depression in primary care (Gerrity et al., 1999)
- Providing academic detailing, educational sessions led by opinion leaders, and follow-up sessions from pharmacists based on AHRQ's clinical practice guidelines for depression in primary care (Goldberg et al., 1998)

- Distributing the American Psychiatric Association's practice guideline for the treatment of MDD with recommendations about specific course of treatment and plan for follow-up visits (Keeley et al., 2014)
- Offering education plus practice with a computerized support decision system based on the Texas Medication Algorithm Project algorithm for MDD (Kurian et al., 2009)
- Providing education with group interactive discussion, role-play, academic detailing, feedback, and review of patient progress with a psychiatric consultant (Lin et al., 2001)
- Providing training in use of WHO depression guidelines compared to simply distributing the guidelines (Linden et al., 2008)
- Promoting pharmacotherapy education group meetings consisting of feedback and interactive problem-oriented educational material to improve diagnostic strategies and increasing prescribing of TCAs, SSRIs, and other antidepressants (Nilsson et al., 2001)
- Providing clinicians with reminders of patients' depression diagnosis with or without specific details for how to treat the patient (Rollman et al., 2001)
- Providing continuing medical education focused on treatment and differential diagnosis of depression disorders based on provider's reported stage of change (Shirazi et al., 2013)
- Giving clinicians detailed patient reports after initial prescription with patient data and treatment recommendations based on a computerized algorithm (Simon et al., 2000)
- Providing training and consultations from experts based on Dutch College of General Practitioners' guidelines for depression and anxiety, including personal barriers to implementing the guidelines (Sinnema et al., 2015)
- Providing group-based or individual-based academic detailing session emphasizing the unique therapeutic difficulties of treating older people and problems of anticholinergic side effects, followed by review of group- or individual-based performance (van Eijk et al., 2001)
- Sponsoring psychiatrist- and academic family physician-led workshops based on the Canadian Medical Association's clinical practice guidelines for depression, with follow-up psychiatrist consultations (Worrall et al., 1999)
- Providing education and a set of tools to facilitate diagnosis, follow-up, and management of postpartum depression (Yawn et al., 2012)

Outcomes were often unique to individual studies and not always universally accepted clinical outcomes. We selected at least one outcome per study as indication of adherence to guidelines or care protocols (Table 3.1). In addition, we analyzed all individual provider outcomes that were assessed in more than one study. We considered any reported adverse events or unintended consequences. KQ1 differentiates studies comparing interventions to usual care practice, practice redesign efforts, or other comparators.

Provider Interventions Compared to Usual Care Practice

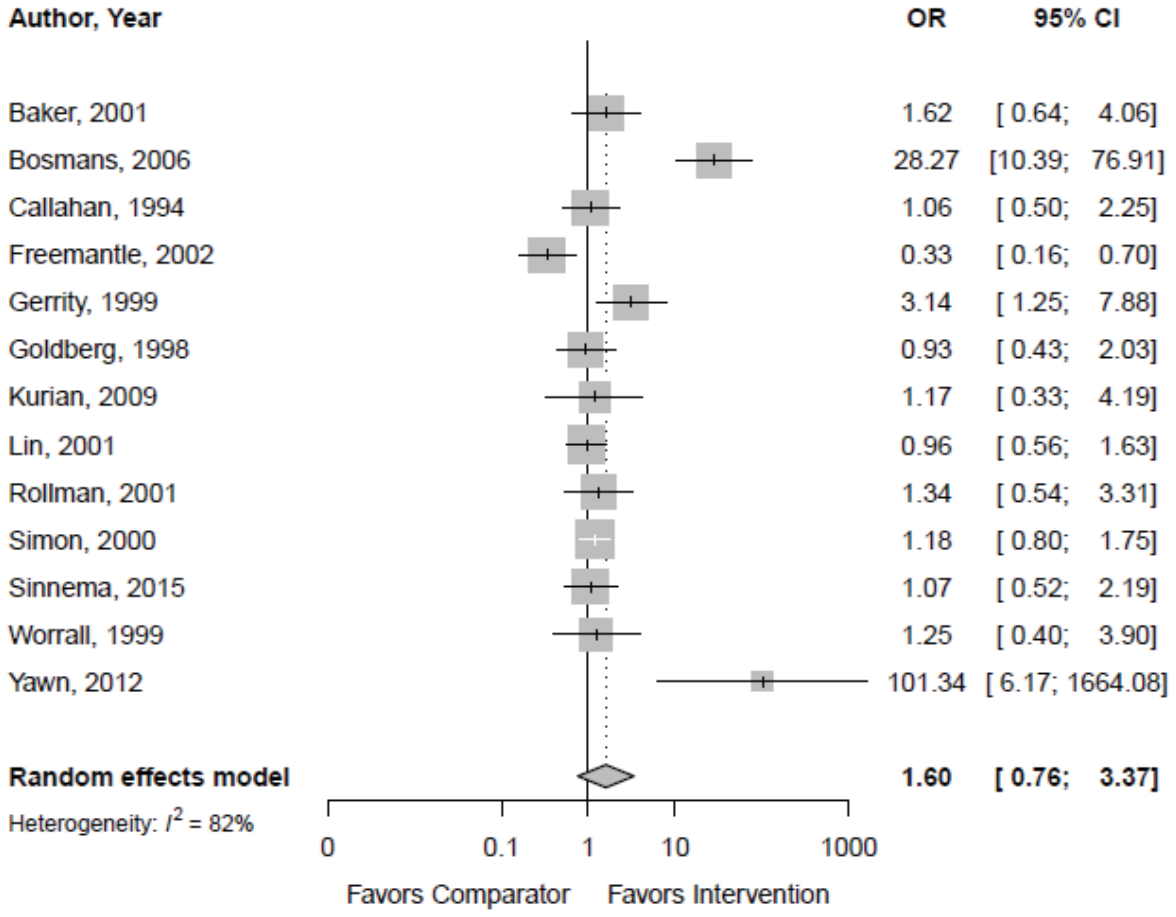
This section describes the effects of interventions compared to either no intervention, comparator arms that were described as usual care by study authors, control conditions that were similar to usual care in that they only described the (passive) distribution of clinical guidelines to providers, or interventions with control groups such as providers receiving training in a non-depression-focused guideline.

The section describes results across studies using the individual and study-specific indicators of provider adherence to depression guidelines first. After this broad overview, results for individual outcome groups are presented that have been assessed in more than one study.

Main Indicators of Provider Adherence to Guidelines

Thirteen studies with 3,158 participants reported on the odds of achieving provider adherence to the guidelines comparing a provider intervention to control groups with no intervention, participating in interventions not aimed at depression treatment, or receiving a guideline with no other training or practice component. Follow-up ranged from six weeks to 12 months. Figure 3.2 documents the results.

Figure 3.2. Odds of Achieving Provider Adherence (Main Indication) Compared to Usual Care Practice



A pooled analysis across studies did not indicate a statistically significant intervention effect compared to providers in the control arm (OR 1.60; CI 0.76, 3.37; 13 RCTs; I^2 82%). The analysis detected considerable heterogeneity. While most studies did not show strong effects for the intervention or the control group, two studies (Yawn et al., 2012; Bosmans et al., 2006)

reported large intervention effects. One of these (Yawn et al., 2012) compared a practice-based training program for treating depression in postpartum mothers with outcomes assessed at 12 months. Providers in the program were more likely to follow up with patients, but no provider in the control group reported making a second phone call to follow up with patients as indicated in the guidelines. The other (Bosmans et al., 2006) evaluated a disease management program for major depression in elderly primary care patients with outcomes also assessed at 12 months, finding that 79 percent of intervention patients received depression treatment and only 12 percent of control participants received depression treatment. An additional study indicated significant effects favoring intervention (Gerrity et al., 1999). In this study, unannounced patients acting out depressive symptoms presented to study providers. Intervention providers were more likely to discuss depression treatment with these standardized patients.

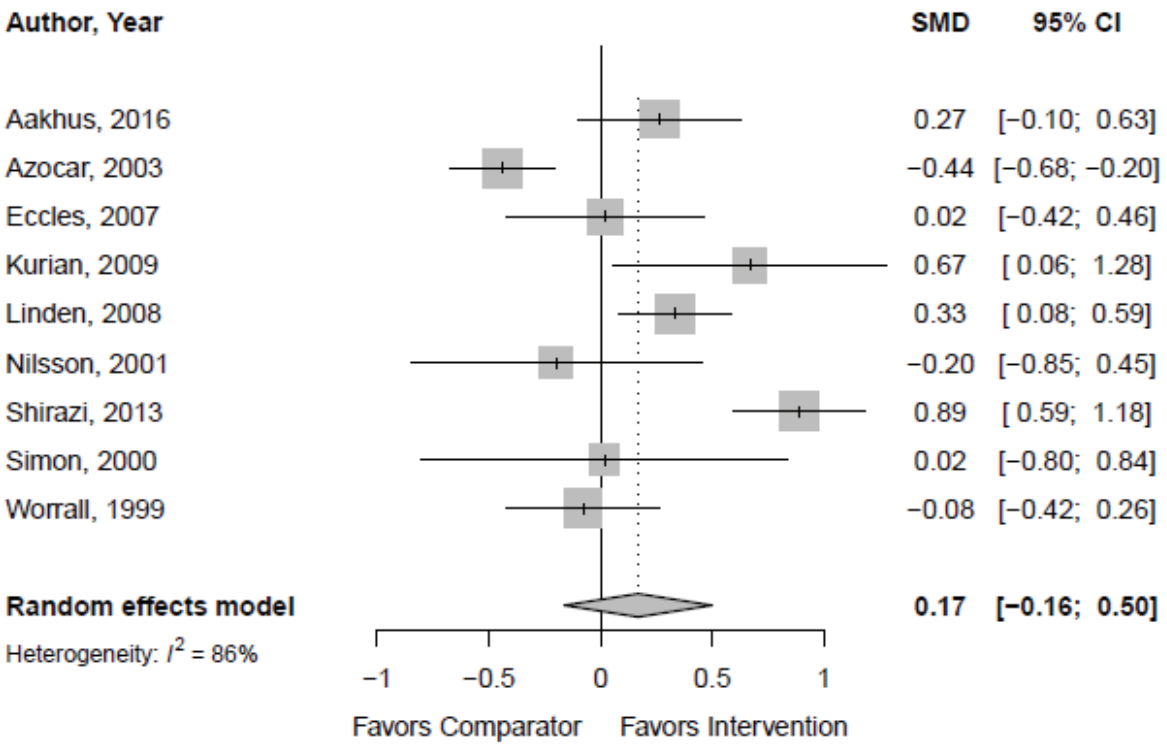
Given that the Yawn and colleagues study reported the largest effect and the result is somewhat of an outlier across studies, we performed a sensitivity analysis to test the robustness of the pooled result. We replaced the selected main adherence outcome ("received a second call from a nurse after a successful first call among women diagnosed with depression") with another study outcome (whether the patient received medication plus counseling) to determine whether the results are primarily driven by the selected outcome for this study. The sensitivity analysis resulted in a smaller effect estimate (OR 1.50; CI 0.83, 2.73; 13 RCTs; I^2 81%). The pooled effect was still not statistically significant and the heterogeneity did not change.

We also performed a sensitivity analysis where we excluded the two studies that were rated as poor quality (Callahan et al., 1994; Lin et al., 2001) to determine whether the lack of study effect was associated with the methodology. Excluding these studies did not change the overall finding (OR 1.82; CI 0.72, 4.62; 11 RCTs; I^2 84%). Similarly, including only studies rated as good quality (Baker et al., 2001; Bosmans et al., 2006; Rollman et al., 2001; Sinnema et al., 2015) showed a larger effect size but the difference between intervention and control groups was also not statistically significant (OR 2.78; CI 0.24, 31.64; 4 RCTs; I^2 90%). See Appendix E, Figure E.2.

Nine studies with 1,236 participants reported mean differences in a continuous outcome such as mean number of recommended patient encounters. Follow-up ranged from 2 to 12 months. Study comparators included no intervention, interventions not aimed at depression treatment, receiving a guideline with no other training or practice component, or receiving a guideline with limited training or tailoring. The individual study results are shown in Figure 3.3.

The pooled analysis did not indicate a statistically significant intervention effect across studies (SMD 0.17; CI –0.16, 0.50; 9 RCTs; I^2 86%). The analysis showed considerable heterogeneity, and results varied with some studies favoring the intervention and others favoring the comparator group.

Figure 3.3. Mean Difference in Provider Adherence (Main Indication) Compared to Usual Care Practice



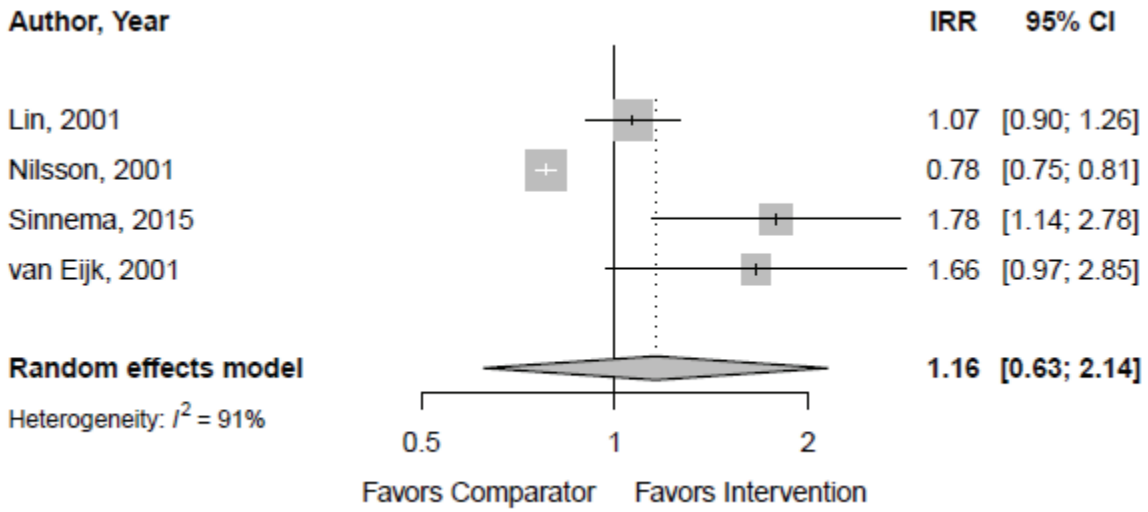
A sensitivity analysis excluding three studies that were rated as poor quality (Azocar et al., 2003; Linden et al., 2008; Nilsson et al., 2001) did not change the overall finding (SMD 0.31; CI –0.12, 0.74; 6 RCTs; I^2 78%). Of note, the included good-quality study (Aakhus et al., 2016) also did not report a statistically significant intervention effect (SMD 0.27; CI –0.10, 0.63).

One study (Rollman et al., 2001; Rollman et al., 2002) was not included in the pooled analysis because the measure of dispersion was not reported and could not be estimated. In this study, providers were assigned to usual care practice, a passive care guideline intervention where providers received reminders of patients' depression diagnosis without specific details for how to treat the patient, or an active care guideline intervention where providers received reminders of patients' depression diagnosis and recommendations for treating the patient. For the main outcome (number of contacts with any primary care physician), the authors concluded that at a six-month follow-up, patients of providers who received either active or passive guidelines had significantly more office visits with the usual primary care physician compared to usual care ($p = 0.02$).

Four studies reported dichotomous data, but expressed as a relative effect compared to the comparator group. The studies compared a count outcome such as the rate of antidepressant prescriptions. Study comparators included comparator groups receiving no intervention,

participating in interventions not aimed at depression treatment, or receiving a guideline with limited training or tailoring. The interventions were education, with or without other components. Follow-up ranged from 4 to 12 months. Study results are shown in Figure 3.4.

Figure 3.4. Incidence of Achieved Provider Adherence (Main Indication) Compared to Usual Care Practice



The pooled result was not statistically significant (IRR 1.16; CI 0.63, 2.14; 4 RCTs; I^2 91%). Visual inspection of the forest plot and the I^2 statistic indicates considerable heterogeneity.

One study judged to be poor quality (Nilsson et al., 2001) had substantial baseline differences with the effect that the IRR favored the control group, though the intervention group showed larger improvements at a 12-month follow-up. Excluding this small study in a sensitivity analysis did not change the overall finding but heterogeneity was reduced (OR 1.39; CI 0.67, 2.88; 3 RCTs; I^2 68%).

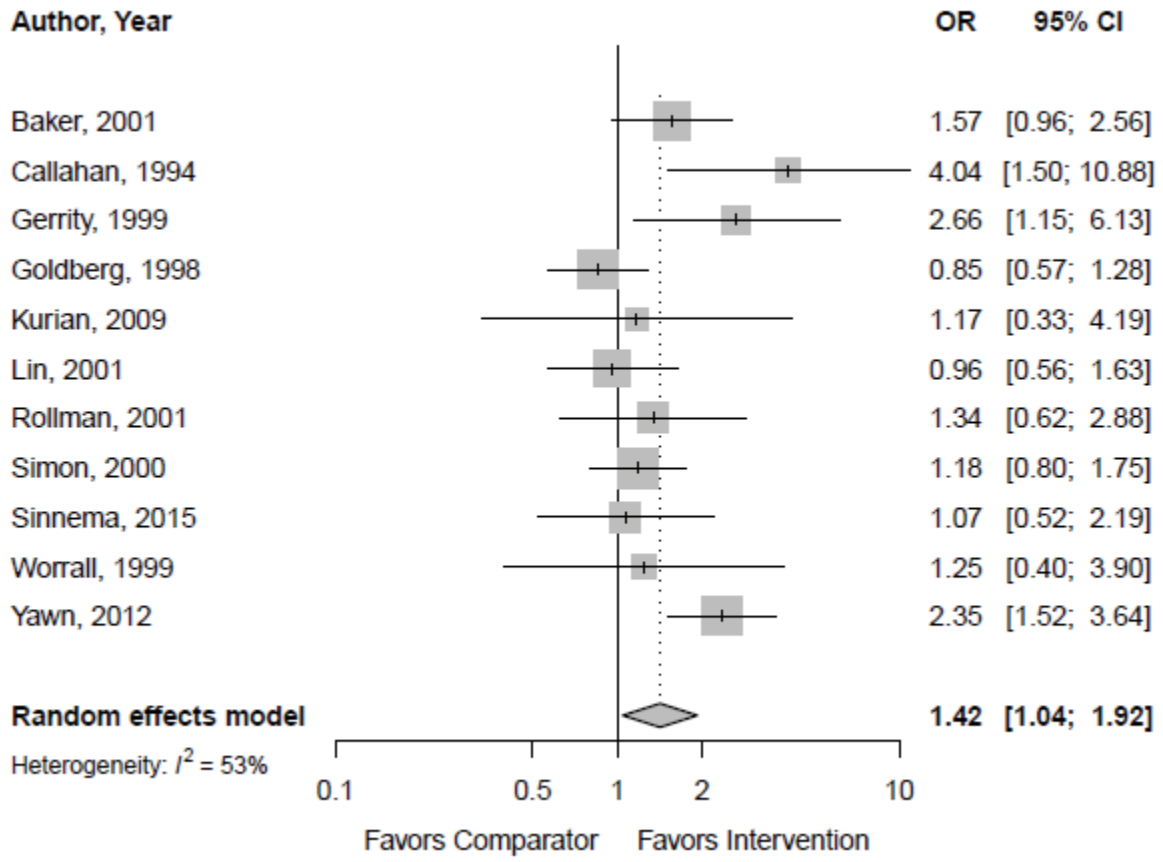
The risk of bias in the three studies varied: they were rated as good, fair, and poor quality, respectively. The one study judged to be good quality (Sinnema et al., 2015) compared an intervention group that received training and consultations with experts on overcoming personal barriers to implement guidelines to a comparator group that received training without the tailored intervention based on personal barriers to implementation. The study reported a significant effect favoring the intervention (IRR 1.78; CI 1.14, 2.78).

Medication Prescribing

Eleven studies with 4,116 participants reported on the odds of improved medication prescribing, including outcomes such as providing patients with a new antidepressant prescription as specified by the intervention. These studies compared a provider intervention involving education plus other components, education only, or distribution of guidelines to comparator groups receiving no intervention, participating in interventions not aimed at

depression treatment, wait list control, or receiving a guideline with no other training or practice component. Follow-up ranged from six weeks to 24 months. Figure 3.5 documents the study-specific results.

Figure 3.5. Odds of Improved Medication Prescribing Compared to Usual Care Practice



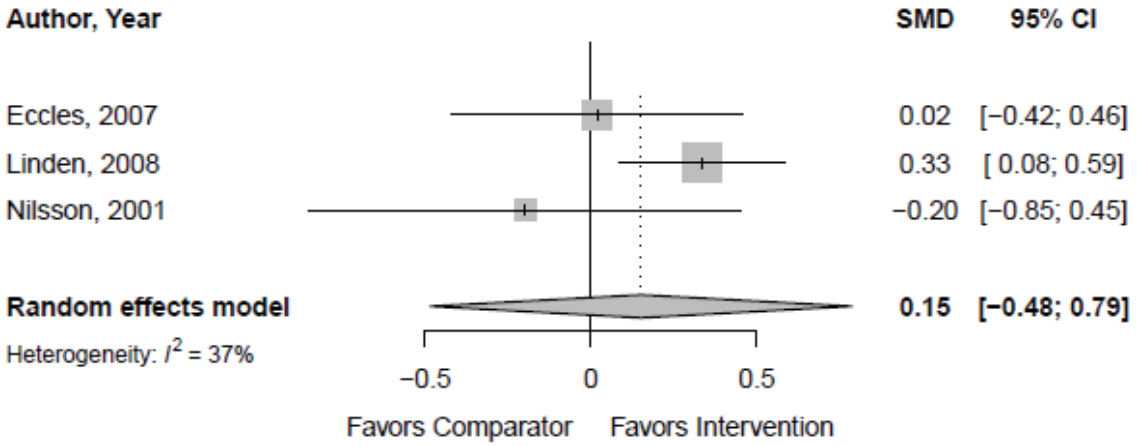
The pooled analysis indicated a statistically significant intervention effect favoring the intervention (OR 1.42; CI 1.04, 1.92; 11 RCTs; I^2 53%). Intervention providers were more likely to prescribe according to clinical practice guidelines. The analysis showed moderate heterogeneity and the direction of effects favored the intervention in all but two studies. The largest effect was found in a study (Callahan et al., 1994) where providers received letters with patients' depression score interviews along with recommended care for the initiation, management, and monitoring of antidepressant medications in elderly patients. This intervention significantly affected the start of antidepressant medication. The follow-up period in this study was six months. There was no indication of publication bias (Begg test p = 0.117; Egger test p = 0.287).

Only two studies were rated as poor, with three studies rated as good, and six studies rated as fair. We performed a sensitivity analysis where we excluded the two studies in the pooled

analyses that were rated as poor quality (Callahan et al., 1994; Lin et al., 2001). Excluding these studies did not change the overall finding, such that intervention providers were more likely to prescribe according to clinical practice guidelines (OR 1.39; CI 1.03, 1.87; 9 RCTs; I^2 46%). We performed an additional sensitivity analysis where we included only the studies rated as good quality (Baker et al., 2001; Rollman et al., 2001; Sinnema et al., 2015). This did not change the point estimate but with only three included studies, the finding was no longer statistically significant (OR 1.38; CI 0.85, 2.23; 3 RCTs; I^2 0%). See Appendix E, Figure E.2.

Three studies with 414 participants reported on the mean difference in improved medication prescribing, including outcomes such as prescribed dosages of specific antidepressants. These studies compared a provider intervention and comparator groups receiving no intervention or participating in interventions not aimed at depression treatment. Follow-up ranged from 12 weeks to 12 months. Study results are shown in Figure 3.6.

Figure 3.6. Mean Difference in Improved Medication Prescribing Compared to Usual Care Practice

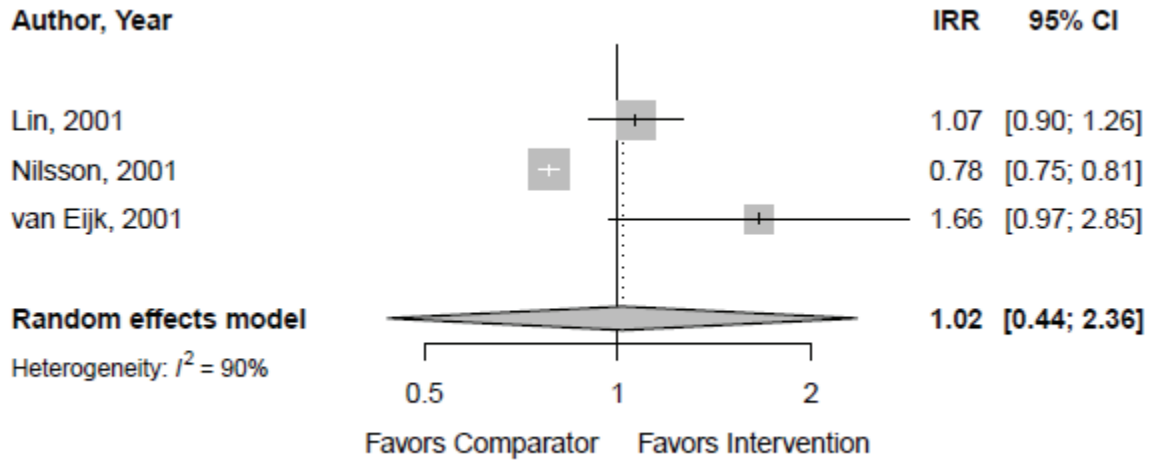


The pooled analysis did not indicate a statistically significant effect (SMD 0.15; CI –0.48, 0.79; 3 RCTs; I^2 37%). The analysis with a small number of small studies detected only negligible heterogeneity, but study results were mixed. One study (Linden et al., 2008), rated as poor quality, favored the intervention at the 12-week follow-up. This study compared a usual care group to an intervention group that received the World Health Organization's depression guidelines, including an educational package; symptom checklist and assessments; pocket-sized information cards and drug reference material; and patient information booklet plus training, plus a day-long seminar on how to use the guidelines.

Three studies reported incidence ratios for the outcome improved medication prescribing. IRRs of improved medication prescribing compared treatment and comparator arms using the rate of defined daily doses per 1,000 patients per year. Comparator groups received no

intervention, non-depression interventions, or a guideline with limited training or tailoring. Follow-up ranged from 4 to 12 months. The results for the individual studies are shown in Figure 3.7.

Figure 3.7. Incidence of Improved Medication Prescribing Compared to Usual Care Practice

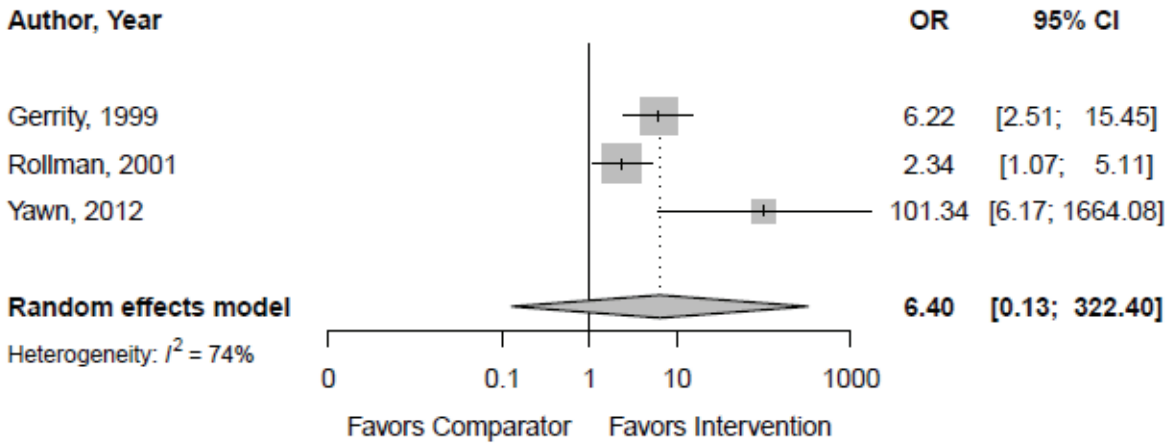


The pooled result did not show a statistically significant difference between intervention and control groups across studies (IRR 1.02; CI 0.44, 2.36; 3 RCTs; I^2 90%), and individual study results varied widely. A study (van Eijk et al., 2001) reporting a positive intervention effect compared a usual care control group to an education plus other components intervention group. The latter received an academic detailing session emphasizing the unique therapeutic difficulties of treating older people and problems of anticholinergic side effects, followed by review of group-based performance during a meeting of a peer review group. Outcomes were assessed at four months. One poor-quality study (Nilsson et al., 2001) with a 12-month follow-up had substantial baseline differences with the effect that the IRR favored the control group although the intervention group showed better results.

Contact with Patients

Three studies with 710 participants reported on the odds of increased patient contacts, comparing provider interventions of education plus other components, education only, and distribution of guidelines to control groups receiving no intervention. Contact with patients was operationalized differently across studies—for example, with an indication of three or more contacts with the usual health care provider or an indication that the provider scheduled a follow-up visit with the patient. Follow-up ranged from six weeks to 12 months. Figure 3.8 documents the results for the studies.

Figure 3.8. Odds of Increased Patient Contacts Compared to Usual Care Practice



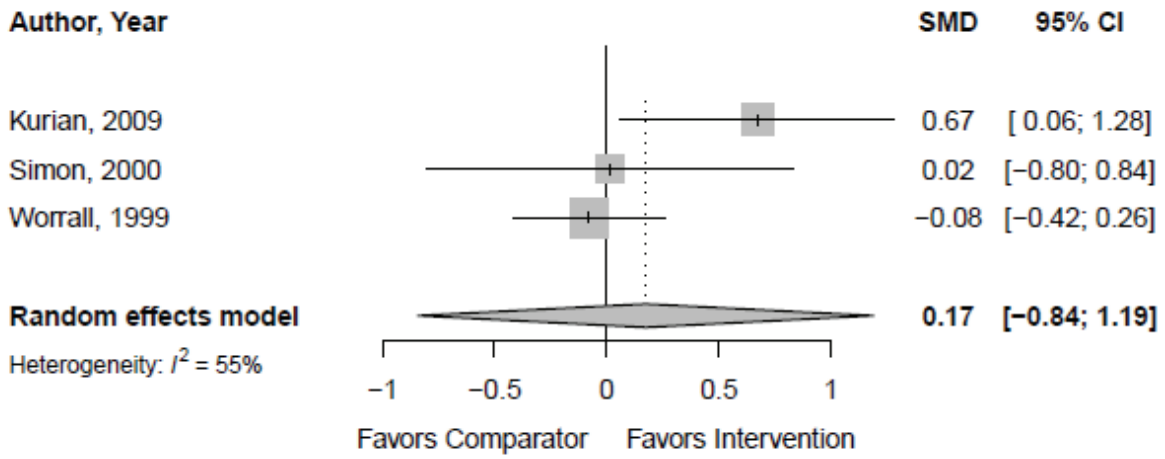
The pooled analysis showed no statistically significant results (OR 6.40; CI 0.13, 322.40; 3 RCTs; I^2 74%) because studies reported very different effect estimates (which increases the confidence interval), but all studies favored the intervention. One study (Yawn et al., 2012) with the largest effect found providers were more likely to follow up with patients as indicated by guidelines. The analysis did not appear to be driven by poor-quality studies, as two studies were rated as fair and one of the studies was rated as good, taking the specified sources of bias into account.

Three studies with 225 participants reported mean differences in contact with patients, such as office visits to the provider. The studies compared education plus other components to comparator groups receiving no intervention or receiving a guideline with no other training or practice component. Follow-up ranged from 12 weeks to six months. Study results are shown in Figure 3.9.

The pooled analysis did not indicate a statistically significant intervention effect (SMD 0.17; CI –0.84, 1.19; 3 RCTs; I^2 55%). Results showed moderate heterogeneity, with one study (Worrall et al., 1999) favoring the comparator (i.e., receipt of clinical practice guidelines without education) at six months follow-up, and one study (Kurian et al., 2009) statistically significantly supporting the intervention at 12 weeks follow-up. This latter study involved training in a computerized decision support system. All three studies were rated as fair quality.

One good-quality study (Sinnema et al., 2015) reported IRR data on the number of provider consultations at six-month follow-up. The intervention group received training and consultations from experts on guidelines that incorporated personal barriers to implementing the guidelines. The comparator group received a one-day training from experts on implementing guidelines but no tailored intervention based on personal barriers to implementation. The study reported a significant effect favoring the intervention (IRR 1.78; CI 1.14, 2.78).

Figure 3.9. Mean Difference in Patient Contacts Compared to Usual Care Practice



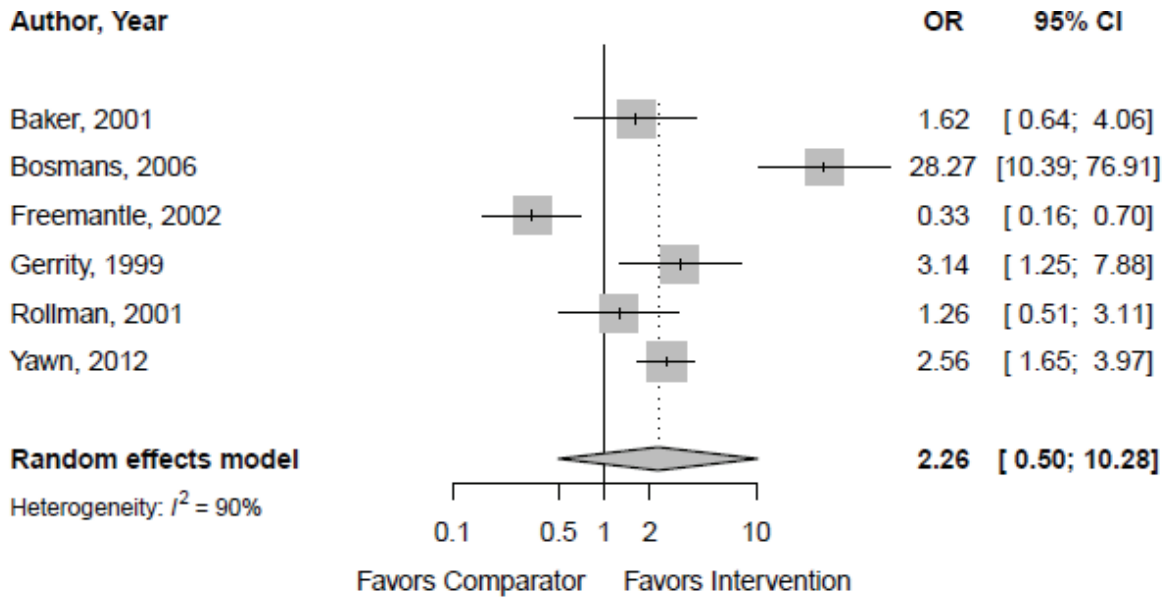
Intervention Adherence

Six studies with 1,375 participants reported on the odds of general adherence to evaluated intervention components compared to a control group. Indicators varied and included patients being treated for a specific recommended time period, the number of providers adhering to the specifications of the guidelines, the number of providers discussing depression with patients, treatment offered to patients, or provider treatment recommendations to patients as advised in the intervention. Interventions included the distribution of guidelines, education only, and education plus other components; study comparators included comparator groups receiving no intervention, participating in interventions not aimed at depression treatment, wait list control, or receiving a guideline with limited training or tailoring. Follow-up was from six weeks to 12 months. Figure 3.10 documents the results for the studies.

The pooled analysis did not indicate a statistically significant intervention effect (OR 2.26; CI 0.50, 10.28; 6 RCTs; I^2 90%). The analysis showed considerable heterogeneity. One study (Freemantle et al., 2002) reported an effect favoring the comparator at six months and the other five studies favored the intervention. One study (Bosmans et al., 2006) reported a large effect of the intervention at 12-month follow-up, where providers attended a training session consisting of education based on the Dutch depression guidelines. This intervention group was compared to a usual care group that was encouraged to practice according to the Dutch depression guidelines, but they were free to deviate as they wished. The study favoring the comparator compared an intervention group that received academic detailing from pharmacists with education messages for two guidelines (one of which was a depression guideline). Comparator providers received similar sessions that focused on non-depression guidelines. All six studies were rated with fair or good quality.

Three studies with 597 participants reported on mean difference in general adherence to the intervention. These studies measured mean adherence to recommendations for the management

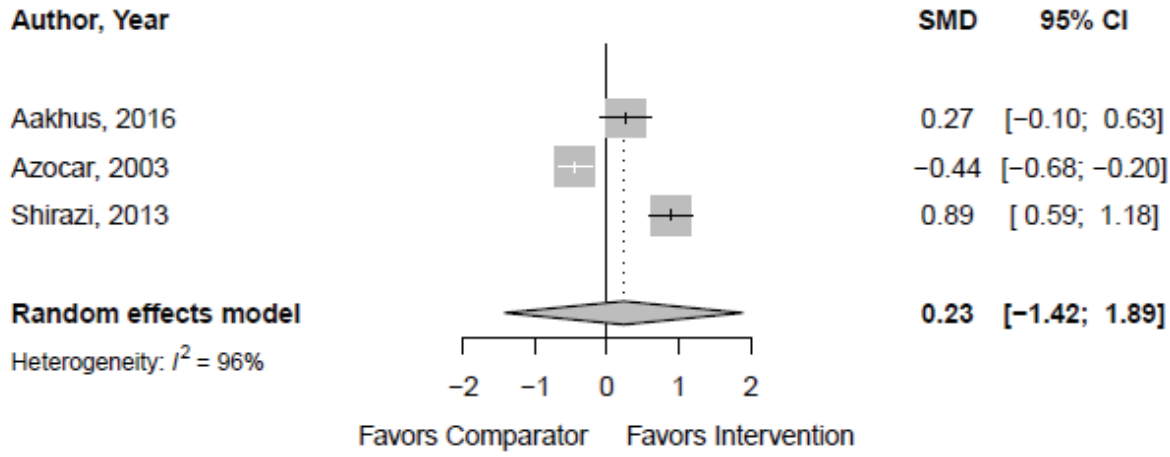
Figure 3.10. Odds of General Adherence to Intervention Compared to Usual Care Practice



of depression, performance scores on appropriate treatment (such as prescription, lab tests, referrals), and a subjective adherence rating. Follow-up was two months to eight months. Studies compared interventions of education plus other components or distribution of guidelines to comparator groups receiving no intervention or receiving a guideline with limited training or tailoring. Figure 3.11 documents the results for the studies.

The pooled analysis did not indicate a statistically significant intervention effect (SMD 0.23; CI –1.42, 1.89; 3 RCTs; I^2 96%), and the wide confidence interval indicated that a pooled estimate is not a meaningful summary of the average treatment effect. The analysis showed considerable heterogeneity, with two studies favoring the intervention (one statistically significantly) and one study (Azocar et al., 2003) favoring the comparator at four-month follow-up. In this study, which

Figure 3.11. Mean Difference in General Intervention Adherence Compared to Usual Care Practice

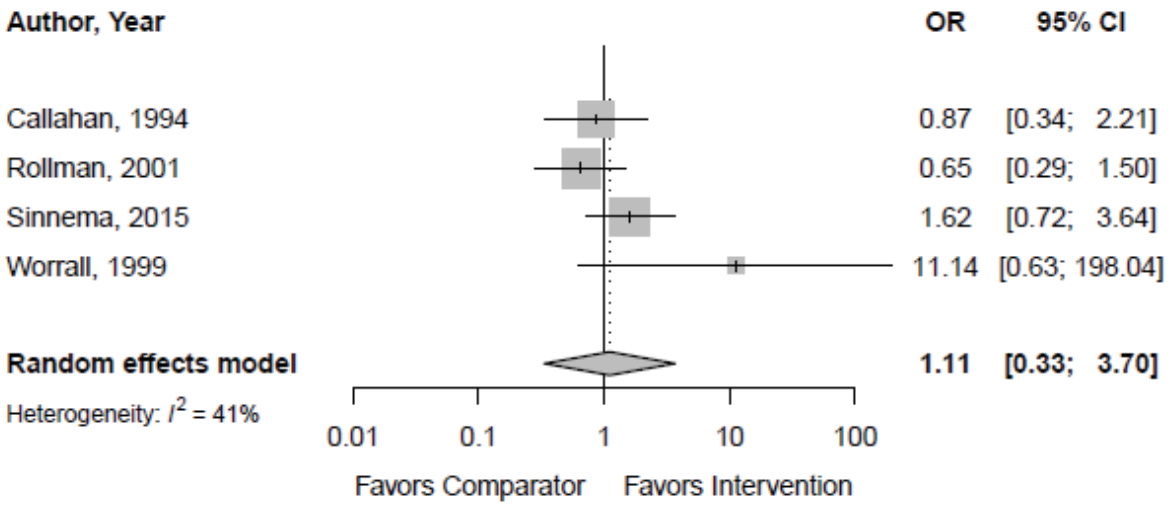


was rated as poor quality, intervention providers were mailed guidelines to target a recently referred patient they had diagnosed with major depression. The other two studies favoring the intervention were rated as good and fair quality. One study (Aakhus et al., 2016) compared a usual care control group to an intervention that included outreach visits to providers with tools to diagnose and manage elderly patients with depression, such as online courses with treatment recommendations. Outcomes were assessed at eight months. The other study (Shirazi et al., 2013) evaluated an intervention group where providers received a two-day continuing medical education course focused on treatment and differential diagnosis of depression disorders. Providers were assigned to either a large or small group format in which education was tailored to their reported stage of change. Providers in the comparator group received education on treatment and diagnosis of depression disorders, but the education was not tailored to stages of change. Outcomes were assessed at two months.

Referral Offered to Patients

Four studies with 896 participants reported on the odds of improved referral offered to patients. These studies compared interventions of distributing guidelines and education plus other components to comparator groups receiving no intervention or receiving a guideline with limited training or tailoring. Referral offered to patients was generally measured by whether or not providers referred patients to mental health specialists. Follow-up was at six months for all studies. Figure 3.12 documents the results for the studies.

Figure 3.12. Odds of Referral Offered to Patients Compared to Usual Care Practice



The pooled analysis did not indicate a systematic intervention effect (OR 1.11; CI 0.33, 3.70; 4 RCTs; I^2 41%). The analysis showed moderate statistical heterogeneity and comparisons showed one study (Worrall et al., 1999) reporting a large effect favoring the intervention at six-month follow-up (but the effect was not statistically significant). The intervention in this

study compared guideline distribution plus a workshop and consultation to receipt of clinical practice guidelines without education. One study (Callahan et al., 1994) with a six-month follow-up was rated as poor quality; the other three were rated as good or fair quality.

Participants with Adverse Events or Unintended Consequences

Only three studies reported on adverse events or unintended consequences of the intervention. One study described adverse drug reactions (Linden et al., 2008) as reported by providers included in the study. The authors concluded that there were no differences in reporting of adverse drug reactions between providers in the intervention group and providers in the control group. Among the full study sample, adverse drug reactions were reported as low, with a mean of 0.02 (SD 0.13) on a scale ranging from 0 (no adverse drug reactions at all) to 3 (three different adverse drug reactions). Another study (Bosmans et al., 2006) described patients' reasons for withdrawal from the study after enrollment. The study reported that three participants died during the course of the study (two in the intervention group, one in the control group) and three participants in the intervention group were too ill to continue participating. One study (Keeley et al., 2014) indicated that no adverse events occurred.

Provider Interventions Compared to Practice Redesign Efforts

This section describes effects of provider interventions compared to practice redesign efforts. The comparator intervention may have a provider component that promotes adherence to evidence-based clinical practice guidelines, but the focus of the control intervention was primarily on efforts to restructure delivery of care; for example, through the introduction of a care manager. As in the comparison to usual care practices, the section describes results across studies using the individual and study-specific indicators of provider adherence to depression guidelines first. After this broad overview, results for individual outcome groups are presented.

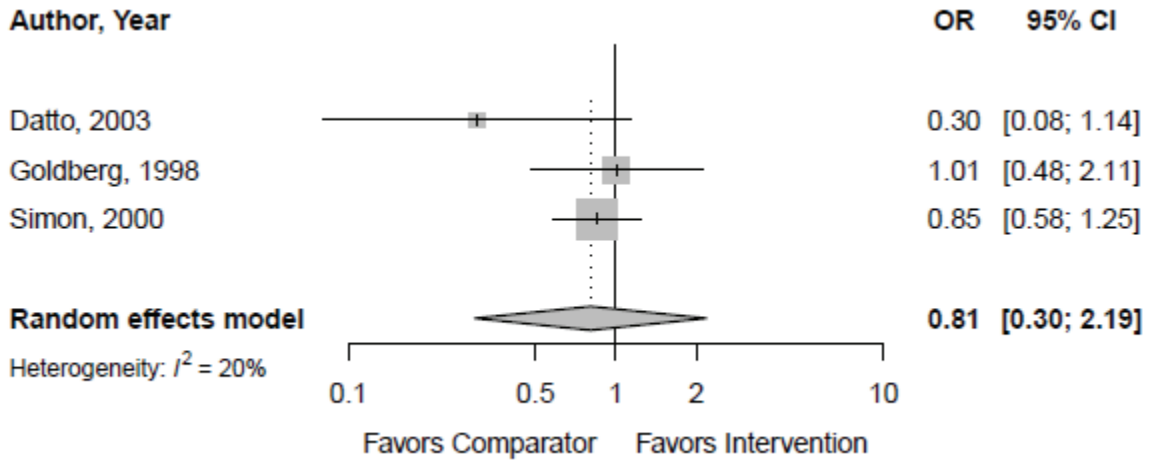
Indication of Provider Adherence to Guidelines

Three studies with 867 participants reported on the odds of achieving provider adherence to a depression guideline, comparing a provider intervention (education plus other components, education only) to comparator groups receiving system redesign involving nurse disease managers and continuous quality improvement teams. Outcomes were specified as improvements in medication prescribing and general adherence to guidelines. Follow-up times ranged from 16 weeks to 12 months. Figure 3.13 documents the study-specific results.

The pooled analysis did not indicate a statistically significant difference between intervention and comparator arms (OR 0.81; CI 0.30, 2.19; 3 RCTs; I^2 20%).

While most studies did not show strong effects and none reported a statistically significant difference, one study (Datto et al., 2003) with 61 participants compared an intervention of provider education and distribution of AHRQ practice guidelines for major depression in primary

Figure 3.13. Odds of Achieving Provider Adherence (Main Indication) Compared to Practice Redesign



care to a system redesign where providers received guidelines and education enhanced with telephone disease management by nurses. This included feedback to providers and nurse-led patient care (e.g., assistance with referral to mental health if needed, teaching coping skills). The provider intervention group received the guidelines and education alone. The outcome was assessed at 16-week follow-up.

Two of the studies in the pooled analysis were rated as fair quality, with one of the studies rated as poor quality. One small, fair-quality study (Simon et al., 2000) with 24 participants reported on mental health visits to the prescribing provider at six-month follow-up. Providers in the intervention group received a detailed report on their patients that contained treatment recommendations on the basis of a computerized algorithm, while the comparator group received this feedback enhanced with care management of patients by care managers who helped to implement the physicians' recommendations. The study did not report a significant effect on the main adherence outcome (SMD 0.07; CI –0.73, 0.87).

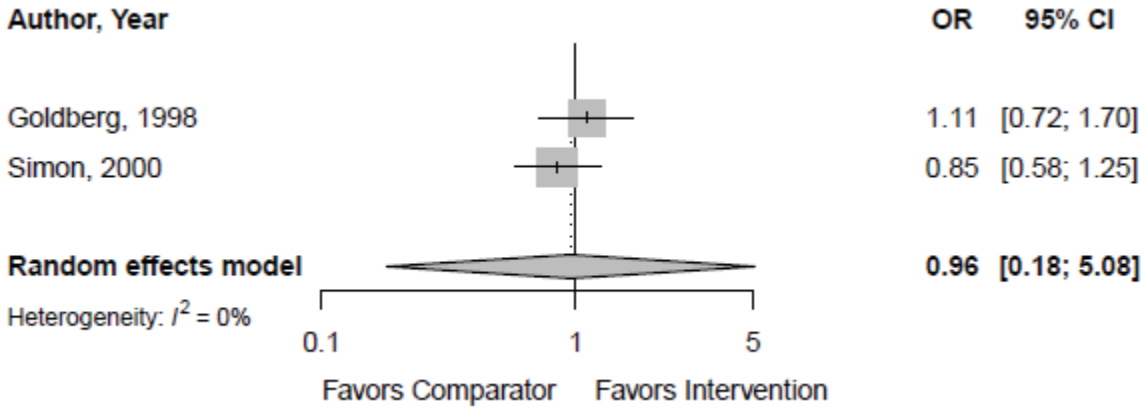
Medication Prescribing

Two studies with 1,738 participants reported on the odds of improved medication prescribing as indicated by outcomes of patients who received an adequate dosage of pharmacotherapy and known depressed patients who received antidepressants as indicated by the guidelines. Follow-up ranged from six to 12 months. Figure 3.14 documents the study-specific results.

The two studies showed conflicting directions of effect and pooled results were not significant (OR 0.96; CI 0.18, 5.08; 2 RCTs; I^2 0%).

The study favoring the comparator (Simon et al., 2000) at six-month follow-up included providers who received a detailed report on their patients that contained treatment recommendations on the basis of a computerized algorithm. The system-redesign group received this feedback enhanced with care management of patients by care managers who helped to implement the physicians' recommendations. The study favoring the intervention group (Goldberg et al., 1998)

Figure 3.14. Odds of Improved Medication Prescribing Compared to Practice Redesign



at 12-month follow-up compared an intervention group that received academic detailing focused on both depression and hypertension. The initial academic detailing was led by opinion leaders and was followed up by additional sessions to review guideline messages and to compare providers' prescribing behavior to peers. The system-redesign comparator included the academic detailing sessions with additional continuous quality improvement team input, where a trained quality improvement manager implemented the intervention, chaired meetings, and provided additional instructions and training to providers. Both studies were rated as fair quality.

Contact with Patients

The only study reporting on contact with patients that compared to a system-redesign effort was the small study mentioned in the previous section (Simon et al., 2000). The study did not report a statistically significant effect on contact with providers (SMD 0.07; CI –0.73, 0.87).

Intervention Adherence

One small, high risk of bias study (Datto et al., 2003) was the only study that reported on a measure of intervention adherence. The result was already included in our main analysis (see main indication, categorical data); the study found no statistically significant difference between interventions (OR 0.30; CI 0.08, 1.14).

Provider Interventions Compared to Other Comparators

One study (Keeley et al., 2014) evaluated an intervention where providers received a copy of the American Psychiatric Association's practice guideline for the treatment of MDD with recommendations about the specific course of treatment and a plan for follow-up visits. The intervention was compared to a provider group that received the guidelines but was additionally trained in motivational interviewing (used to enhance providers' communication style to help depressed patients better discuss their depression symptoms and consider treatment). The outcomes were assessed at 24 months, which represented the longest follow-up time point of all 22 studies included in the review. The main adherence outcome indicated whether prescriptions

for antidepressant medication were filled. The study was rated as good quality and included 171 participants. The direction of effects favored the comparator group but the difference was not statistically significant (OR 0.85; CI 0.43, 1.69). The outcome indicating general adherence to the intervention (whether the provider recommended physical activity to the patient to help manage depression) also did not show a statistically significant difference groups (OR 0.45; CI 0.20, 1.01).

KQ1a. Do the Effects Vary by Type of Intervention?

To answer question KQ1a, we used direct evidence reported in head-to-head trials comparing different provider interventions, meta-regressions for indirect comparisons, and subgroup analyses where indicated.

Comparative Effectiveness

Ten studies compared two provider interventions (Baker et al., 2001; Datto et al., 2003; Goldberg et al., 1998; Keeley et al., 2014; Kurian et al., 2009; Rollman et al., 2001; Simon et al., 2000; Sinnema et al., 2015; Worrall et al., 1999; Shirazi et al., 2013). Three of the studies compared a provider intervention to system redesign (Datto et al., 2003; Goldberg et al., 1998; Keeley et al., 2014); one study compared a provider intervention to another intervention (i.e., motivational interviewing training) (Keeley et al., 2014). These ten studies provided direct comparative effectiveness results for the interventions. All studies reported on unique interventions and comparators. The synthesis concentrates on the main outcome identified for each study, expressed as a dichotomous variable comparing the odds ratio or a continuous variable comparing standardized mean differences, to facilitate a comparison. All assessed outcomes and respective results for the included studies are documented in the evidence table in Appendix C.

A study (Baker et al., 2001) with 378 participants comparing guideline distribution plus tailored implementation recommendations compared to guideline distribution alone reported no statistically significant increased odds of provider adherence at 12-month follow-up (OR 1.62; CI 0.64, 4.06).

A study with 61 participants comparing the effects of distributing guidelines to providers with a system-redesign intervention that included the distribution of guidelines, education, and nurse disease management (Datto et al., 2003) found no statistically significant difference in the odds of achieving provider adherence at 16-week follow-up (OR 0.30; CI 0.08, 1.14).

One study (Goldberg et al., 1998) involving 389 participants compared academic detailing to system redesign involving academic detailing plus continuous quality improvement. The authors found no statistically significant difference in odds of achieving provider adherence at 12-month follow-up (OR 1.01; CI 0.48, 2.11).

A study (Keeley et al., 2014) involving 171 participants compared guideline distribution versus guideline distribution and motivational interviewing training for providers at 24-month

follow-up. The authors found no statistically significant difference in odds of achieving provider adherence (OR 0.85; CI 0.43, 1.69).

A study (Kurian et al., 2009) involving 55 participants compared education plus additional training sessions and hands-on practice with a computerized support decision system to education alone featuring one hour of training on guidelines. The authors reported no statistically significant standardized mean difference in provider adherence between groups (OR 1.17; CI 0.33, 4.19; SMD 0.67; CI 0.06, 1.28). Outcomes were assessed after 12 weeks.

In a study (Simon et al., 2000) with 417 participants and a six-month follow-up period, authors compared a provider group that received patient-specific treatment recommendations to a system-redesign approach where providers received recommendations enhanced with care management designed to help implement the recommendations. Authors reported no statistically significant difference between interventions (OR 0.85; CI 0.58, 1.25; SMD 0.07; CI –0.73, 0.87).

A study (Sinnema et al., 2015) involving 444 participants compared provider training in guidelines plus tailored implementation to provider training alone. Authors reported no statistically significant difference in odds for achieving provider adherence at six-month follow-up (OR 1.07; CI 0.52, 2.19). Study authors reported a significant effect favoring the group that received provider training in guidelines plus tailored implementation for the incidence risk for achieving provider adherence, which was specified in the study as the number of consultations related to anxiety and depressive symptoms after recognition by the provider, as obtained from medical records (IRR 1.78; CI 1.14, 2.78).

A study (Worrall et al., 1999) of 147 participants that compared guideline distribution plus an educational workshop and consultation to guideline distribution alone reported no statistically significant difference in odds of achieving provider adherence (OR 1.25; CI 0.40, 3.90) and no statistically significant standardized mean difference for achieving provider adherence (SMD –0.08; CI –0.42, 0.26) at six-month follow-up.

A study (Shirazi et al., 2013) involving 389 participants compared education plus other components with guidelines and education found a statistically significant mean difference in provider adherence, which was specified in the study as a performance score after providers were visited by standardized patients presenting as individuals with depressive symptoms (SMD 0.89; CI 0.59, 1.18). Outcomes were assessed at two months. The intervention featured a two-day continuing medical education course focused on treatment and differential diagnosis of depression disorders. Providers were assigned to a large or small group in which the education component was tailored to the providers' self-reported stage of change. The comparator group received education on treatment and diagnosis of depression disorders without tailoring to stages of change. The study was rated as fair quality and reported adequate power.

A study comparing passive guideline distribution to active guideline distribution at six-month follow-up in a sample of 138 participants (Rollman et al., 2001) reported no statistically significant difference in odds for achieved provider adherence (OR 1.76; CI 0.64, 4.86).

Indirect Comparisons

Indirect comparisons across studies focused on differences in education only versus other interventions, the difference between unidimensional and multidimensional interventions, and the effect of the intervention's intensity.

A meta-regression investigated whether education-only interventions and interventions that combined education plus other components differed systematically in reported intervention effects. Of note, the analysis did not compare provider interventions with practice redesign analyses (see KQ1); instead, the meta-regression determined whether within the range of eligible provider interventions, those that combined education with other components, such as tailored implementation strategies, reported consistently better results than education-only interventions. The analyses did not indicate that education only interventions systematically reported different effects from interventions with additional components based on the main study outcomes (dichotomous outcome $p = 0.574$, continuous outcome $p = 0.238$). There were insufficient studies for analyses for individual outcomes such as medication prescribing.

A meta-regression comparing unidimensional and multidimensional interventions found no statistically significant effects for dichotomous outcomes ($p = 0.707$) but the equivalent analysis for studies reporting continuous outcomes approached statistical significance ($p = 0.055$). Meta-regressions comparing unidimensional and multidimensional interventions found no statistically significant effects for the odds of medication prescribing ($p = 0.317$) or referral offered to patients ($p = 0.195$).

Using the rated intensity of the intervention, a meta-regression for the dichotomous adherence outcome did not show a systematic effect ($p = 0.973$); however, the analysis of the continuous adherence outcome suggested that the intensity of the intervention is associated with the effect size ($p = 0.033$). The analysis should be interpreted with caution because of the small number of studies contributing to individual intensity categories (only one low-intensity study contributed to this analysis). Meta-regressions for the odds of improved medication prescribing ($p = 0.414$) or general intervention adherence ($p = 0.542$) found no systematic effects.

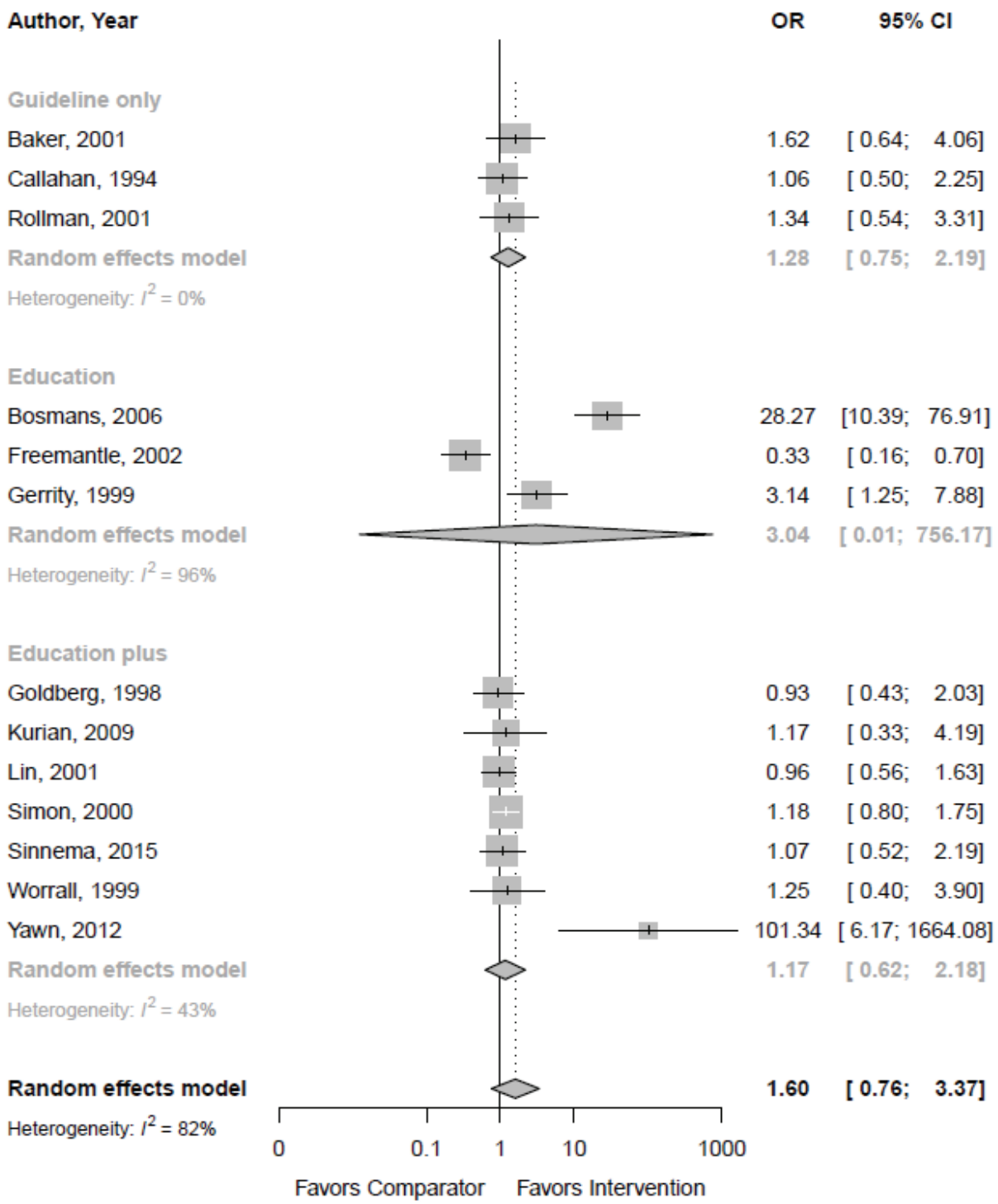
Subgroup Analyses

Following the meta-regression that indicated that the intensity of the intervention may be associated with the intervention effect, we stratified the included studies by those distributing guidelines, studies analyzing the effect of education, and studies that included an education component in addition to other components and provide separate effect estimates for these subgroups.

Indicators of Provider Adherence to Guidelines

Figure 3.15 demonstrates the stratified findings from the dichotomous provider adherence outcomes. All three subgroups still reported no statistically significant differences between the

Figure 3.15. Odds of Achieving Provider Adherence (Main Indication) Compared to Usual Care Practice by Intervention Type



intervention and the comparator groups; however, heterogeneity was substantially reduced in two of the subgroups compared to the main result documented in KQ1 (OR 1.60; CI 0.76, 3.37; I^2 82%). This suggests that the intensity of the intervention is a source of heterogeneity across identified studies that may account for differences in effect estimates across studies.

There was no statistically significant intervention effect in studies that simply distributed treatment guidelines (OR 1.28; CI 0.75, 2.19; 3 RCTs; I^2 0%). All studies favored the intervention arm and there was no indication of heterogeneity, but effects were very small and not statistically significant.

Three studies evaluated an education intervention. The analysis showed considerable heterogeneity and conflicting results: two studies favored the intervention and one study favored the comparator. The wide confidence interval (OR 3.04; CI 0.01, 756.17; I^2 96%) did not indicate that a pooled effect is a meaningful representation of the average effect of education interventions.

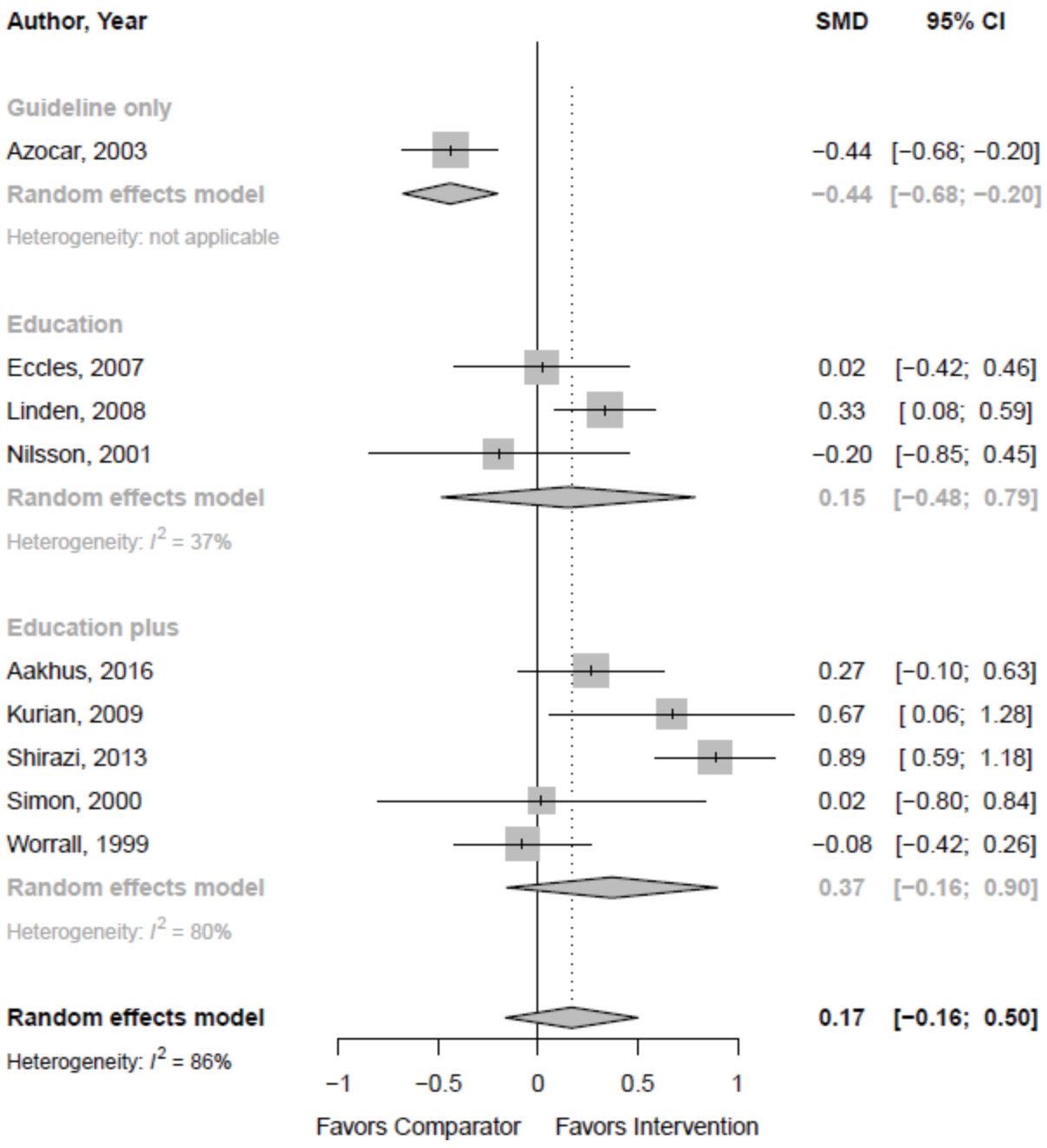
There were seven studies of education plus other components. In terms of direction of effects, five studies favored the intervention and two favored the control group. The subgroup analysis showed negligible heterogeneity. Only one of the individual studies reported a statistically significant difference between groups. The pooled analysis also did not indicate a statistically significant intervention effect (OR 1.17; CI 0.62, 2.18; I^2 43%).

Studies reporting the equivalent outcome based on a continuous variable are shown in Figure 3.16. The visual inspection of the stratified forest plot indicated a trend toward larger intervention effects with increasing intensity of the intervention. However, results in all subgroups did not show a statistically significant intervention effect. Subgroup analyses also showed reduced heterogeneity compared to the main results as reported in KQ1 (SMD 0.17; CI –0.16, 0.50; I^2 86%).

The figure shows one study of guideline distribution and that study reported a statistically significant effect favoring the control group (SMD –0.44; CI –0.68, –0.20). In this study (Azocar et al., 2003), intervention providers received treatment guidelines tailored to a recently referred patient. The comparator group was not mailed guidelines and received delivered care under usual care practices. The study's risk of bias was rated as high. A potential explanation as to why providers in the no guideline condition performed better may be related to the outcome. The provider behavior measure was a rating scale where providers rated themselves on adherence to guidelines. The measure asked providers whether or not they assessed patients' medical and psychiatric comorbidities, provided psychoeducation, provided treatment options and requested treatment consent, and gathered collateral information from other clinicians. Study authors suggested that receiving the guideline may have prompted providers' awareness that they were not practicing according to evidence-based guidelines. Providers who had not received the guidelines may have incorrectly assumed they were practicing according to the behaviors assessed in the scale.

The three studies evaluating education interventions showed different results. The pooled analysis did not indicate a systematic intervention effect (SMD 0.15; CI –0.48, 0.79; I^2 37%). Two studies (Eccles et al., 2007; Linden et al., 2008) with 12-month and 12-week follow-up periods, respectively, favored the intervention and one (Nilsson et al., 2001) favored the comparator. There was negligible statistical heterogeneity but the pooled effect showed a wide confidence interval, suggesting that the studies are difficult to compare and that the pooled effect

Figure 3.16. Mean Difference in Achieved Provider Adherence (Main Indication) Compared to Usual Practice by Intervention Type



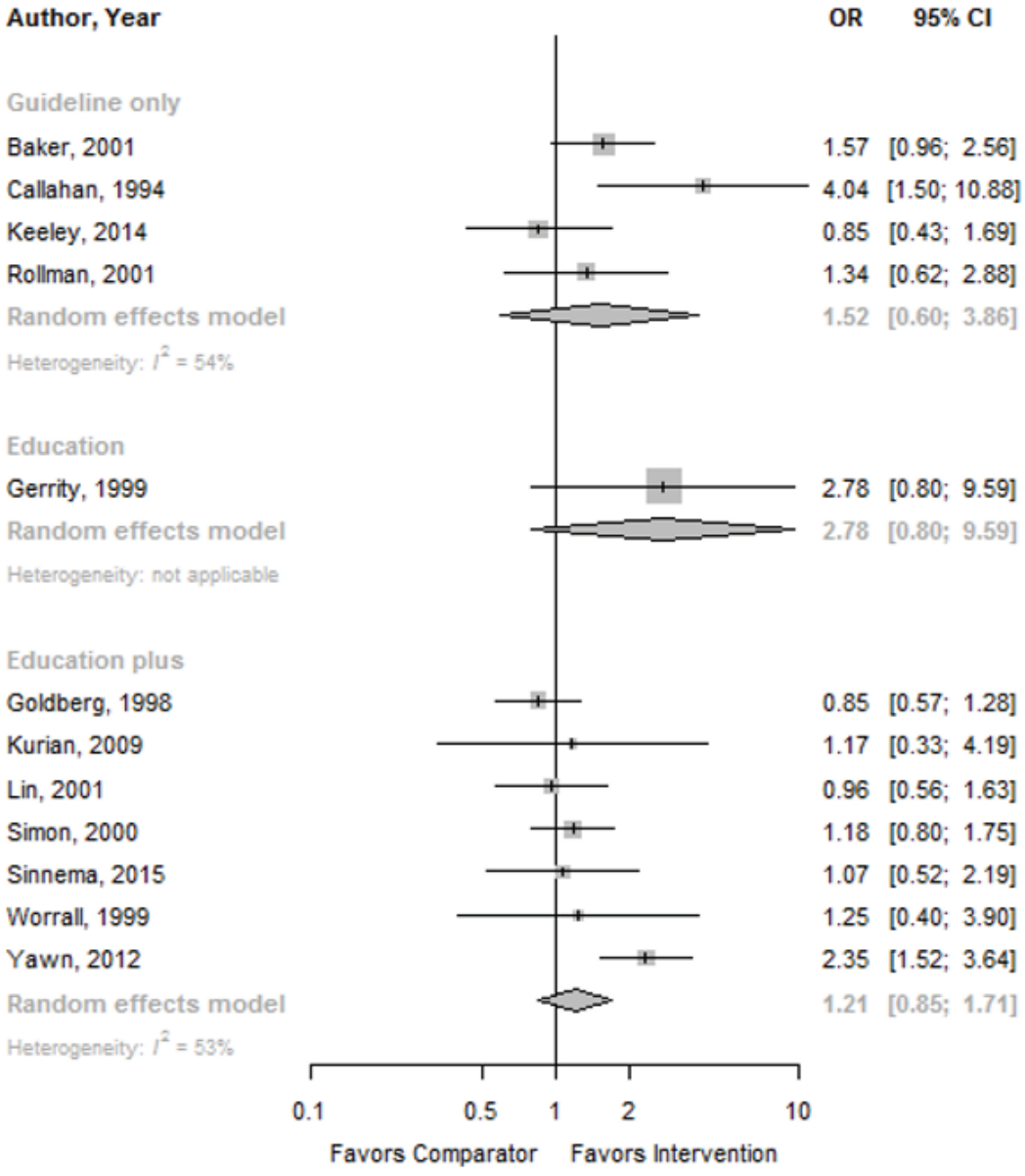
is not a meaningful estimate of the average intervention effect. Two of the three studies were rated as high risk of bias.

There were five studies of education plus other components. Though results did not indicate a statistically significant intervention effect (SMD 0.37; CI –0.16, 0.90; I^2 80%), the direction of effects in all but one study (Worrall et al., 1999) favored the intervention at a six-month follow-up point. Heterogeneity was reduced compared to the main analysis but was still considerable.

Medication Prescribing

Studies reporting on the odds of improved medication prescribing are shown in Figure 3.17.

Figure 3.17. Odds of Improved Medication Prescribing Compared to Usual Care Practice by Intervention Type



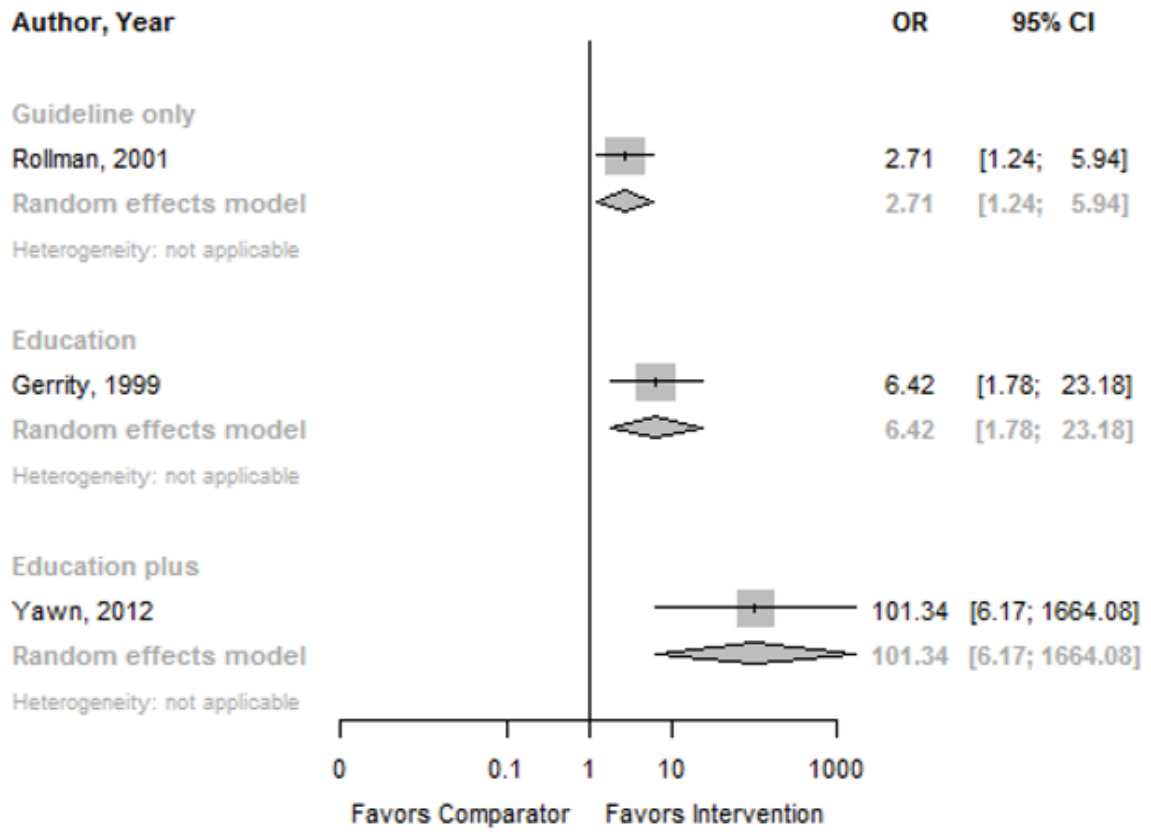
The visual inspection of the stratified forest plot indicated a trend toward larger intervention effects with increasing intensity of the intervention in all subgroups; however, each of the subgroups did not show a statistically significant intervention effect: guideline only (OR 1.52; CI 0.60, 3.86), education (OR 2.78; CI 0.80, 9.59), and education plus (OR 1.21; CI 0.85, 1.71.

For the continuous outcome of improved medication prescribing, there were no studies on guidelines only or education plus other components; thus, we do not present the forest plot here.

Contact with Patients

Subgroup results for increased contact with patients as specified by depression guidelines are shown in Figure 3.18.

Figure 3.18. Odds of Increased Provider Contact with Patient Compared to Usual Care Practice by Intervention Type



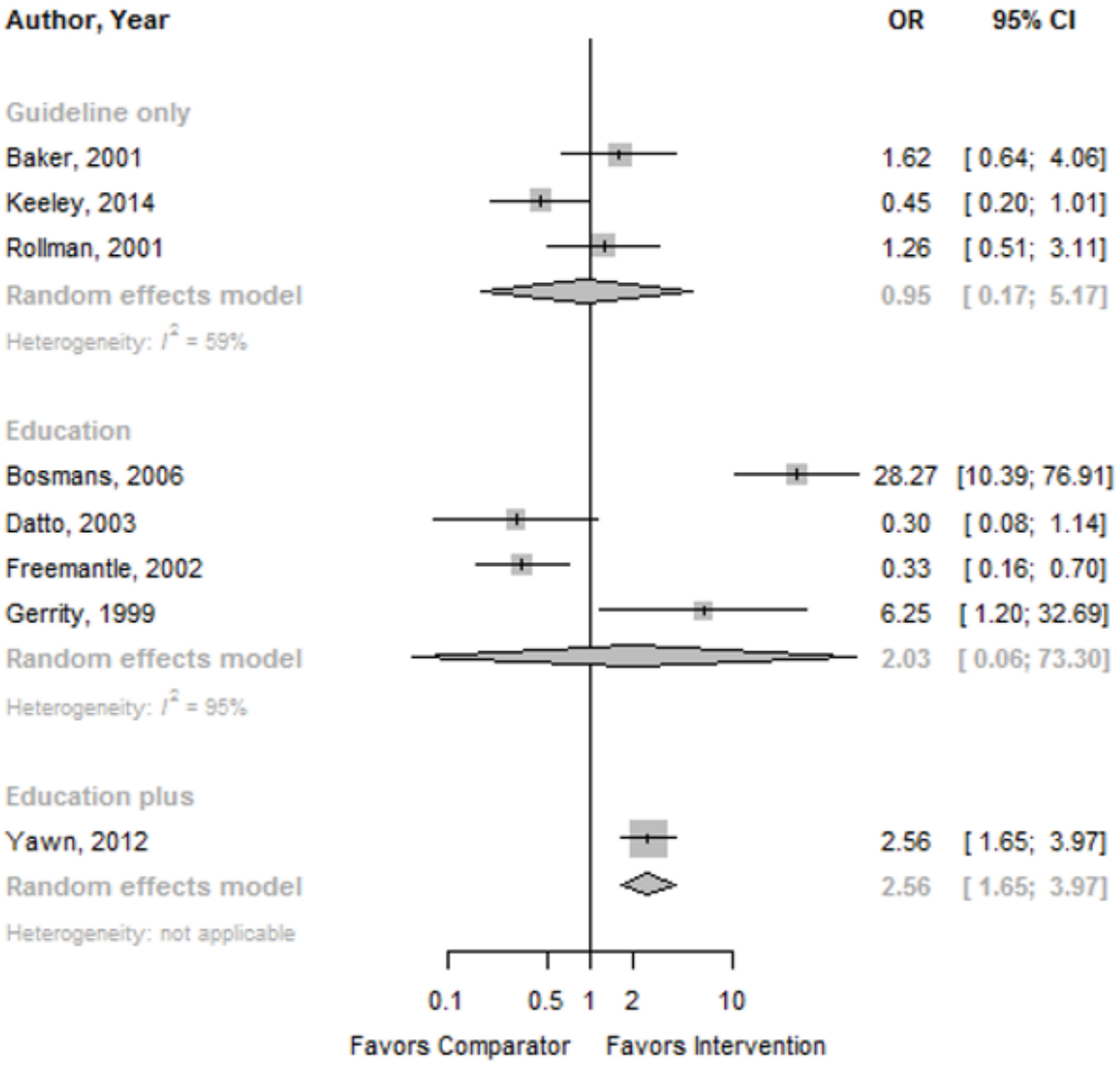
Each category includes a single study and each one shows positive effects: guideline only (OR 2.71; CI 1.24, 5.94), education (OR 6.42; CI 1.78, 23.18), and education plus (OR 101.34; CI 6.17, 1664.08). As described in the main analysis, pooled across studies the synthesis is not statistically significant because the individual effect estimates differ substantially, which suggests a distribution with a wide confidence interval.

For the continuous outcome of increased provider contact, there were no studies on guidelines only or education; thus, we do not present the forest plot here.

Intervention Adherence

Studies reporting on improved adherence to the intervention are shown in Figure 3.19. The visual inspection of the stratified forest plot indicated a trend toward larger intervention effects with increasing intensity of the intervention. The education plus subgroup demonstrated a statistically significant intervention effect (OR 2.56; CI 1.65, 3.97) but it was based on a single study (Yawn et al., 2012). Neither guideline only (OR 0.95; CI 0.17, 5.17) nor education

Figure 3.19. Odds of Improved General Adherence to the Intervention Compared to Usual Care Practice by Intervention Type



(OR 2.03; CI 0.06, 73.30) showed a systematic difference between intervention and control group.

We did not identify education-only studies reporting on a continuous outcome of improved general adherence to the intervention; hence, we do not present the subgroup forest plot here.

We did not identify sufficient studies reporting on referrals offered to patient to allow subgroup analyses.

KQ1b. Do the Effects Vary by Type of Provider Targeted by the Intervention?

To answer question KQ1b, we used direct evidence reported in head-to-head trials comparing different provider types targeted by the intervention, meta-regressions for indirect comparisons, and subgroup analyses where indicated.

Comparative Effectiveness

We did not identify any studies directly comparing effects for different types of health care providers.

Indirect Comparisons

To assess whether effects varied by type of provider, we indirectly compared the 20 interventions that targeted single providers and the two studies that targeted a team of providers. For the dichotomous adherence outcome, 12 studies of single providers contributed data to analysis. Only one of these team studies (Yawn et al., 2012) contributed data to analyses; the other (van Eijk et al., 2001) did not have a dichotomous provider adherence outcome that could be pooled. A meta-regression indicated that the intervention effect systematically varied by the type of provider targeted ($p = 0.034$). However, the analysis should be interpreted with caution because only one of the team studies contributed data to this. The team study (Yawn et al., 2012) involved a practice-based training program for depression treatment in postpartum mothers with outcomes assessed at 12 months. Providers in each practice, which consisted of a lead physician and a member of the nursing staff, were provided with education and a set of tools to facilitate diagnosis, follow-up, and management of postpartum depression. Control group practices engaged in usual care with an additional 30-minute presentation about postpartum depression. Furthermore, the effect was not replicated in an analysis based on IRR data that compared the other team intervention (van Eijk et al., 2001) with the three sole provider interventions that had count outcomes ($p = 0.352$).

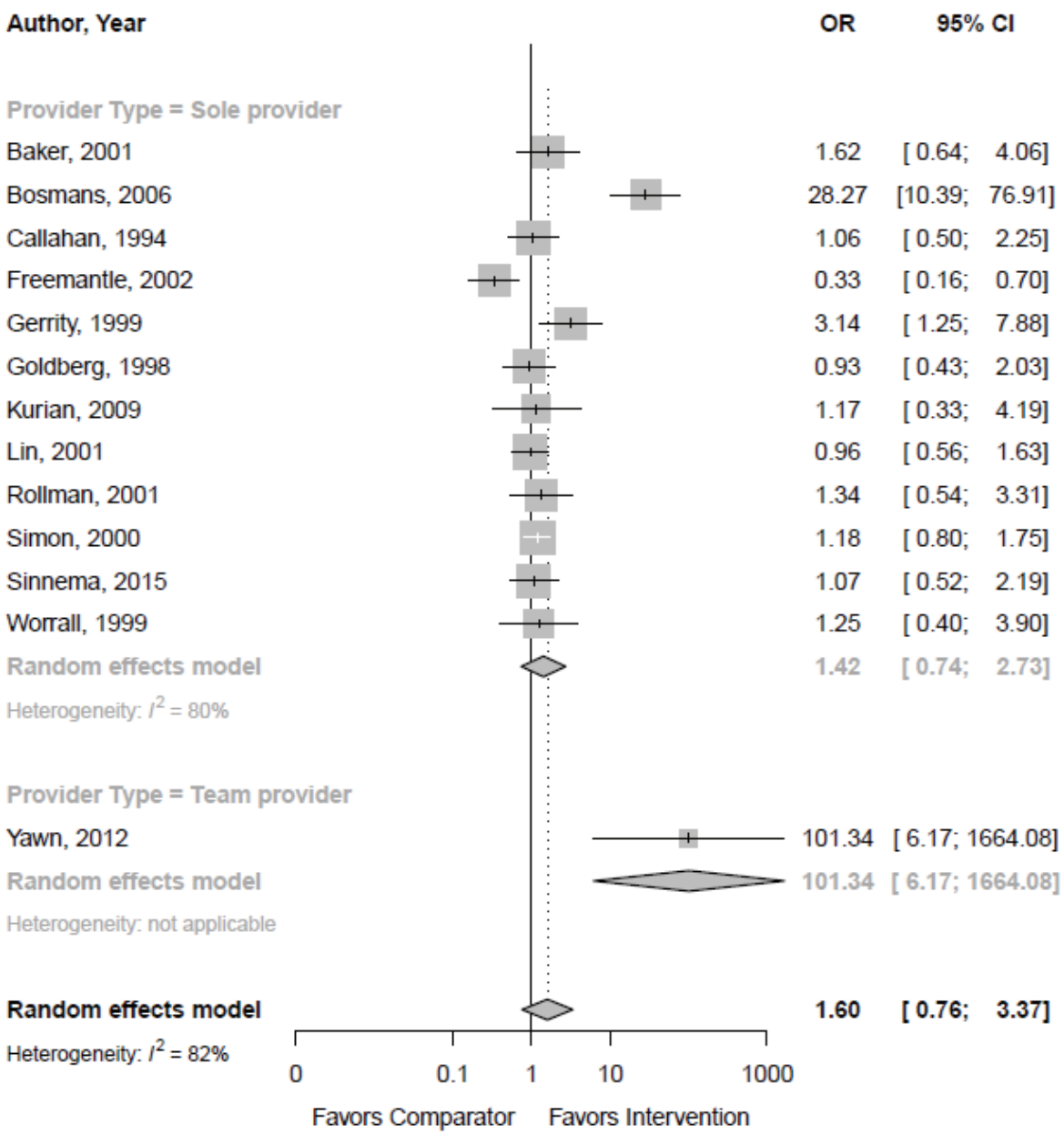
Subgroup Analyses

Following the meta-regression that indicated that the type of provider may be associated with the effect size, we stratified the results by interventions on single providers versus teams of

providers (Figure 3.20). Stratification did not change the results; however, heterogeneity was greatly reduced in two of the subgroups compared to the main result documented in KQ1 (OR 1.60; CI 0.76, 3.37; I^2 82%). This suggests that the type of provider intervention is a source of heterogeneity across studies.

Studies of interventions that targeted single providers did not report a statistically significant intervention effect (OR 1.42; CI 0.74, 2.73; 12 RCTs; I^2 80%). The analysis showed considerable

Figure 3.20. Provider Type, Odds of Achieving Provider Adherence (Main Indication, Categorical Data)



heterogeneity, and studies reported conflicting results. One study (Bosmans et al., 2006) reported a large effect favoring the intervention at 12 months. Providers in the intervention condition received training in the Dutch depression guidelines, whereas providers in the control condition did not receive the training.

One study (Yawn et al., 2012) compared a team intervention to a control. The effect was significant in favor of the intervention group at 12-month follow-up (OR 101.34, CI 6.17, 1664.08). In this study, physicians and nursing staff received a practice-based training program and tools for managing depression in postpartum mothers, while the control group received a brief presentation about postpartum depression.

Given that only one study was available to serve as comparator, we did not stratify the sample further by computing effects for individual outcomes.

KQ1c. Do Effects Vary by Setting?

We did not identify any studies directly comparing the effects of the setting.

To assess whether effects varied by setting, we indirectly compared the two studies conducted in specialty care settings with 20 studies conducted in primary care settings (specific settings are listed in Appendix C). Both specialty care setting studies only had continuous adherence outcomes (i.e., no categorical) and seven of the primary care setting studies had continuous outcomes. A meta-regression on the nine studies with continuous adherence outcome did not suggest any systematic effects of the setting ($p = 0.385$) but the result should be interpreted with caution as only two studies provided data on specialty care settings. The analysis is unlikely to have sufficient statistical power to detect a systematic effect across settings. There were insufficient studies for the equivalent categorical outcome analysis.

KQ1d. Are Effects on Providers Associated with Patient Outcomes?

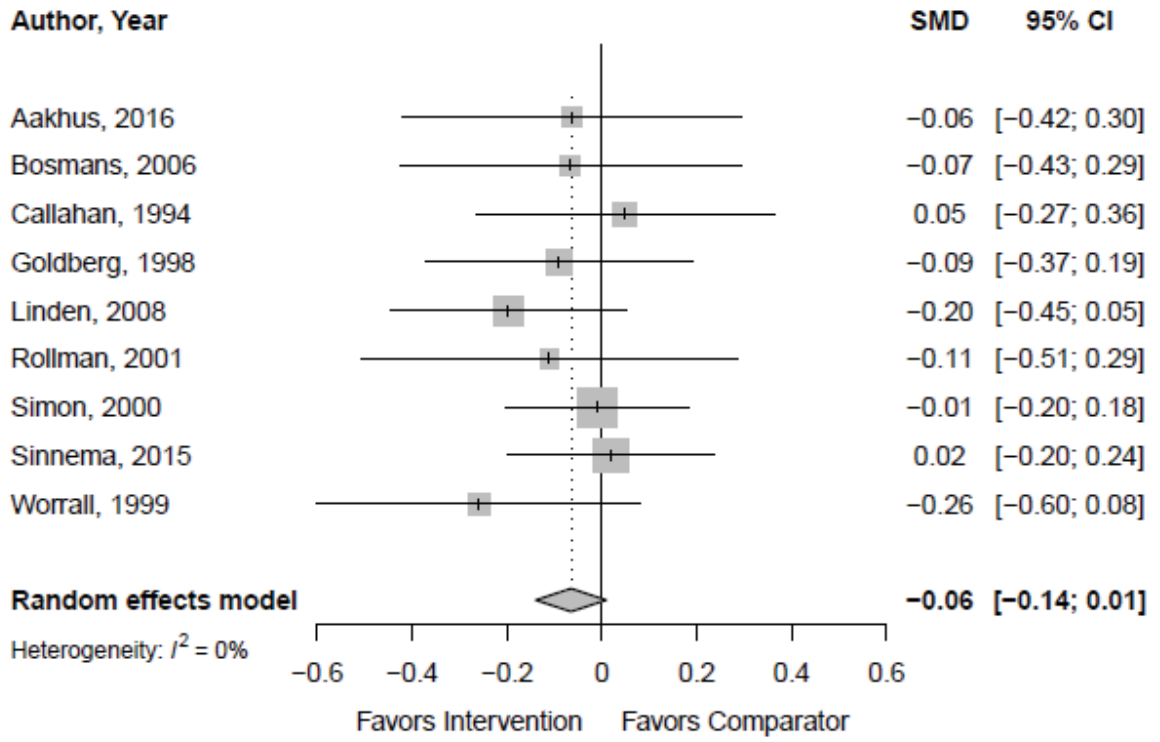
We found 14 studies that reported patient outcomes. Studies reported depression rating scale scores, depression treatment response (i.e., proportion of patients with improvement, including remission), depression recovery (i.e., proportion of patients in remission/not meeting depression criteria at follow-up), and treatment adherence (e.g., medication adherence). We differentiate studies comparing to usual care practice, to practice redesign efforts, or to other comparators.

Provider Interventions Compared to Usual Care Practice

This section describes the effects of provider interventions compared to either no intervention, comparator arms that were described as usual care by study authors, control conditions that were similar to usual care in that they only described the (passive) distribution of clinical guidelines to providers, or interventions with control groups such as providers receiving training in a non-depression-focused guideline.

Nine studies with 2,196 participants reported on the mean difference in patient depression rating scales. These studies compared interventions of education plus other components, education only, and distribution of guidelines to comparators of no intervention (seven studies) or less intensive guideline distribution that did not include education or tailoring. Outcomes were generally specified by a standardized patient self-report depression scale. These included the HRSD (Hamilton, 1960), the CES-D (Radloff, 1977), the Hopkins Symptom Checklist (HSCL) (Derogatis et al., 1974), the Montgomery-Åsberg Depression Rating Scale (Montgomery and Asberg, 1979), the Hospital Anxiety and Depression Scale (Snaith, 2003), the Symptom Checklist (SCL) Core Depression Scale (Magnusson Hanson et al., 2014), and the Four-Dimensional Symptom Questionnaire (Terluin et al., 2006). One study used a provider-rated depression rating scale. Follow-up ranged from 6 to 12 months. Figure 3.21 documents the study results.

Figure 3.21. Mean Difference in Depression Rating Scales Compared to Usual Care

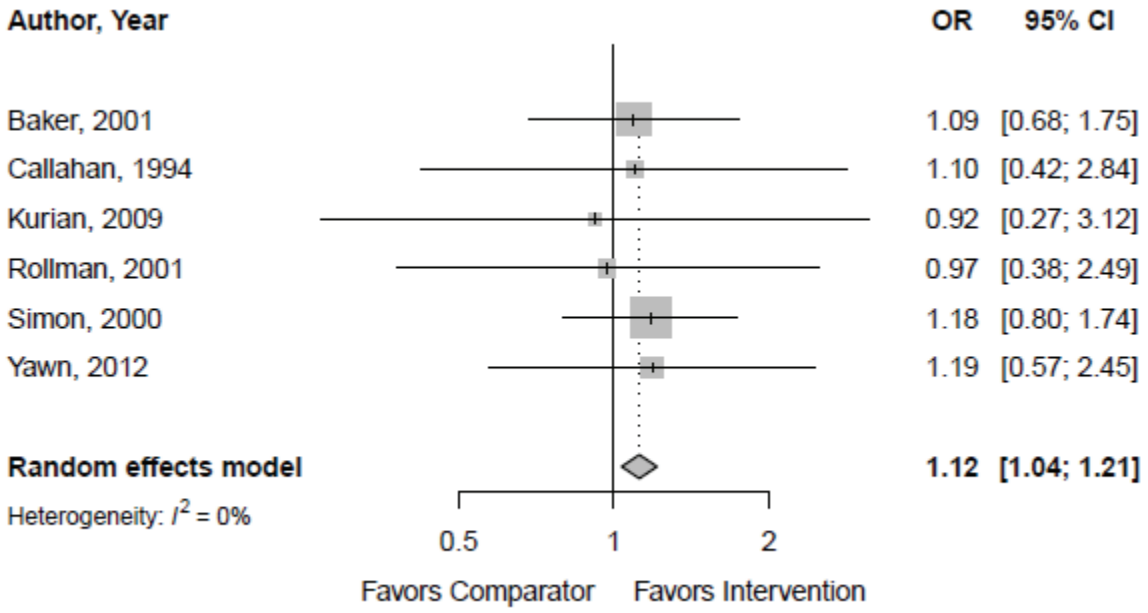


A pooled analysis of the patient depression rating scale did not indicate a statistically significant intervention effect (SMD –0.06; CI –0.14, 0.01; 9 RCTs; I^2 0%). The analysis detected no heterogeneity, and inspection of the forest plot indicated that all but two studies favored the intervention. Risk of bias was mixed; four of the studies were rated as good quality, three as fair quality, and two as poor quality.

Six studies with 1,312 participants reported on a depression treatment response outcome that was indicated by improvements in depression rating scales such as proportion of patients

showing a score less than 11 on the Beck Depression Inventory (BDI) (Beck et al., 1961) or the proportion of patients with at least a 50-percent reduction in CES-D scores. These studies compared interventions of education plus other components and distribution of guidelines to comparators of no intervention or less intensive guideline distribution that did not include education or tailoring. Follow-up ranged from 12 weeks to 12 months. Figure 3.22 documents the results for the identified studies.

Figure 3.22. Odds of Depression Treatment Response Compared to Usual Care

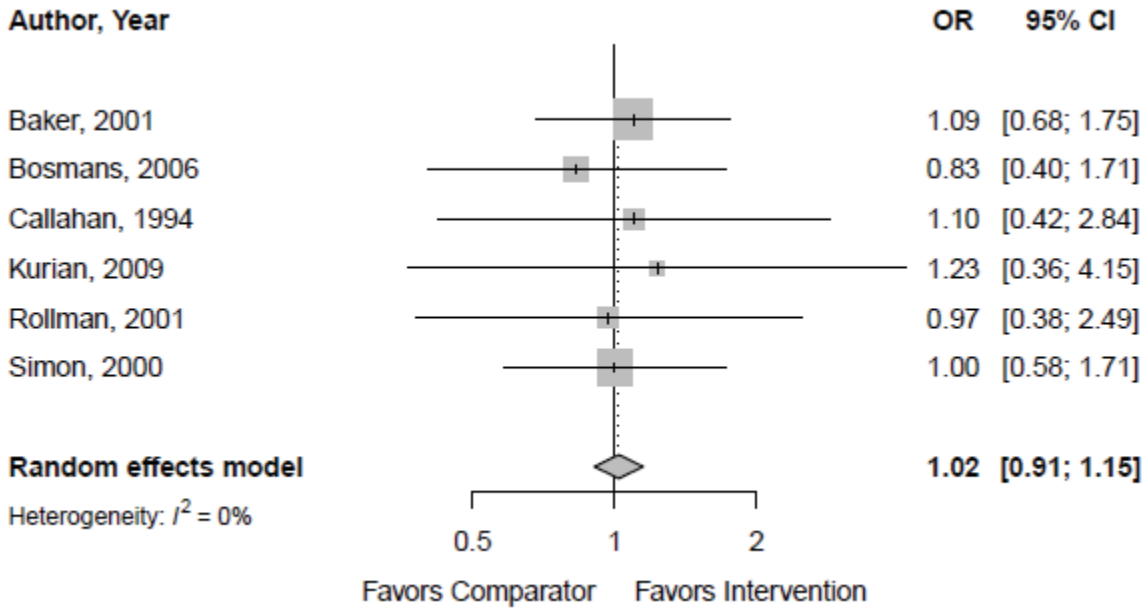


The pooled analysis indicated a statistically significant intervention effect (OR 1.12; CI 1.04, 1.21; 6 RCTs; I^2 0%). The analysis detected no heterogeneity, and inspection of the forest plots showed that all but two studies favored the intervention. One study (Kurian et al., 2009) favoring the comparator at 12 weeks included a comparator group featuring usual care that included initial one-hour training on guidelines; the intervention group received more intensive guideline training, such as an introductory teleconference followed by an on-site training session with hands-on practice using a computerized decision support system. The other study (Rollman et al., 2001) included providers who received a detailed report on their patients with targeted treatment recommendations based on a computerized algorithm compared to usual care practice with no additional services. Outcomes were assessed at six months. One of the interventions was rated as poor quality, while two were rated as good, and three were rated as fair. There was no indication of publication bias (Begg test p = 0.910; Egger test p = 0.110).

Six studies with 1,274 participants reported on patient recovery from depression, defined by proportions of patients that no longer met depression criteria at follow-up or rates of symptom improvement in depression rating scales below a threshold for meeting depression criteria. The

studies compared interventions of education plus other components, education only, and distribution of guidelines to comparators of no intervention or less intensive guideline distribution that did not include education or tailoring. Follow-up ranged from 12 weeks to six months. Figure 3.23 documents the study-specific results.

Figure 3.23. Odds of Depression Recovery Compared to Usual Care



The pooled analysis did not indicate a statistically significant effect (OR 1.02; CI 0.91, 1.15; 6 RCTs; I^2 0%). The analysis detected no heterogeneity, and inspection of the forest plots indicated all but two studies favored the intervention. One of the interventions was rated as poor quality; three were rated as good, and two were rated as fair.

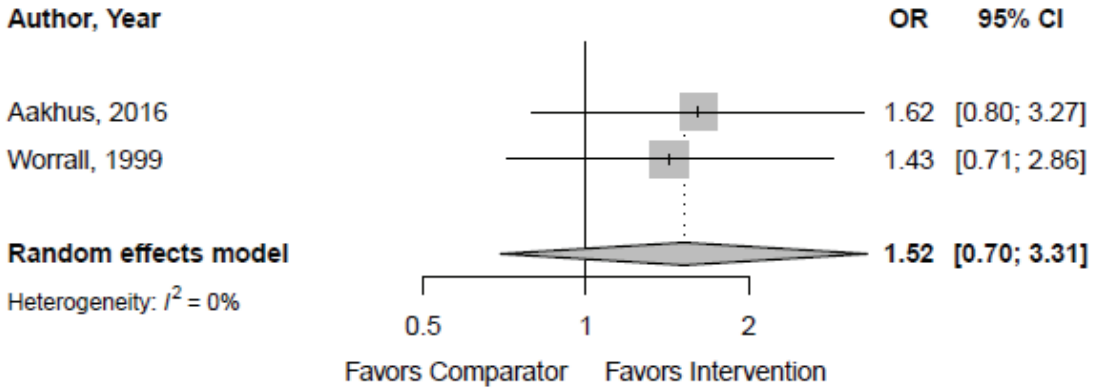
Two studies involving 281 participants reported on patient treatment adherence as indicated by the proportion of patients who took prescribed antidepressants as indicated. The studies compared interventions of education plus other components to comparators of no intervention or less intensive guideline distribution that did not include education or tailoring. Follow-up ranged from six to eight months. Figure 3.24 documents the study-specific results.

The pooled analysis across the two studies did not indicate a statistically significant effect (OR 1.52; CI 0.70, 3.31; 2 RCTs; I^2 0%). Both studies favored the intervention. One of the studies was rated as fair quality and one was rated as good quality.

Provider Interventions Compared to Practice Redesign Efforts

This section describes effects of provider interventions compared to practice redesign efforts. The comparator intervention may still have a provider component that promotes adherence to

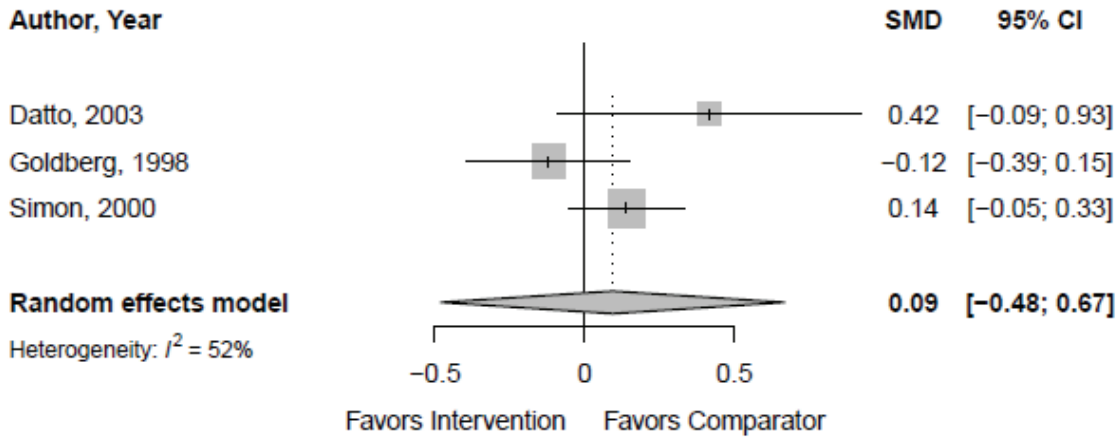
Figure 3.24. Odds of Patient Depression Treatment Adherence Compared to Usual Care



clinical practice guidelines, but the focus of the control intervention was primarily on efforts to restructure the delivery of care; for example, through the introduction of a care manager.

Three studies with 861 participants reported on the mean difference in patient depression rating scales as specified by the CES-D scale, the HSCL, and the SCL. These studies compared a provider intervention (education plus other components, education only) to comparator groups receiving system redesign involving nurse disease managers and continuous quality improvement teams. Follow-up ranged from 16 weeks to 12 months. Figure 3.25 documents the results for the studies.

Figure 3.25. Mean Difference in Depression Rating Scales Compared to Practice Redesign

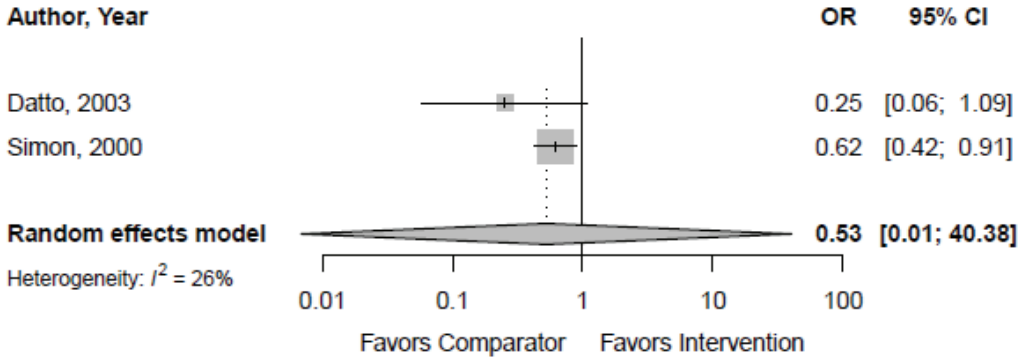


The pooled analysis did not indicate a statistically significant intervention effect (SMD 0.09; CI –0.48, 0.67; 3 RCTs; I^2 52%). The inspection of the forest plots showed that two studies favored the comparator group and one study favored the intervention group. The study favoring the intervention group (Goldberg et al., 1998) was rated as fair quality and compared an intervention group that received academic detailing and follow-up sessions to review guideline messages and compare providers' prescribing behavior to peers. The system-redesign

comparator included the academic detailing sessions with additional continuous quality improvement teams. Outcomes were assessed at 12 months. The two studies favoring the comparator group were rated as fair (Simon et al., 2000) and poor quality (Datto et al., 2003), with the latter study comparing an intervention group that received guidelines and education, while the comparator group received telephone disease management by nurses in addition to the guidelines and education. Outcomes were assessed at six months and 16 weeks, respectively.

Two studies with 478 participants reported on improvements on depression rating scales also at six months and 16 weeks, respectively. These studies compared interventions of education with or without other components to system redesign in the form of care management. Figure 3.26 documents the results for the studies.

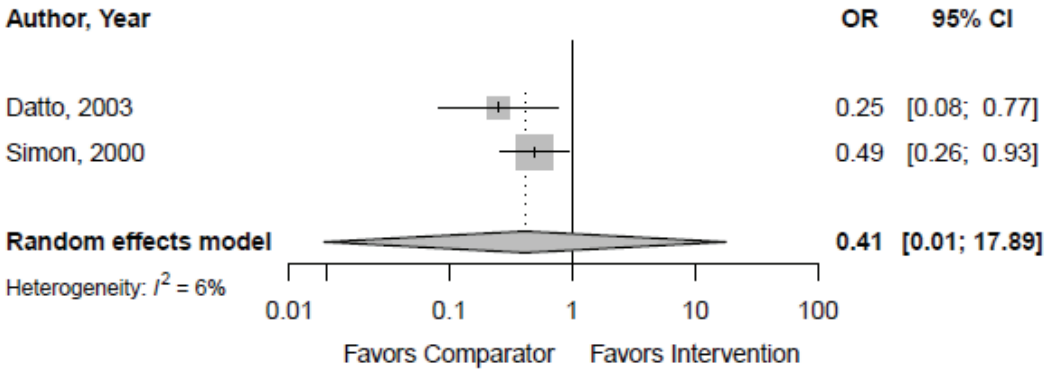
Figure 3.26. Odds of Depression Treatment Response Compared to Practice Redesign



The pooled analysis across the two studies did not indicate a statistically significant effect (OR 0.53; CI 0.01, 40.38; 2 RCTs; I^2 26%). The analysis detected negligible heterogeneity and both studies favored the comparator group. One study (Datto et al., 2003) that was rated as poor quality compared an intervention group that received guidelines and education to a system-redesign comparator group that received telephone disease management by nurses in addition to the guidelines and education. The outcome was assessed at 16-week follow-up. The other study (Simon et al., 2000) was rated as fair quality and compared an intervention group that received a detailed report on their patients with treatment recommendations to a system-redesign comparator group that received this feedback enhanced with care management of patients. The outcomes were assessed at six-month follow-up.

Two studies with 478 participants reported on patient depression recovery as specified by outcomes of proportions of patients that no longer met depression criteria at six-month follow-up or rates of symptoms improvement on the CES-D that fell below the threshold for meeting depression criteria at 16 weeks' follow-up. These studies compared interventions of education plus other components and education only to comparator groups receiving system redesign in the form of care management from the nontargeted providers. Figure 3.27 documents the results for the studies.

Figure 3.27. Odds of Depression Recovery Compared to Practice Redesign



Both studies favored the comparator. However, the reported size of the intervention effect in the two observations varied, and, consequently, the pooled analysis showed a wide confidence interval (OR 0.41; CI 0.01, 17.89; 2 RCTs; I^2 6%). One of the studies (Datto et al., 2003), rated as high risk of bias, compared an intervention group that received guidelines and education to a comparator group combining system redesign, guidelines, and education, and enhanced by telephone disease management by nurses. The outcome was assessed at a 16-week follow-up. The other study (Simon et al., 2000) was rated as fair quality and compared an intervention group that received detailed patient reports with treatment recommendations to a comparator group that combined system redesign with performance feedback and care management (outcome assessed at six months).

One of the studies (Datto et al., 2003) reported whether patients followed the treatment recommendations of their providers with respect to initiating treatment by taking medications. The difference was not statistically significant (OR 0.16; CI 0.02, 1.39).

Provider Interventions Compared to Other Interventions

One study (Keeley et al., 2014) compared a provider intervention to a comparator that was neither usual care practice nor system redesign. This study compared an intervention group where providers received a copy of the APA's Practice Guideline for the Treatment of MDD with recommendations about a specific course of treatment and plan for follow-up visits compared to a comparator group that received the guidelines and additional training in motivational interviewing to enhance providers' interviewing techniques with depressed patients. This study reported on patient treatment adherence both as a dichotomous (i.e., whether patient filled prescription) and a continuous outcome (i.e., days physically active in past week). The study was rated as good quality, included 171 participants, and assessed outcomes after 24 months. Though the effect favored the comparator groups, there was a nonsignificant effect on filled prescription (OR 0.79; CI 0.30, 2.08). There was a significant effect favoring the comparator group on physical activity (SMD –0.43; CI –0.76, –0.11).

4. Discussion

Summary of Key Findings

This systematic review compiles research evidence on the effects of health care provider interventions to increase uptake of guidelines for depression treatment. We found 22 RCTs that evaluated diverse interventions and reported on a wide range of outcomes. Comparisons with usual clinical care practice did not show consistent and statistically significant differences across guideline adherence indicators, but there was evidence of heterogeneity across studies and results for individual outcomes varied. Comparative effectiveness data for different provider interventions were only available in unique dyads of interventions and comparators. Indirect comparisons indicated that more complex interventions may show more favorable outcomes. Due to the small number of studies reporting team interventions or interventions in specialty care, we did not find robust evidence that effects varied by targeted provider group or setting. Effects on patient health were mixed; while response to depression treatment improved, we did not find significant effects for other patient outcomes.

Table 4.1 summarizes our quality of evidence assessment and the summary of findings. The table lists the interventions and comparators and the assessed outcomes, the number of studies and number of participants included for each outcome assessment, the direction and magnitude of the effect for each outcome, relative and absolute intervention effects, and the quality of the evidence for each outcome.

The methodological rigor of studies varied, but we did not downgrade results based on study limitations; none of the analyses were exclusively based on poor-quality studies. All studies were rated high risk of performance bias because none were able to blind providers to interventions. Cross-over/contamination was the criterion most likely to be rated as low risk of bias because providers were typically randomized at the site level. Most studies met multiple criteria from the QI-MQCS, including all 22 studies reporting on organizational motivation, intervention rationale, implementation, study design, and limitations. However, only 9 studies clearly described follow-up relative to the start and end of the intervention, only 1 study addressed the sustainability of the intervention, and only 3 studies described initiatives to spread the intervention or addressed the potential for or barriers to spread.

Effect of Interventions to Increase Uptake of Evidence-Based Depression Treatment on Provider Behavior

We focused on provider adherence to treatment guidelines or care protocols and guidance-concordant practices as described in each study. We purposefully focused on provider outcomes as the primary outcome of this review given the large number of behavioral change strategies

that have been proposed to encourage providers to adopt evidence-based treatments for depression in practice (Gilbody et al., 2003; Raney, 2015; Unützer and Park, 2012; Katon et al., 2010). The review was not restricted to a set of known interventions, but was open to all innovations that met inclusion criteria, testing strategies to increase the uptake of guidelines and guideline-concordant practices. We reviewed unique intervention approaches, ranging from the simple distribution of guidelines to education strategies and multicomponent interventions. As outlined, we did not identify statistically significant differences across the interventions compared to usual care practice, though analyses showed heterogeneity and wide confidence intervals that support a large range of potential intervention effects.

A pooled analysis of 11 RCTs indicated increased odds of improved medication prescribing, arguably the aspect of depression care most under the health care providers' control. Expressed as absolute numbers, this represents an increase of 55 more cases of recommended prescribing compared to 390 per 1,000 cases. There was no indication of publication bias; however, we detected considerable heterogeneity and determined the result to be low quality of evidence. Furthermore, no statistically significant difference emerged from an analysis for improved medication prescribing that used a different operationalization of the outcome, namely a continuous outcome as indicated by fractional prescribing rates and prescribed dosages or specific antidepressants such as mirtazapine and tricyclic antidepressants.

One study (Sinnema et al., 2015) showed an increased rate of contact with patients following training and consultations from experts on guidelines that incorporated personal barriers to implementing the guidelines, compared to usual care practice. However, the result is based on a single study and we have limited confidence in this result. No other specific provider behavior change was found to be significant for provider interventions compared to any comparator.

Very few studies reported adverse events or unintended consequences associated with the provider interventions. This is consistent with prior reviews of provider interventions that have reported minimal adverse events (Gilbody et al., 2003; Sikorski et al., 2012). Across analyses, we found no indication of publication bias. Because the outcomes we were interested in often were not the primary outcome of research studies, we are confident that intervention effect estimates in our review are unlikely to be affected by publication bias. Our knowledge of the sustainability of any findings is limited by relatively short follow-up periods. Follow-up ranged from 2 months to 24 months, with all but one study examining outcomes at 12 months or less. Over half of the studies reported effects at six months or less. Only one study (Baker et al., 2001) explicitly addressed the sustainability of the intervention, and three studies (Baker et al., 2001; Nilsson et al., 2001; Rollman et al., 2001) described initiatives to spread the intervention, such as by addressing the potential or barriers for spread of the intervention throughout the organization and beyond. Thus, the long-term effects of provider interventions are not well understood.

Type of Intervention

Given the diversity of the interventions evaluated in individual studies and the heterogeneity in results, an important question of this systematic review was whether effects vary by type of intervention. Our searches identified a few studies that directly compared different provider interventions. Studies compared varying forms of guideline distribution to each other; guidelines alone to guideline distribution plus additional training and implementation recommendations; training in guidelines implementation alone to tailored training; academic detailing alone to academic detailing involving continuous quality improvement teams; patient-specific treatment recommendations to recommendations and care management; and education alone to education plus other components, such as additional training sessions and follow-up provider feedback. However, no two studies reported on a similar intervention and comparator, limiting comparative effectiveness analyses.

The existing research identified only a few statistically significant differences between interventions. One study (Sinnema et al., 2015) reported a significant effect from training plus tailored implementation compared to training alone. Another study (Shirazi et al., 2013) found a significant effect with a two-day continuing medical education course tailored to the providers' reported stage of change compared to receiving guidelines and education without tailoring. Bosmans and colleagues (2006) found a large effect at 12 months favoring an intervention featuring training in the Dutch depression guidelines. Yawn and colleagues (2012) found that physicians and nursing staff receiving a practice-based training program and tools for managing depression in postpartum mothers reported significant effects on provider outcomes at 12 months compared to comparator. Finally, Gerrity and colleagues (1999) found that a significantly greater percentage of providers in an education intervention group discussed depression with unannounced standardized patients compared to the comparator group. However, all promising results were based on single studies, often with imprecision in effect estimates and follow-up periods of one year or less. The evidence was rated as very low quality.

Comparisons across studies provided indirect evidence for differences between interventions and usual care practice. While we tested whether unidimensional and multidimensional interventions differ, we did not detect consistent and systematic differences between these two dichotomous categories of interventions. However, we also rated the degree of intensity of each intervention. The analysis for continuous outcomes indicated that effects were associated with the intensity of the intervention, such that more complex interventions reported larger intervention effects. This finding is based on indirect rather than direct head-to-head comparisons and should be interpreted with caution; we rated the finding as very low quality of evidence. Furthermore, the finding was not shown in studies reporting on categorical data. In addition, stratified analyses by intervention type were also not statistically significant, including for the most intensive interventions. Finally, we also assessed whether educational interventions alone can change provider behavior in clinical practice, an assessment also addressed in previous

reviews (Gilbody et al., 2003; Sikorski et al., 2012). In line with existing reviews, our analyses did not find significant differences.

In summary, we were not able to identify subgroups of interventions that were consistently associated with statistically significant effects on provider outcomes. Of note, though we included them in our search terms, we did not find evaluations of financial or regulatory interventions outside of more complicated system-redesign efforts. Such approaches have also not been found in earlier published reviews (Gilbody et al., 2003; Sikorski et al., 2012).

Type of Provider

Provider interventions are often targeted toward individual primary care providers, but efforts may involve care teams to increase uptake of evidence-based treatments for depression. Only two studies in our review reported on team-based interventions; the others reported on individual provider interventions. Only one of these two studies (Yawn et al., 2012) with a team of providers contributed to a statistical analysis. The authors reported a statistically significant effect in favor of the intervention group, which featured a practice-based training program and tools for physicians and nursing staff to manage depression in postpartum mothers, while a comparator group received only a brief presentation about postpartum depression.

Consequently, we did not identify statistically robust evidence that intervention effects varied by targeted provider group. Because this finding is based on evidence of very low quality, it was not possible to determine whether effects of provider interventions vary by the type of provider that the intervention targeted.

Effects of the Setting

Depression is most often identified by practitioners in primary care settings (Wittchen, Holsboer, and Jacobi, 2001; Bijl and Ravelli, 2000), making it essential to understand which provider interventions can be recommended for primary care settings. Even in specialty care settings, where the majority of RCTs evaluating medication and behavioral treatments for depression are conducted (Laoutidis and Mathiak, 2013; Barth et al., 2013; Cuijpers et al., 2011; Khan et al., 2012), we need to understand if what is known in the research community appears in clinical practice (Shidhaye, Lund, and Chisholm, 2015). Thus, we examined if provider intervention effects vary across primary care and specialty care settings.

Only 2 of the 22 studies included in our review reported on specialty care interventions; all others were conducted in primary care settings. Due to the small number of studies reporting on specialty care, there is not enough evidence to determine whether effects of provider interventions vary by setting.

Effects on Patient Outcomes

Results for effects on patients' health outcomes were mixed, across studies as well as across individual outcomes of interest (see the last page of Table 4.1). As documented in the evidence

table in Appendix C, while individual studies reported a few positive effects, we found only one significant effect across all available studies: improved treatment response. A pooled analysis containing six RCTs significantly favored the provider intervention over usual care practice (moderate QoE); the quality was downgraded due to inconsistency across studies.

The findings for patient outcomes are limited because we restricted the review to studies that reported on provider outcomes. Thus, analyses of patient outcomes are based only on the 14 RCTs that reported provider as well as patient outcomes. The list of excluded studies shows that a substantial number of studies report on patient outcomes with no information of provider outcomes (see Appendix B). Prior reviews have evaluated how provider interventions affect patient outcomes and concluded that multifaceted and system-redesign approaches, such as providing education to patients after depression screening during initial meetings and realignment of professional roles in an organization, were more effective than simpler or single component interventions, such as distribution of guidelines and education alone, in improving patient outcomes (Gilbody et al., 2003; Sikorski et al., 2012).

Comparison to System Redesign

Our review set out to identify interventions that can be implemented in health care organizations without practice redesign efforts. A number of studies that the searches identified (N = 63) were excluded from our review because they described practice redesign interventions in which change in provider behavior was only one component of many. Our rationale was that training existing providers to increase the uptake of evidence-based treatment for depression cannot be teased apart from the effects of larger system-redesign efforts. It is unclear whether or to what extent the provider behavior component contributed to the overall effect. In addition, many health care organizations are interested to identify strategies to change provider behavior without committing to any structural changes to the way health care is delivered. The decision of whether to include or exclude studies was based on a thorough review of all published information on the studies and, in some cases, discussions with the study authors.

Practice redesign efforts have been documented as achieving very promising results for depression care. Examples of large-scale RCTs are Partners in Care, the Texas Medication Algorithm Project, and the Quality Enhancement by Strategic Teaming intervention. The Partners in Care study (Wells et al., 2004; Jaycox et al., 2003; Meredith et al., 2000; Rubenstein et al., 1999; Unützer et al., 2001; Wells et al., 2000; Wells et al., 2008) trained providers but it also hired nurse care managers who were added to the clinic for the purposes of implementing the intervention. In addition to helping providers implement guidelines, nurses supported patients, providers, and mental health specialists by educating, maintaining contact with patients on a regular basis, and helping to facilitate communication between care teams. The authors concluded that Partners in Care was an effective intervention with respect to quality of care, mental health outcomes, and retention of employment of depressed patients, with some study effects lasting upward of nine years post-intervention.

Table 4.1. Summary of Findings

Intervention Type and Outcome Measure	Number of RCTs and Participants	Study Limitations	Inconsistency	Indirectness	Imprecision	Publication Bias	Control Risk/Score	Intervention Risk/Score	Direction and Magnitude of Relative Effect	Absolute Control Risk/Score	Absolute Risk/Score Difference	Grade
KQ1. Effects of provider intervention on health care professional behavior												
Provider intervention vs. UCP												
Odds of achieved provider adherence (main indication)	13 RCTs (Simon et al., 2000; Lin et al., 2001; Worrall et al., 1999; Baker et al., 2001; Bosmans et al., 2006; Callahan et al., 1994; Gerrity et al., 1999; Goldberg et al., 1998; Kurian et al., 2009; Rollman et al., 2001; Sinnema et al., 2015; Yawn et al., 2012; Freemantle et al., 2002) N = 3,158	–	^ (H)	D	(P)	NC	N/A	741/1,567	Provider interventions not statistically significantly different from comparator groups (OR 1.60; CI 0.76, 3.37)	N/A*	n.s.	Moderate
Mean difference in achieved provider adherence (main indication)	9 RCTs (Simon et al., 2000; Worrall et al., 1999; Aakhus et al., 2016; Azocar et al., 2003; Eccles et al., 2007; Kurian et al., 2009; Linden et al., 2008; Nilsson et al., 2001; Shirazi et al., 2013) N = 1,236	–	^^ (H) (D)	D	(P)	NC	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (SMD 0.17; CI –0.16, 0.50)	N/A*	–	Low
Incidence rate of achieved provider adherence (main indication)	4 RCTs (Lin et al., 2001; Nilsson et al., 2001; Sinnema et al., 2015; van Eijk et al., 2001) N = 63,588	–	^ (H)	D	^	NC	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (IRR 1.16; CI 0.63, 2.14)	N/A*	–	Low

Table 4.1. Summary of Findings—Continued

Intervention Type and Outcome Measure	Number of RCTs and Participants	Study Limitations	Inconsistency	Indirectness	Imprecision	Publication Bias	Control Risk/Score	Intervention Risk/Score	Direction and Magnitude of Relative Effect	Absolute Control Risk/Score	Absolute Risk/Score Difference	Grade
Odds of improved medication prescribing	11 RCTs (Simon et al., 2000; Lin et al., 2001; Worrall et al., 1999; Baker et al., 2001; Callahan et al., 1994; Gerrity et al., 1999; Goldberg et al., 1998; Kurian et al., 2009; Rollman et al., 2001; Sinnema et al., 2015; Yawn et al., 2012) N = 4,116	–	^ (H)	D	^	n.s.	788/2,078	915/2,038	Provider interventions statistically significantly different from comparator groups (OR 1.42; CI 1.04, 1.92) favoring the intervention	390/1,000	55 more per 1,000	Low
Mean difference in improved medication prescribing	3 RCTs (Eccles et al., 2007; Linden et al., 2008; Nilsson et al., 2001) N = 414	–	^ (D)	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (SMD 0.15; CI –0.48, 0.79)	N/A*	–	Low
Incidence rate of improved medication prescribing	3 RCTs (Lin et al., 2001; Nilsson et al., 2001; van Eijk et al., 2001) N = 63,144	–	^ (H)	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator group (IRR 1.02; CI 0.44, 2.36)	N/A*	–	Low
Odds for increased contact with patients	3 RCTs (Gerrity et al., 1999; Rollman et al., 2001; Yawn et al., 2012) N = 710	–	^ (H)	D	^	N/A	44/345	134/365	Provider interventions not statistically significantly different from comparator groups (OR 6.40; CI 0.13, 322.40)	360/1,000	n.s.	Low
Mean difference in contact with patients	3 RCTs (Simon et al., 2000; Worrall et al., 1999; Kurian et al., 2009) N = 225	–	–	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (SMD 0.17; CI –0.84, 1.19)	N/A*	–	Moderate
Incidence rate of number of consultations (contact with patients)	1 RCT (Sinnema et al., 2015) N = 444	–	^^ (S)	D	(P)	NC	N/A	N/A	Provider intervention statistically significantly different from comparator group (IRR 1.78; CI 1.14, 2.78) favoring the intervention	N/A*	–	Very low

Table 4.1. Summary of Findings—Continued

Intervention Type and Outcome Measure	Number of RCTs and Participants	Study Limitations	Inconsistency	Indirectness	Imprecision	Publication Bias	Control Risk/Score	Intervention Risk/Score	Direction and Magnitude of Relative Effect	Absolute Control Risk/Score	Absolute Risk/Score Difference	Grade
Odds of general adherence to intervention	6 RCTs (Baker et al., 2001; Bosmans et al., 2006; Gerrity et al., 1999; Rollman et al., 2001; Yawn et al., 2012; Freemantle et al., 2002) N = 1,375	–	^ (H)	D	^	N/A	374/676	479/699	Provider interventions not statistically significantly different from comparator groups (OR 2.26; CI 0.50, 10.28)	465/1,000	n.s.	Low
Mean difference in general adherence to intervention	3 RCTs (Aakhus et al., 2016; Azocar et al., 2003; Shirazi et al., 2013) N = 597	–	^^ (H) (D)	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (SMD 0.23; CI –1.42, 1.89)	N/A*	–	Very low
Odds of referral offered to patient	4 RCTs (Worrall et al., 1999; Callahan et al., 1994; Rollman et al., 2001; Sinnema et al., 2015) N = 896	–	–	D	^	N/A	44/439	54/457	Provider interventions not statistically significantly different from comparator groups (OR 1.11; CI 0.33, 3.70)	93/1,000	n.s.	Moderate
Provider intervention vs. practice redesign												
Odds of achieved provider adherence (main indication)	3 RCTs (Simon et al., 2000; Goldberg et al., 1998; Datto et al., 2003) N = 867	–	–	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (OR 0.81; CI 0.30, 2.19)	N/A	n.s.	Moderate
Mean difference in achieved provider adherence (main indication)	1 RCT (Simon et al., 2000) N = 24	–	^^ (S)	D	(P)	N/A	0.09	0.13	Provider intervention not statistically significantly different from comparator group (SMD 0.07; CI –0.73, 0.87)	N/A	0.04	Low
Odds of improved medication prescribing	2 RCTs (Simon et al., 2000; Goldberg et al., 1998) N = 1,738	–	^ (D)	D	^	N/A	275/853	294/885	Provider interventions not statistically significantly different from comparator groups (OR 0.96; CI 0.18, 5.08)	375/1,000	n.s.	Low

Table 4.1. Summary of Findings—Continued

Intervention Type and Outcome Measure	Number of RCTs and Participants	Study Limitations	Inconsistency	Indirectness	Imprecision	Publication Bias	Control Risk/Score	Intervention Risk/Score	Direction and Magnitude of Relative Effect	Absolute Control Risk/Score	Absolute Risk/Score Difference	Grade
Mean difference in contact with patients	1 RCT (Simon et al., 2000) N = 24	–	^^ (S)	D	(P)	N/A	0.09	0.13	Provider intervention not statistically significantly different from comparator group (SMD 0.07; CI –0.73, 0.87)	N/A	0.04	Low
Odds of general adherence to intervention	1 RCT (Datto et al., 2003) N = 61	Poor RoB, IP	^^ (S)	D	(P)	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (OR 0.30; CI 0.08, 1.14)	N/A	n.s.	Very low
Provider intervention vs. other interventions												
Odds of achieved provider adherence (main indication)	1 RCT: (Keeley et al., 2014) N = 171	PND	^^ (S)	D	^	N/A	36/85	33/86	Provider intervention not statistically significantly different from comparator group (OR 0.85; CI 0.43, 1.69)	420/1,000	n.s.	Very low
Odds of improved medication prescribing	1 RCT (Keeley et al., 2014) N = 171	PND	^^ (S)	D	^	N/A	36/85	33/86	Provider intervention not statistically significantly different from comparator group (OR 0.85; CI 0.43, 1.69)	420/1,000	n.s.	Very low
Odds of general adherence to intervention	1 RCT (Keeley et al., 2014) N = 171	PND	^^ (S)	D	^	N/A	29/85	16/86	Provider intervention not statistically significantly different from comparator group (OR 0.45; C 0.20, 1.01)	340/1,000	n.s.	Very low
KQ1a. Effects by intervention type												
Comparative effectiveness												
Guideline distribution plus implementation recommendations vs. guideline distribution alone: Odds of achieved provider adherence (main indication)	1 RCT (Baker et al., 2001) N = 378	IP	^^ (S)	D	^	N/A	168/181	188/197	Provider interventions not statistically significantly different (OR 1.62; CI 0.64, 4.06)	928/1,000	n.s.	Very low

Table 4.1. Summary of Findings—Continued

Intervention Type and Outcome Measure	Number of RCTs and Participants	Study Limitations	Inconsistency	Indirectness	Imprecision	Publication Bias	Control Risk/Score	Intervention Risk/Score	Direction and Magnitude of Relative Effect	Absolute Control Risk/Score	Absolute Risk/Score Difference	Grade
Guideline distribution and education vs. guideline distribution, education, and nurse disease management (system redesign): Odds of achieved provider adherence (main indication)	1 RCT (Datto et al., 2003) N = 61	Poor RoB, IP	^^ (S)	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different (OR 0.30; CI 0.08, 1.14)	N/A	n.s.	Very low
Academic detailing vs. academic detailing plus continuous quality improvement: Odds of achieved provider adherence (main indication)	1 RCT (Goldberg et al., 1998) N = 389	–	^^ (S)	D	^	N/A	36/240	22/149	Provider interventions not statistically significantly different (OR 1.01; CI 0.48, 2.11)	148/1,000	n.s.	Very low
Guideline distribution vs. guideline distribution and motivational interviewing training: Odds for achieved provider adherence (main indication)	1 RCT (Keeley et al., 2014) N = 171	PND	^^ (S)	D	^	N/A	36/85	33/86	Provider interventions not statistically significantly different (OR 0.85; CI 0.43, 1.69)	420/1,000	n.s.	Very low
Education plus additional training sessions vs. education alone: Odds for achieved provider adherence (main indication)	1 RCT (Kurian et al., 2009) N = 55	PND	^^ (S)	D	^	N/A	15/23	22/32	Provider interventions not statistically significantly different (OR 1.17; CI 0.33, 4.19)	652/1,000	n.s.	Very low
Education plus additional training sessions vs. education alone: Mean difference in achieved provider adherence (main indication)	1 RCT (Kurian et al., 2009) N = 55	PND	^^ (S)	D	^	N/A	3.70	5.00	Provider interventions not statistically significantly different (SMD 0.67; CI 0.06, 1.28)	N/A	1.30	Very low

Table 4.1: Summary of Findings—Continued

Intervention Type and Outcome Measure	Number of RCTs and Participants	Study Limitations	Inconsistency	Indirectness	Imprecision	Publication Bias	Control Risk/Score	Intervention Risk/Score	Direction and Magnitude of Relative Effect	Absolute Control Risk/Score	Absolute Risk/Score Difference	Grade
Patient-specific treatment recommendations vs. recommendations and care management: Odds for achieved provider adherence (main indication)	1 RCT (Simon et al., 2000) N = 417	–	^^ (S)	D	^	N/A	92/196	95/221	Provider interventions not statistically significantly different (OR 0.85; CI 0.58, 1.25)	470/1,000	n.s.	Very low
Patient-specific treatment recommendations vs. recommendations and care management: Mean difference in achieved provider adherence (main indication)	1 RCT (Simon et al., 2000) N = 417	–	^^ (S)	D	^	N/A	0.09	0.13	Provider interventions not statistically significantly different (SMD 0.07; CI –0.73, 0.87).	N/A	0.04	Very low
Training plus tailored implementation vs. training alone: Odds for achieved provider adherence (main indication)	1 RCT (Sinnema et al., 2015) N = 444	–	^^ (S)	D	^	N/A	30/246	26/198	Provider interventions not statistically significantly different (OR 1.07; CI 0.52, 2.19).	122/1,000	n.s.	Very low
Training plus tailored implementation vs. training alone: Incidence rate for achieved provider adherence (main indication)	1 RCT (Sinnema et al., 2015) N = 444	–	^^ (S)	D	^	NC	N/A	N/A	Provider interventions statistically significantly different (IRR 1.78; CI 1.14, 2.78), favoring the intervention of training plus tailored implementation	N/A	--	Very low
Guideline distribution plus workshop and consultation vs. guideline distribution alone: Odds of achieved provider adherence (main indication)	1 RCT (Worrall et al., 1999) N = 147	PND	^^ (S)	D	^	N/A	50/56	83/91	Provider interventions not statistically significantly different (OR 1.25; CI 0.40, 3.90)	893/1,000	n.s.	Very low

Table 4.1: Summary of Findings—Continued

Intervention Type and Outcome Measure	Number of RCTs and Participants	Study Limitations	Inconsistency	Indirectness	Imprecision	Publication Bias	Control Risk/Score	Intervention Risk/Score	Direction and Magnitude of Relative Effect	Absolute Control Risk/Score	Absolute Risk/Score Difference	Grade
Guideline distribution plus workshop and consultation vs. guideline distribution alone: Mean difference in achieved provider adherence (main indication)	1 RCT (Worrall et al., 1999) N = 147	PND	^^ (S)	D	^	N/A	4.20	3.60	Provider interventions not statistically significantly different (SMD –0.08; CI –0.42, 0.26)	N/A	–0.60	Very low
Education plus other components vs. guidelines and education without tailoring to stages of change: Mean difference in achieved provider adherence (main indication)	1 RCT (Shirazi et al., 2013) N = 36	–	^^ (S)	D	^	NC	22.00	49.00	Provider interventions statistically significantly different (SMD 0.89; CI 0.59, 1.18), favoring intervention with education plus other components tailored toward stages to change	N/A	27.00	Very low
Guideline distribution (passive) vs. guideline distribution (active): Odds of achieved provider adherence (main indication)	1 RCT (Rollman et al., 2001) N = 138	IP	^^ (S)	D	^	N/A	54/68	61/70	Provider interventions not statistically significantly different (OR 1.76; CI 0.64, 4.86)	794/1,000	n.s.	Very low
Indirect comparison												
Meta-regression education only vs. education plus for odds of achieved provider adherence (main indication)	10 RCTs	–	N/A	^^ (I)	^	N/A	N/A	N/A	No systematic effect detected (p = 0.574)	N/A	N/A	Very low
Meta-regression education only vs. education plus for mean difference in achieved provider adherence (main indication)	8 RCTs	–	N/A	^^ (I)	^	N/A	N/A	N/A	No systematic effect detected (p = 0.238)	N/A	N/A	Very low

Table 4.1: Summary of Findings—Continued

Intervention Type and Outcome Measure	Number of RCTs and Participants	Study Limitations	Inconsistency	Indirectness	Imprecision	Publication Bias	Control Risk/Score	Intervention Risk/Score	Direction and Magnitude of Relative Effect	Absolute Control Risk/Score	Absolute Risk/Score Difference	Grade
Meta-regression unidimensional vs. multidimensional for odds of achieved provider adherence (main indication)	13 RCTs	–	N/A	^^ (I)	^	N/A	N/A	N/A	No systematic effect detected (p = 0.707)	N/A	N/A	Very low
Meta-regression unidimensional vs. multidimensional for mean difference in achieved provider adherence (main indication)	9 RCTs	–	N/A	^^ (I)	^	N/A	N/A	N/A	No systematic effect detected (p = 0.055)	N/A	N/A	Very low
Meta-regression unidimensional vs. multidimensional for odds of improved medical prescribing	12 RCTs	–	N/A	^^ (I)	^	N/A	N/A	N/A	No systematic effect detected (p = 0.317)	N/A	N/A	Very low
Meta-regression unidimensional vs. multidimensional for odds of referral offered to patients	4 RCTs	–	N/A	^^ (I)	^	N/A	N/A	N/A	No systematic effect detected (p = 0.195)	N/A	N/A	Very low
Meta-regression intervention intensity for odds of achieved provider adherence (main indication)	13 RCTs	–	N/A	^^ (I)	^	N/A	N/A	N/A	No systematic effect detected (p = 0.973)	N/A	N/A	Very low
Meta-regression intervention intensity for mean difference in achieved provider adherence (main indication)	9 RCTs	–	N/A	^^ (I)	^	NC	N/A	N/A	The analysis suggested that the intensity of the intervention is associated with the effect size (p = 0.033)	N/A	N/A	Very low

Table 4.1: Summary of Findings—Continued

Intervention Type and Outcome Measure	Number of RCTs and Participants	Study Limitations	Inconsistency	Indirectness	Imprecision	Publication Bias	Control Risk/Score	Intervention Risk/Score	Direction and Magnitude of Relative Effect	Absolute Control Risk/Score	Absolute Risk/Score Difference	Grade
Meta-regression intervention intensity for odds of improved medical prescribing	12 RCTs	–	N/A	^^ (I)	^	N/A	N/A	N/A	No systematic effect detected (p = 0.414)	N/A	N/A	Very low
Meta-regression intervention intensity for odds of general adherence to intervention	8 RCTs	–	N/A	^^ (I)	^	N/A	NA	NA	No systematic effect detected (p = 0.542)	NA	NA	Very low
Subgroup analyses by intervention type												
Guideline distribution only: Odds of achieved provider adherence (main indication)	3 RCTs (Baker et al., 2001; Callahan et al., 1994; Rollman et al., 2001) N = 683	–	N/A	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (OR 1.28; CI 0.75, 2.19)	N/A	N/A	Low
Guideline distribution only: Mean difference for achieved provider adherence (main indication)	1 RCT (Azocar et al., 2003) N = 281	PND	^^ (S)	D	^	NC	0.91	0.80	Provider intervention statistically significantly different from comparator group (SMD –0.44; CI –0.68, –0.20), favoring the comparator	N/A	–0.11	Very low
Guideline distribution only: Odds of improved medication prescribing	4 RCTs (Baker, 2001; Callahan, 1994; Keeley et al., 2014; Rollman, 2001) N = 854	–	^ (H)	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (OR 1.52; CI 0.60, 3.86)	N/A	N/A	Low
Guideline distribution only: Odds of increased provider contact with patients	1 RCT (Rollman, 2001) N = 130	IP	^^ (S)	D	^	N/A	26/62	45/68	Provider intervention statistically significantly different from comparator group (OR 2.71; CI 1.24, 5.94)	419/1,000	242 more per 1,000	Very low
Guideline distribution only: Odds of general adherence to intervention	3 RCTs (Baker, 2001; Keeley, 2014; Rollman, 2001) N = 679	–	^^ (H) (D)	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (OR 0.95; CI 0.17, 5.17)	N/A	N/A	Very low

Table 4.1: Summary of Findings—Continued

Intervention Type and Outcome Measure	Number of RCTs and Participants	Study Limitations	Inconsistency	Indirectness	Imprecision	Publication Bias	Control Risk/Score	Intervention Risk/Score	Direction and Magnitude of Relative Effect	Absolute Control Risk/Score	Absolute Risk/Score Difference	Grade
Education only: Odds of achieved provider adherence (main indication)	3 RCTs (Bosmans et al., 2006; Gerrity et al., 1999; Freemantle et al., 2002) N = 338	–	^ (H)	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (OR 3.04; CI 0.01, 756.17)	N/A	N/A	Low
Education only: Mean difference in achieved provider adherence (main indication)	3 RCTs (Eccles et al., 2007; Linden et al., 2008; Nilsson et al., 2001) N = 414	–	–	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (SMD 0.15; CI –0.48, 0.79)	N/A	N/A	Moderate
Education only: Odds of improved medication prescribing	1 RCT (Gerrity, 1999) N = 48	–	^^ (S)	D	^	N/A	N/A	N/A	Provider intervention not statistically significantly different from comparator group (OR 2.78; CI 0.80, 9.59)	N/A	N/A	Very low
Education only: Odds of increased provider contact with patients	1 RCT (Gerrity, 1999) N = 48	–	^^ (S)	D	^	N/A	9/26	17/22	Provider intervention statistically significantly different from comparator group (OR 6.42; CI 1.78, 23.18)	346/1,000	427 more per 1,000	Very low
Education only: Odds of general adherence to intervention	4 RCTs (Bosmans, 2006; Datto, 2003; Freemantle, 2002; Gerrity, 1999) N = 399	–	^^ (H) (D)	D	^^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (OR 2.03; CI 0.06, 73.30)	N/A	N/A	Very low
Education plus other components: Odds for achieved provider adherence (main indication)	7 RCTs (Simon et al., 2000; Lin et al., 2001; Worrall et al., 1999; Goldberg et al., 1998; Kurian et al., 2009; Sinnema et al., 2015; Yawn et al., 2012) N = 2,090	–	–	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (OR 1.17; CI 0.62, 2.18)	N/A	N/A	Moderate

Table 4.1: Summary of Findings—Continued

Intervention Type and Outcome Measure	Number of RCTs and Participants	Study Limitations	Inconsistency	Indirectness	Imprecision	Publication Bias	Control Risk/Score	Intervention Risk/Score	Direction and Magnitude of Relative Effect	Absolute Control Risk/Score	Absolute Risk/Score Difference	Grade
Education plus other components: Mean difference in achieved provider adherence (main indication)	5 RCTs (Simon et al., 2000; Worrall et al., 1999; Aakhus et al., 2016; Kurian et al., 2009; Shirazi et al., 2013) N = 938	–	^ (H)	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (SMD 0.37; CI –0.16, 0.90)	N/A	N/A	Low
Education plus other components: Odds of improved medical prescribing	7 RCTs (Goldberg et al., 1998; Kurian, 2009; Lin, 2001; Simon, 2000; Sinnema, 2015; Worrall, 1999; Yawn, 2012) N =1,710	–	^^ (H) (D)	D	(P)	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (OR 1.21; CI 0.85, 1.71)	N/A	N/A	Low
Education plus other components: Odds of increased provider contact with patients	1 RCT (Yawn, 2012) N = 482	–	^^ (S)	D	^	N/A	0/233	55/250	Provider interventions statistically significantly different from comparator group (OR 101.34; CI 6.17, 1,664.08)	0/1,000	220 more per 1,000	Very low
Education plus other components: Odds of general adherence to intervention	1 RCT (Yawn, 2012) N = 482	–	^^ (S)	D	(P)	N/A	70/189	176/293	Provider interventions statistically significantly different from comparator group (OR 2.56; CI 1.65, 3.97)	370/1,000	230 more per 1,000	Very low
KQ1b. Effects by provider type												
Meta-regression single provider vs. team for odds of achieved provider adherence (main indication)	13 RCTs (Simon et al., 2000; Lin et al., 2001; Worrall et al., 1999; Baker et al., 2001; Bosmans et al., 2006; Callahan et al., 1994; Gerrity et al., 1999; Goldberg et al., 1998; Kurian et al., 2009; Rollman et al., 2001; Sinnema et al., 2015; Freemantle et al., 2002; Yawn et al., 2012) N = 1816	–	N/A	^^ (I)	^	NC	N/A	N/A	The analysis suggested that the type of provider is associated with the effect size (p = 0.034); however, the analysis is based on only 1 team intervention	N/A	N/A	Very low

Table 4.1: Summary of Findings—Continued

Intervention Type and Outcome Measure	Number of RCTs and Participants	Study Limitations	Inconsistency	Indirectness	Imprecision	Publication Bias	Control Risk/Score	Intervention Risk/Score	Direction and Magnitude of Relative Effect	Absolute Control Risk/Score	Absolute Risk/Score Difference	Grade
Subgroup analysis by provider type												
Single provider interventions: Odds for achieved provider adherence (main indication)	12 RCTs (Simon et al., 2000; Lin et al., 2001; Worrall et al., 1999; Baker et al., 2001; Bosmans et al., 2006; Callahan et al., 1994; Gerrity et al., 1999; Goldberg et al., 1998; Kurian et al., 2009; Rollman et al., 2001; Sinnema et al., 2015; Freemantle et al., 2002) N = 1,334	–	^ (H)	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (OR 1.42; CI 0.74, 2.73)	N/A	N/A	Low
Team provider interventions: Odds of achieved provider adherence (main indication)	1 RCT (Yawn et al., 2012) N = 482	–	^^ (S)	D	^	NC	N/A	N/A	Provider intervention statistically significantly different from comparator group (OR 101.34, CI 6.17, 1,664.08), favoring the intervention	N/A	N/A	Very low
KQ1c. Effect by setting												
Meta-regression primary care vs. specialty care setting for mean difference in achieved adherence (main indication)	10 RCTs (Simon et al., 2000; Worrall et al., 1999; Aakhus et al., 2016; Callahan et al., 1994; Eccles et al., 2007; Kurian et al., 2009; Linden et al., 2008; Nilsson et al., 2001; Rollman et al., 2001; Shirazi et al., 2013)	–	N/A	^^ (I)	^	N/A	N/A	N/A	No systematic effect detected (p = 0.385); however, the analysis is based on only 2 specialty care interventions	N/A	N/A	Very low

Table 4.1: Summary of Findings—Continued

Intervention Type and Outcome Measure	Number of RCTs and Participants	Study Limitations	Inconsistency	Indirectness	Imprecision	Publication Bias	Control Risk/Score	Intervention Risk/Score	Direction and Magnitude of Relative Effect	Absolute Control Risk/Score	Absolute Risk/Score Difference	Grade
KQ1d. Patient outcomes												
Provider intervention vs. UCP												
Mean difference in depression rating scale scores	9 RCTs (Simon et al., 2000; Worrall et al., 1999; Aakhus et al., 2016; Bosmans et al., 2006; Callahan et al., 1994; Goldberg et al., 1998; Linden et al., 2008; Rollman et al., 2001; Sinnema et al., 2015) N = 2,196	–	^ (D)	D	(P)	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (SMD –0.06; CI –0.14, 0.01)	N/A*	–	Moderate
Odds of depression treatment response	6 RCTs (Simon et al., 2000; Baker et al., 2001; Callahan et al., 1994; Kurian et al., 2009; Rollman et al., 2001; Yawn et al., 2012) N = 1,312	–	^ (D)	D	(P)	n.s.	189/591	252/721	Provider interventions statistically significantly different from comparator groups (OR 1.12; CI 1.04, 1.21) favoring the intervention	338/1,000	24 more per 1,000	Moderate
Odds of depression recovery	6 RCTs (Simon et al., 2000; Baker et al., 2001; Bosmans et al., 2006; Callahan et al., 1994; Kurian et al., 2009; Rollman et al., 2001) N = 1,274	–	^ (D)	D	(P)	N/A	142/601	157/673	Provider interventions not statistically significantly different from comparator groups (OR 1.02; CI 0.91, 1.15)	248/1,000	n.s.	Moderate
Odds of depression treatment adherence	2 RCTs (Worrall et al., 1999; Aakhus et al., 2016) N = 281	–	–	D	^	N/A	47/130	70/151	Provider interventions not statistically significantly different from comparator groups (OR 1.52; CI 0.70, 3.31)	363/1,000	n.s.	Moderate

Table 4.1: Summary of Findings—Continued

Intervention Type and Outcome Measure	Number of RCTs and Participants	Study Limitations	Inconsistency	Indirectness	Imprecision	Publication Bias	Control Risk/Score	Intervention Risk/Score	Direction and Magnitude of Relative Effect	Absolute Control Risk/Score	Absolute Risk/Score Difference	Grade
Provider intervention vs. system redesign												
Mean difference in depression rating scale scores	3 RCTs (Simon et al., 2000; Goldberg et al., 1998; Datto et al., 2003) N = 861	–	–	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (SMD 0.09; CI –0.48, 0.67)	N/A*	n.s.	Moderate
Odds of depression treatment response	2 RCTs (Simon et al., 2000; Datto et al., 2003) N = 478	–	–	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (OR 0.53; CI 0.01, 40.38)	N/A	n.s.	Moderate
Odds of depression recovery	2 RCTs (Simon et al., 2000; Datto et al., 2003) N = 478	–	–	D	^	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (OR 0.41; CI 0.01, 17.89)	N/A	n.s.	Moderate
Odds of depression treatment adherence	1 RCT (Datto et al., 2003) N = 61	Poor RoB, IP	^^ (S)	D	(P)	N/A	N/A	N/A	Provider interventions not statistically significantly different from comparator groups (OR 0.16; CI 0.02, 1.39)	N/A	n.s.	Very low
Provider intervention vs. other interventions												
Odds of depression treatment adherence	1 RCT (Keeley et al., 2014) N = 171	PND	^^ (S)	D	^	N/A	53/85	48/86	Provider intervention not statistically significantly different from motivational interviewing (OR 0.79; CI 0.30, 2.08)	620/1000	n.s.	Very low
Mean difference in treatment adherence	1 RCT (Keeley et al., 2014) N = 171	PND	^^ (S)	D	(P)	N/A	3.05	1.84	Provider intervention not statistically significantly different from motivational interviewing (SMD –0.43; CI –0.76, –0.11)	N/A	–1.21	Very low

NOTES: ^ downgrade by one; ^^ downgrade by two; D = direct; PND = power not discussed in study regarding provider outcomes; IP = insufficient power; (H) = heterogeneity; (D) = direction of effects; (S) = single study; (I) = indirect; (P) = precise; N/A = not applicable or not available; NC = not able to be computed; IRR = incidence rate ratio; OR = odds ratio; SMD = standardized mean difference; UCP = usual care practice; vs. = versus; Poor RoB = study rated with poor quality; * = the outcome is a composite outcome and there is no meaningful absolute control risk score; n.s. = not significant.

The Texas Medication Algorithm Project (Kashner et al., 2006; Trivedi et al., 2004) hired and trained care managers over four months before implementation of the provider component of the intervention; care managers were also charged with supporting providers with guideline use. Study authors concluded that the intervention improved depressive and mental functioning outcomes. A study that used the guidelines developed in the original study was included in our review (Kurian et al., 2009) because it did not include the specialized role of care coordinators in the intervention and focused on provider training in implementing the guidelines.

The Quality Enhancement by Strategic Teaming intervention (Rost et al., 2000; Smith et al., 2001) involved nurse care managers in managing patient care through patient education about treatment options, helping patients navigate through system-level barriers, and continuous monitoring of treatment response among patients. The authors concluded that the patients seen by providers in the intervention group reported improved depression symptoms compared to usual care patients.

In some cases, the interventions included in this review were tested against practice redesigns, and the direction of effects favored practice redesign efforts in most of these studies. Yet, as documented in Table 4.1, differences between interventions were not statistically significant. This is perhaps surprising given the extent of some system-redesign efforts, which one might suspect would have larger effects as they involved restructuring clinics and hiring new staff to implement changes. They included nurse care managers to help clinicians implement the recommendations and to provide additional patient care (Datto et al., 2003), academic detailing, plus continuous quality improvement teams that implemented the interventions (Goldberg et al., 1998) and physician feedback enhanced by care managers who helped to implement the physicians' recommendations (Simon et al., 2000). However, the statistical power to detect a difference between the interventions is not known because studies often did not assess provider outcomes in their power calculations. While meta-analysis aggregates data across individual studies, the study pool was small. Extensive interventions, which have also included collaborative care approaches and other guideline implementation strategies embedded in more complex interventions, have been shown to be effective in managing depression as evidenced by improved patient outcomes (Gilbody et al., 2003).

Findings Relative to Prior Systematic Reviews

The results of this systematic review are comparable to conclusions of other reviews—specifically, that education alone is an ineffective strategy to change provider behavior (Gilbody et al., 2003; Sikorski et al., 2012). Fourteen years ago, Gilbody and colleagues reviewed organizational and educational interventions targeted at primary care providers treating depressed patients. They concluded that effective strategies to improve depression management in this setting were focused on multifaceted and system-redesign approaches, such as screening for depression, providing education to patients, and realignment of professional roles in an

organization. Sikorski and colleagues (2012) similarly concluded that provider training alone did not improve depression care. Our review shows that, despite new research, there is still a lack of effective approaches to change provider behavior. Continued efforts are needed to identify successful strategies to help implement evidence-based treatment guidelines in routine clinical practice.

Strengths and Limitations

This review has several strengths, including an a priori research design, duplicate study selection and data abstraction of study information, a thoughtful and thorough literature search not restricted to a small set of known interventions, detailed critical appraisal, and comprehensive quality of evidence assessments used to formulate review conclusions. Acknowledging the very wide and diverse field of health care provider interventions, we applied a complex search strategy to identify pertinent interventions. Throughout the review, we used procedures to reduce literature reviewer errors and bias, such as having independent reviewers screen or abstract data. We used outcomes as reported by the original study authors, but we also selected effectiveness indicators and categorized outcomes to make studies easier to compare.

Our review documents the results of RCTs, a robust study design that allows confident evidence statements. Some authors (Barkham and Parry, 2008) and the Cochrane EPOC group have recommended other study designs, such as controlled before-after studies, in addition to RCTs, when evaluating organizational interventions. However, we wanted a strong and universally accepted study design to document the state of evidence for provider interventions. In addition, practice redesign efforts that require more substantial organizational changes were outside the scope of this review. The provider interventions that were the focus of this review seem amenable to random intervention allocation. Interventions could also be rolled out and evaluated in a stepped wedge design within the health care organization. An exploratory search for non-RCT literature indicated that results reported with other study designs appear to be similarly mixed. For example, in a nonrandomized controlled study (Bermejo et al., 2009) of 44 general practitioners and psychiatrists working in outpatient settings, intervention providers were provided with training sessions that included continuous medical education, benchmarking to identify areas needing improvement, and interdisciplinary quality circles. Analyses adjusting for clustering did not indicate a significant effect favoring intervention or a usual care comparator on prescription of an adequate antidepressant dose or the referrals offered. In a time-series (Lai et al., 2011), researchers did not observe significant effects indicating that issuing guidelines about the inappropriate use of benzodiazepines alone was effective in changing provider prescribing behavior. A pre-post study (Lin et al., 1997) reported after an education intervention consisting of case consultations, role-plays, academic detailing, and training lectures, that the intervention and control groups did not differ statistically on improved medication prescribing behavior over a two-year period. Cohort studies have found that

prescribing rates do not significantly improve from before to after widespread implementation of clinical practice guidelines within large health care systems in the United States, Japan, and Canada (Jones et al., 2006; Sewitch et al., 2007; Smolders et al., 2009; Furukawa et al., 2013).

We used meta-analysis to increase the statistical power and aggregate data across provider intervention studies where possible, given that several individual studies were unlikely to have sufficient statistical power to detect effects. We used a conservative method, the Hartung-Knapp-Sidik-Jonkman method for random effects meta-analysis (Hartung, 1999; Hartung and Knapp, 2001; Sidik and Jonkman, 2006), given that the number of studies was often small and there was evidence of heterogeneity (IntHout, Ioannidis, and Borm, 2014). As indicated in the result section, the pooled observed confidence intervals in pooled analyses were sometimes wider than in individual studies. This reflects that the method generalizes to the "universe of studies" and extrapolates to (assumed) available studies when calculating the confidence interval. A small number of studies that report substantially different effect estimates will show wider confidence intervals in the pooled analysis than in individual studies.

By including only studies that measure provider behavior and outcomes, we were able to judge whether the intervention is having the intended effects. Nonetheless, this restriction excluded a large number of existing research studies that did not report on provider behavior change. We recommend that future research assess provider outcomes as well as patient outcomes to determine whether the intervention had immediate effects on guideline-concordant practices and whether these provider behavior changes are associated with patients' health.

We identified few studies that could support an answer to two key questions: whether results differ by provider characteristics or by care setting. We identified only two studies reporting on interventions evaluated in specialty care. Specialty care health care providers are likely to treat people who are experiencing depression every day, yet there is a substantial gap between what is known to be effective in the psychiatric research community and clinical practice in specialty mental health settings (Shidhaye, Lund, and Chisholm, 2015). More research is needed on how to increase the uptake of evidence-based treatment for depression in these settings.

Furthermore, whether the treatment guidelines assessed in individual studies were evidence-based could not be verified. To be included, studies had to report on treatment. Effects on improving recognition, screening, diagnosis of patients, or on increasing referral behavior to specialty mental health care settings should be assessed in future systematic reviews.

Implications for Future Research and Practice

We found some evidence that more complex interventions, such as those involving education plus additional components of follow-up feedback or tailoring education and guidelines to specific providers and patients, were associated with larger changes in provider behavior. As has been concluded in prior reviews of provider interventions, we conclude that provider interventions focused primarily on guideline distribution or education only are unlikely to be

effective in the absence of additional components. However, our review also did not identify subgroups or categories of interventions that were consistently associated with increased adherence to depression guidelines. More research is needed to identify provider interventions that effectively promote the uptake of depression treatment guidelines and guideline-concordant practices in routine clinical practice. Innovations are needed to support health care organizations that want to improve adherence but do not intend to invest in practice redesign or other efforts to restructure how care is delivered. Research should be supported by a framework of provider interventions that allows for a more structured assessment to identify successful intervention approaches and to determine the effects of individual components of interventions.

While there is a substantial body of evidence on provider interventions in terms of research volume, it is noteworthy that we evaluated many unique interventions. The individual successful approaches observed for main adherence outcomes (i.e., provider training session based on the Dutch depression guideline in Bosmans et al., 2006; provider training for clinicians based on the AHRQ's clinical practice guidelines in Gerrity et al., 1999; provider training in guidelines plus tailored implementation in Sinnema et al., 2105; education plus other components tailored toward providers' stages of change in Shirazi et al., 2013; education and tools to facilitate management of postpartum depression in Yawn et al., 2012) have not been investigated in more than one study, so findings have not been replicated across independent researcher groups. Generally, more studies are needed that report on provider behavior change outcomes in addition to patient outcomes, so that it can be better understood whether the intended intervention target (i.e., provider behavior) is affected by the intervention. More studies are needed that attempt to isolate the specific provider intervention either within system redesigns or in studies that evaluate provider interventions specifically.

Additionally, while we have described how the content of interventions varied considerably across studies, the specific guidelines utilized within the interventions themselves varied. These ranged from the American Psychiatric Association Practice Guidelines for the Treatment of Psychiatric Disorders to the Dutch College of General Practitioners' Practice Guideline for Depression to the Agency for Health Care Policy and Research Practice (now AHRQ). Guidelines for Depression (American Psychiatric Association, 2006; Schulberg et al., 1998; van Avendonk et al., 2012). There is substantial variation in the length of these guidelines, as well as those used by providers in the interventions (e.g., lengthy formal guidelines, summaries, variations on the guidelines as chosen by the study authors). Many of the studies did not specify in detail how lengthy or how much of a time commitment the guidelines were for providers. Yet, if the guidelines were lengthy, cumbersome, and time-consuming to read and implement, such factors may partially account for the effects of provider change behaviors described within the individual included studies. Though the length of the training and education sessions was often indicated, in no study was there a measure of how closely the provider participants read the guidelines or how long they spent reviewing them. Thus, some standardization across studies regarding the guidelines used in practice appears needed. Such standardization could help

account for confounding factors in research studies, but the field may also benefit from a single source of information on best treatment practices for depression.

Our review findings suggest that interventions targeting multidisciplinary team members are more effective than interventions targeting only health care providers directly, but the number of available studies is very limited. Additional research studies are needed to confirm this finding. Given the lack of studies in specialty care settings, more studies conducted in these settings are needed to understand how evidence-based interventions can best be adopted by providers outside of psychiatric research settings. Last, no included study focused on active military or veteran populations. Future RCTs incorporating military-related eligibility criteria or conducted within primary care and specialty care settings could provide more applicable evidence to decisionmakers in military and veteran health systems.

Conclusions

Depression is among the most common but also one of the most treatable mental health disorders, and different approaches have been suggested to increase the uptake of evidence-based treatment for depression. The available evidence on provider interventions to increase the uptake of treatment guidelines and guideline-concordant practices includes interventions that distribute guidelines to providers, education approaches such as academic detailing, and complex interventions with multiple components such as training and follow-up feedback on performance or exploring individual barriers to implementation of guidelines.

The interventions did not result in statistically significant effects across indicators of guideline adherence, but there was some evidence for improvement in individual outcomes, such as medication prescribing. Indirect comparisons indicated that more complex interventions (i.e., interventions that go beyond the simple dissemination of guidelines or offering information and education sessions to health care providers) may be associated with larger intervention effects. However, the result was based on very low quality of evidence and we did not identify types of interventions that were consistently associated with improved adherence to guidelines across studies. The low QoE and lack of replication of specific intervention strategies across studies limit the conclusions that can be drawn from the literature.

More research is needed to identify interventions that effectively promote uptake of depression treatment guidelines and guideline-concordant practices in routine clinical care. Research should be supported by a framework of provider interventions that allows for more structured assessments. More research is also needed to compare interventions targeting multidisciplinary teams with those targeting health care providers only. In addition, more research is needed on how to increase uptake of evidence-based treatment for depression in specialty care settings.

Appendix A. Search Strategy

MEDLINE Ovid

Search 1: December 15, 2016 results

1	(Depress$ or dysthymia or mood dysregulation or premenstrual dysphoric).tw. or depressive disorder/	423642
2	((quality and improv* and intervention$) or knowledge translation or Implement* or research to practice).tw.	419078
3	(evidence-based or guideline$ or care protocol or treatment recommendation or recommended treatment or appropriate care).tw.	339589
4	2 and 3	43697
5	1 and 4	1388
6	exp *education,continuing/	33754
7	((education$ adj3 (program$ or intervention? or meeting? or session? or strateg$ or workshop? or visit?)) or disease management program).tw.	67834
8	(behavio?r$ adj2 intervention?).tw.	12667
9	pamphlets/	3776
10	(leaflet? or booklet? or poster? or pamphlet?).tw.	32751
11	((written or printed or oral) adj information).tw.	1929
12	(information$ adj2 campaign).tw.	431
13	(education$ adj1 (method? or material?)).tw.	6391
14	*advance directives/	3470
15	outreach.tw.	11295
16	(((opinion or education$ or influential) adj1 leader?) or ((opinion or education$ or influential) adj1 champion))).tw.	1427
17	facilitator?.tw.	19367
18	(academic detailing or train the trainer).tw.	957
19	consensus conference?.tw.	5182
20	(consultation and supervision and coaching).ti,ab.	2
21	(Depression education or Continuing education or competence training or learning collaborative).tw.	452
22	*guideline adherence/	13268
23	practice guideline?.tw.	20254
24	((guideline? adj2 (compl$ or implement$ or introduc$ or issu$ or impact or effect$ or disseminat$ or distribut$ or learn or adopt$ or rollout or roll-out)) and depression management).tw.	2
25	(toolkit? adj2 (compl$ or implement$ or introduc$ or issu$ or impact or effect$ or disseminat$ or distribut$ or learn or adopt$ or rollout or roll-out)).tw.	167
26	(evidence-based adj2 (compl$ or implement$ or introduc$ or issu$ or impact or effect$ or disseminat$ or distribut$ or learn or adopt$ or rollout or roll-out)).tw.	6168

27	((compl$ or effect$ or impact or evaluat$ or introduc$ or compar$) adj2 training program$).tw.	1491
28	*reminder systems/	2002
29	(reminder? or clinical support tool).tw.	10309
30	(recall adj2 system$).tw.	488
31	(prompter? or prompting).tw.	7145
32	algorithm?.tw.	195548
33	*feedback/ or feedback.tw.	118374
34	chart review$.tw.	32588
35	((effect? or impact or records or chart?) adj2 audit).tw.	984
36	exp *reimbursement mechanisms/	19800
37	fee for service.tw.	4831
38	or/6-37	599654
39	(clinician? or practitioner? or pharmacist? or provider? or physician? or doctor? or counselor? or therapist? or psycholog$ or psychiatr$).ti,ab.	599654
40	(nurse adj (rehabilitator? or clinician? or practitioner? or provider?)).ti,ab.	10689
41	(patient care team? or practice team?).ti,ab.	795
42	exp *patient care planning/	27963
43	(integrat$ adj2 (care or service?)).tw.	10938
44	(care adj2 (coordinat$ or program$ or continuity)).tw.	25966
45	(case adj1 management).tw.	9900
46	physician's practice patterns/	52429
47	quality assurance.tw.	22855
48	*process assessment/ [health care]	2044
49	*program evaluation/	9395
50	exp *"Referral and Consultation"/ and "consultation"/	23724
51	*drug therapy,computer assisted/	1351
52	*health maintenance organizations/	10174
53	(managed care or general practice).tw.	50823
54	or/39-53	1365250
55	38 and 54	108289
56	1 and 55	5169
57	(quality and ((continuous$ or total) adj5 (manag$ or improv$))).tw.	7458
58	((continuous$ or total) and (quality adj3 (manag$ or improv$))).tw.	23701
59	(CQI or TQM).tw.	1517
60	total quality management/	13070
61	quality manag$.tw.	5721
62	((process or processes or system or systems) adj3 (improving or improvement or improve or redesign$)).tw.	21691
63	model for improvement.tw.	392
64	((improvement or QI or quality assurance or QA) adj5 (team? or microsystem? or cycle?)).tw.	2321

65	(PDSA or PDCA or TQIS or plan do study or plan do check).tw.	962
66	((shewhart or shewart or deming) adj3 (cycle or method)).tw.	87
67	(breakthrough adj3 (series or project or collaborative?)).tw.	191
68	(lean adj (approach or management or method? or methodology or thinking or enterpri#e or practice or philosophy or principles)).tw.	381
69	six sigma.tw.	492
70	or/57-69	63541
71	1 and 70	1339
72	5 or 56 or 71	7319
73	Randomized controlled trial.pt. or (random$.tw. and (publisher or pubmed-not-medline or in process).st.)	649462
74	72 and 73	1559
75	(mouse or mice or rats or dogs).ti.	912129
76	74 not 75	1559
77	humans/ or (publisher or pubmed-not-medline or in process).st.	19898696
78	76 and 77	1556
79	limit 78 to english language	1521

NOTE: Line 1: Depression (topic filter); Lines 2–3: search strategy using general knowledge translation terms; Lines 6–55: EPOC provider intervention filter augmented by guideline and DoD/VA specific provider intervention terms; Lines 57–70: continuous quality improvement (CQI) filter Line 73: RCT filter; Lines 75–77: human research filter; Line 79: English language filter

Search 2 (adding behavioral change techniques): February 10, 2017 results

1	Persuasion.tw. or persuasive communication/	4229
2	(incentivise or incentivize or incentivization or incentivisation or incentive*).tw.	23405
3	(environmental adj2 restructuring).tw.	21
4	(behavioral* modeling or behavioural* modeling).tw.	45
5	action planning.tw.	810
6	(provider behaviour or provider behavior).tw.	328
7	(behavi?r* adj substitution).tw.	13
8	(behavi?r* adj2 contract).tw.	49
9	cue signaling.tw.	42
10	(behavi#ral adj2 practice).tw.	137
11	(behavi#ral adj2 rehearsal).tw.	46
12	mental rehearsal.tw.	113
13	(monitoring adj2 behavi?r*).tw.	850
14	reframing.tw.	1167
15	graded tasks.tw.	14
16	role model.tw.	1179
17	(reward adj2 behavi?r*).tw.	1083
18	overcorrection.tw.	1467

19	problem solving.tw.	14857
20	((prompt* or cue) adj2 (treatment or guideline)).tw.	5503
21	(re-attribution or reattribution).tw.	67
22	(restructur* adj2 environment).tw.	22
23	(review adj2 behavi?r adj2 (goal or goals)).tw.	4
24	(salience adj2 consequences).tw.	7
25	peer comparison.tw.	83
26	(shaping adj2 behavi?r*).tw.	305
27	(reinforcement or reinforcing or reinforcer).tw.	41322
28	(commitment adj2 (guideline or protocol)).tw.	13
29	(behavi?ral adj2 consequences).tw.	1720
30	(generali#ation adj2 behavi?r*).tw.	95
31	classical conditioning.tw.	2334
32	operant conditioning.tw.	1804
33	covert learning.tw.	4
34	shaping knowledge.tw.	8
35	(reattribution or re-attribution).tw.	67
36	habit reversal.tw.	198
37	habit formation.tw.	312
38	(rais* adj2 awareness).tw.	7553
39	external change agent.tw.	6
40	(guidance adj2 (manager or supervisor or “change leader” or champion or “implementation leader”)).tw.	2
41	performance evaluation.tw.	3913
42	change leader.tw.	14
43	(knowledge adj2 transfer).tw.	1757
44	(computerized adj2 decisional adj2 support).tw.	3
45	(multiprofessional adj2 collaboration).tw.	39
46	or/1-45	114227
47	(depress* or dysthymia or mood dysregulation or premenstrual dysphoric).tw. or depressive disorder/	394251
48	(clinician? or practitioner? or pharmacist? or provider? or physician? or doctor? or counselor? or therapist? or psycholog* or psychiatr* or patient care team? or practice team?).tw. or (managed care or general practice).tw.	1172255
49	((evidence based or guideline* or “care protocol” or treatment) adj2 (recommendation or recommended) adj2 (treatment or “appropriate care”)).tw.	8375
50	46 and 47 and 48 and 49	0
51	47 and 48 and 49	147
52	goal setting.tw.	2710
53	47 and 48 and 49 and 52	0
54	48 or 49	1179611

55	46 and 47 and 54	1313
56	Randomized controlled trial.pt. or (random$.tw. and (publisher or pubmed-not-medline or in process).st.)	546030
57	55 and 56	245
58	(mouse or mice or rats or dogs).ti.	838740
59	57 not 58	244
60	humans/ or (publisher or pubmed-not-medline or in process).st.	19060874
61	59 and 60	243
62	limit 61 to english language	240

NOTE: Lines 1–46: search strategy using behavior change strategy terms; Line 47: Depression (topic filter); Line 48: provider intervention filter; Line 49: search strategy using general knowledge translation terms; Line 56: RCT filter; Lines 58–60: human research filter; Line 62: English language filter

Search 3: February 20, 2017 results

PsycINFO

Search 3: February 20, 2017 results

Human, English

Depress* OR dysthymia OR "mood dysregulation" OR "premenstrual dysphoric" OR (DE "Major Depression" OR DE "Anaclitic Depression" OR DE "Dysthymic Disorder" OR DE "Endogenous Depression" OR DE "Late Life Depression" OR DE "Postpartum Depression" OR DE "Reactive Depression" OR DE "Recurrent Depression" OR DE "Treatment Resistant Depression")

AND

"knowledge translation" OR "knowledge transfer" OR "continuing education" OR "behavior intervention" OR "information campaign" OR "provider education" OR "opinion leader" OR "opinion champion" OR "academic detailing" OR "Train the trainer" OR "depression education" OR "continuing education" OR "competence training" OR "learning collaborative" OR "guideline adherence" OR "guideline rollout" OR "guideline roll-out" OR "guideline toolkit" OR "provider training" OR "provider reminder" OR "reminder*" OR "clinical support tool" OR "guideline prompt" OR "guideline prompting" OR "guideline cue" OR "behavior feedback" OR "patient care planning" OR "computer assisted drug therapy" OR "continuous quality improvement" OR "CQI OR TQM" OR "total quality management" OR "process improvement" OR "model for improvement" OR "PDSA" OR "PDCA" OR "TQIS" OR "Plan do study" OR "Plan do check" OR "shewart cycle" OR "shewhart cycle" OR "deming cycle" OR "shewart method" OR "shewhart method" OR "deming method" OR "breakthrough series" OR "collaborative breakthrough" OR "breakthrough collaborative" OR "six sigma" OR "persuasion" OR "persuasive communication" OR "incentivize" OR "incentivize" OR "incentivisation" OR

“incentivization” OR “incentive” OR “behavioural modeling” OR “behavioral modeling” OR “provider behavior” OR “provider behaviour” OR “behavior substitution” OR “behaviour substitution” OR “behavior contract” OR “behaviour contract” OR “cue signaling” OR “mental rehearsal” OR “behavior monitoring” OR “behaviour monitoring” OR “reframing” OR “role model” OR “behavior reward” OR “behaviour reward” OR “behavior overcorrection” OR “behaviour overcorrection” OR “shaping behavior” OR “shaping behaviour” OR “reinforcement” OR “reinforcing” OR “reinforce” OR “guideline commitment” OR “covert learning” OR “shaping knowledge” OR “habit reversal” OR “habit formation” OR “raising awareness” OR “raise awareness” OR “external change agent” OR “performance evaluation” OR “change leader” OR “computerized decision support” OR “goal setting”

AND

“Clinician*” OR “practitioner*” OR “pharmacist*” OR “provider*” OR “physician*” OR “doctor*” OR “counselor*” OR “therapist*” OR “psycholog*” OR “psychiatr*” OR “patient care team” OR “patient care teams” OR “managed care” OR “general practice”

AND

(“evidence based” OR “evidence-based” OR “guideline*” OR “care protocol” OR “treatment recommendation*” OR “recommended treatment*”)

AND

DE “clinical trials” OR “random*”

Results: 96

CINAHL

(MH “Depression+”) OR (MH “Premenstrual Dysphoric Disorder”) OR “depress*” OR “dysthymia” OR “mood dysregulation” OR “premenstrual dysphoric”

AND

“knowledge translation” OR “knowledge transfer” OR “continuing education” OR “behavior intervention” OR “information campaign” OR “provider education” OR “opinion leader” OR “opinion champion” OR “academic detailing” OR “Train the trainer” OR “depression education” OR “continuing education” OR “competence training” OR “learning collaborative” OR “guideline adherence” OR “guideline rollout” OR “guideline roll-out” OR “guideline toolkit” OR “provider training” OR “provider reminder” OR “reminder*” OR “clinical support tool” OR “guideline prompt” OR “guideline prompting” OR “guideline cue” OR “behavior feedback” OR “patient care planning” OR “computer assisted drug therapy” OR “continuous quality improvement” OR “CQI” OR “TQM” OR “total quality management” OR “process improvement” OR “model for improvement” OR “PDSA” OR “PDCA” OR “TQIS” OR “Plan

do study" OR "Plan do check" OR "shewart cycle" OR "shewhart cycle" OR "deming cycle" OR "shewart method" OR "shewhart method" OR "deming method" OR "breakthrough series" OR "collaborative breakthrough" OR "breakthrough collaborative" OR "six sigma" OR "persuasion" OR "persuasive communication" OR "incentivize" OR "incentivize" OR "incentivisation" OR "incentivization" OR "incentive" OR "behavioural modeling" OR "behavioral modeling" OR "provider behavior" OR "provider behaviour" OR "behavior substitution" OR "behaviour substitution" OR "behavior contract" OR "behaviour contract" OR "cue signaling" OR "mental rehearsal" OR "behavior monitoring" OR "behaviour monitoring" OR "reframing" OR "role model" OR "behavior reward" OR "behaviour reward" OR "behavior overcorrection" OR "behaviour overcorrection" OR "shaping behavior" OR "shaping behaviour" OR "reinforcement" OR "reinforcing" OR "reinforce" OR "guideline commitment" OR "covert learning" OR "shaping knowledge" OR "habit reversal" OR "habit formation" OR "raising awareness" OR "raise awareness" OR "external change agent" OR "performance evaluation" OR "change leader" OR "computerized decision support" OR "goal setting"

AND

"Clinician*" OR "practitioner*" OR "pharmacist*" OR "provider*" OR "physician*" OR "doctor*" OR "counselor*" OR "therapist*" OR "psycholog*" OR "psychiatr*" OR "patient care team" OR "patient care teams" OR "managed care" OR "general practice"

AND

("evidence based" OR "evidence-based" OR "guideline*" OR "care protocol" OR "treatment recommendation*" OR "recommended treatment*")

AND

(MH "Randomized Controlled Trials") OR "random*"

Results: 32 – duplicates = 17

CENTRAL

(title/abstract/keywords)

"depress*" OR "dysthymia" OR "mood dysregulation" OR "premenstrual dysphoric"

AND

"knowledge translation" OR "knowledge transfer" OR "continuing education" OR "behavior intervention" OR "information campaign" OR "provider education" OR "opinion leader" OR "opinion champion" OR "academic detailing" OR "Train the trainer" OR "depression education" OR "continuing education" OR "competence training" OR "learning collaborative" OR "guideline adherence" OR "guideline rollout" OR "guideline roll-out" OR "guideline toolkit" OR "provider training" OR "provider reminder" OR "reminder*" OR "clinical support tool" OR "guideline prompt" OR "guideline prompting" OR "guideline cue" OR "behavior feedback" OR "patient care planning" OR "computer assisted drug therapy" OR "continuous quality

improvement" OR "CQI" OR "TQM" OR "total quality management" OR "process improvement" OR "model for improvement" OR "PDSA" OR "PDCA" OR "TQIS" OR "Plan do study" OR "Plan do check" OR "shewart cycle" OR "shewhart cycle" OR "deming cycle" OR "shewart method" OR "shewhart method" OR "deming method" OR "breakthrough series" OR "collaborative breakthrough" OR "breakthrough collaborative" OR "six sigma" OR "persuasion" OR "persuasive communication" OR "incentivise" OR "incentivize" OR "incentivisation" OR "incentivization" OR "incentive" OR "behavioural modeling" OR "behavioral modeling" OR "provider behavior" OR "provider behaviour" OR "behavior substitution" OR "behaviour substitution" OR "behavior contract" OR "behaviour contract" OR "cue signaling" OR "mental rehearsal" OR "behavior monitoring" OR "behaviour monitoring" OR "reframing" OR "role model" OR "behavior reward" OR "behaviour reward" OR "behavior overcorrection" OR "behaviour overcorrection" OR "shaping behavior" OR "shaping behaviour" OR "reinforcement" OR "reinforcing" OR "reinforce" OR "guideline commitment" OR "covert learning" OR "shaping knowledge" OR "habit reversal" OR "habit formation" OR "raising awareness" OR "raise awareness" OR "external change agent" OR "performance evaluation" OR "change leader" OR "computerized decision support" OR "goal setting"

AND

"Clinician*" OR "practitioner*" OR "pharmacist*" OR "provider*" OR "physician*" OR "doctor*" OR "counselor*" OR "therapist*" OR "psycholog*" OR "psychiatr*" OR "patient care team" OR "patient care teams" OR "managed care" OR "general practice"

AND

("evidence based" OR "evidence-based" OR "guideline*" OR "care protocol" OR "treatment recommendation*" OR "recommended treatment*")

Results: 109 – duplicates = 65

CDSR

(title/abstract/keywords)

"depress*" OR "dysthymia" OR "mood dysregulation" OR "premenstrual dysphoric"

AND

"knowledge translation" OR "knowledge transfer" OR "continuing education" OR "behavior intervention" OR "information campaign" OR "provider education" OR "opinion leader" OR "opinion champion" OR "academic detailing" OR "Train the trainer" OR "depression education" OR "continuing education" OR "competence training" OR "learning collaborative" OR "guideline adherence" OR "guideline rollout" OR "guideline roll-out" OR "guideline toolkit" OR "provider training" OR "provider reminder" OR "reminder*" OR "clinical support tool" OR "guideline prompt" OR "guideline prompting" OR "guideline cue" OR "behavior feedback" OR "patient care planning" OR "computer assisted drug therapy" OR "continuous quality

improvement" OR "CQI" OR "TQM" OR "total quality management" OR "process improvement" OR "model for improvement" OR "PDSA" OR "PDCA" OR "TQIS" OR "Plan do study" OR "Plan do check" OR "shewart cycle" OR "shewhart cycle" OR "deming cycle" OR "shewart method" OR "shewhart method" OR "deming method" OR "breakthrough series" OR "collaborative breakthrough" OR "breakthrough collaborative" OR "six sigma" OR "persuasion" OR "persuasive communication" OR "incentivise" OR "incentivize" OR "incentivisation" OR "incentivization" OR "incentive" OR "behavioural modeling" OR "behavioral modeling" OR "provider behavior" OR "provider behaviour" OR "behavior substitution" OR "behaviour substitution" OR "behavior contract" OR "behaviour contract" OR "cue signaling" OR "mental rehearsal" OR "behavior monitoring" OR "behaviour monitoring" OR "reframing" OR "role model" OR "behavior reward" OR "behaviour reward" OR "behavior overcorrection" OR "behaviour overcorrection" OR "shaping behavior" OR "shaping behaviour" OR "reinforcement" OR "reinforcing" OR "reinforce" OR "guideline commitment" OR "covert learning" OR "shaping knowledge" OR "habit reversal" OR "habit formation" OR "raising awareness" OR "raise awareness" OR "external change agent" OR "performance evaluation" OR "change leader" OR "computerized decision support" OR "goal setting"

AND

"Clinician*" OR "practitioner*" OR "pharmacist*" OR "provider*" OR "physician*" OR "doctor*" OR "counselor*" OR "therapist*" OR "psycholog*" OR "psychiatr*" OR "patient care team" OR "patient care teams" OR "managed care" OR "general practice"

AND

("evidence based" OR "evidence-based" OR "guideline*" OR "care protocol" OR "treatment recommendation*" OR "recommended treatment*")

Results = 2 (no duplicates)

Appendix B. Excluded Publications

Publications Not Meeting Inclusion Criteria with Reasons for Exclusion

Aakhus, Eivind, S. A. Flottorp, and A. D. Oxman, "Implementing Evidence-Based Guidelines for Managing Depression in Elderly Patients: A Norwegian Perspective," *Epidemiology and Psychiatric Sciences*, Vol. 21, No. 3, 2012, pp. 237–240. Reason for exclusion: Wrong study design (non-RCT)

Aakhus, Eivind, I. Granlund, J. Odgaard-Jensen, A. D. Oxman, and S. A. Flottorp, "A Tailored Intervention to Implement Guideline Recommendations for Elderly Patients with Depression in Primary Care: A Pragmatic Cluster Randomised Trial," *Implementation Science*, Vol. 11, 2016. Reason for exclusion: Practice redesign intervention

Addington, Donald, E. McKenzie, H. Smith, H. Chuang, S. Boucher, B. Adams, and Z. Ismail, "Conformance to Evidence-Based Treatment Recommendations in Schizophrenia Treatment Services," *La Revue canadienne de psychiatrie* [*The Canadian Journal of Psychiatry*], Vol. 57, No. 5, 2012, pp. 317–323. Reason for exclusion: Wrong study design (non-RCT)

Alegría, Margarita, R. Frank, and T. McGuire, "Managed Care and Systems Cost-Effectiveness: Treatment for Depression," *Medical Care*, Vol. 43, No. 12, 2005, pp. 1225–1233. Reason for exclusion: Not provider behavior change intervention, not about the use of evidence-based treatment for depression

Alexopoulos, George S., I. R. Katz, M. L. Bruce, M. G. Heo, T. Ten Have, P. Raue, H. R. Bogner, H. C. Schulberg, B. H. Mulsant, and C. F. Reynolds, III, "Remission in Depressed Geriatric Primary Care Patients: A Report from the PROSPECT Study," *American Journal of Psychiatry*, Vol. 162, No. 4, 2005, pp. 718–724. Reason for exclusion: Does not include provider behavior change outcomes

Alexopoulos, George S., C. F. Reynolds, III, M. L. Bruce, I. R. Katz, P. J. Raue, B. H. Mulsant, D. W. Oslin, T. Ten Have, and Prospect Group, "Reducing Suicidal Ideation and Depression in Older Primary Care Patients: 24-Month Outcomes of the PROSPECT Study," *American Journal of Psychiatry*, Vol. 166, No. 8, August 2009, pp. 882–890. Reason for exclusion: Practice redesign intervention

Almeida, Osvaldo P., J. Pirkis, N. Kerse, M. Sim, L. Flicker, J. Snowdon, B. Draper, G. Byrne, R. Goldney, N. T. Lautenschlager, N. Stocks, H. Alfonso, and J. J. Pfaff, "A Randomized Trial to Reduce the Prevalence of Depression and Self-Harm Behavior in Older Primary Care Patients," *Annals of Family Medicine*, Vol. 10, No. 4, July–August 2012, pp. 347–356. Reason for exclusion: Does not include provider behavior change outcomes

Andersen, S. M., and B. H. Harthorn, "Changing the Psychiatric Knowledge of Primary Care Physicians: The Effects of a Brief Intervention on Clinical Diagnosis and Treatment," *General Hospital Psychiatry*, Vol. 12, No. 3, May 1990, pp. 177–190. Reason for exclusion: Does not include provider behavior change outcomes

Aragones, Enric, A. Caballero, J. L. Pinol, and G. Lopez-Cortacans, "Persistence in the Long Term of the Effects of a Collaborative Care Programme for Depression in Primary Care," *Journal of Affective Disorders*, Vol. 166, September 2014, pp. 36–40. Reason for exclusion: Practice redesign intervention

Aragones, Enric, A. Caballero, J. L. Pinol, G. Lopez-Cortacans, W. Badia, J. M. Hernandez, P. Casaus, S. Folch, J. Basora, A. Labad, and Indi Research Group, "Assessment of an Enhanced Program for Depression Management in Primary Care: A Cluster Randomized Controlled Trial. The INDI Project (Interventions for Depression Improvement)," *BMC Public Health*, Vol. 7, 2007, p. 253. Reason for exclusion: Practice redesign intervention

Aragones, Enric, J. L. Pinol, A. Caballero, G. Lopez-Cortacans, P. Casaus, J. M. Hernandez, W. Badia, and S. Folch, "Effectiveness of a Multi-Component Programme for Managing Depression in Primary Care: A Cluster Randomized Trial. The INDI Project," *Journal of Affective Disorders*, Vol. 142, No. 1–3, December 15, 2012, pp. 297–305. Reason for exclusion: Practice redesign intervention

Arends, Iris, J. J. van der Klink, and U. Bultmann, "Prevention of Recurrent Sickness Absence Among Employees with Common Mental Disorders: Design of a Cluster-Randomised Controlled Trial with Cost-Benefit and Effectiveness Evaluation," *BMC Public Health*, Vol. 10, 2010, p. 132. Reason for exclusion: Wrong study design (non-RCT)

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Appendix C. Evidence Table of Included Studies

Study Details	Participants	Intervention and Treatment	Outcomes and Results
Parent study: Aakhus, 2016 References: Aakhus, 2016; Aakhus, 2014 Country: Norway Setting: Primary care office Randomization unit: Municipality Reported power calculation: Insufficient power Study quality: Good. Achieved adequate randomization, blinding of outcome assessment, handling of incomplete outcome data, and selective reporting of outcomes. Low risk for cross-over/contamination and unclear risk for allocation concealment. Blinding of personnel not possible.	Number of sites: 51 municipalities (26 intervention, 28 control) Number of providers: 124 (51 intervention, 73 control) Provider type: Provider only Provider target category: PCP Number of patients: 134 (66 intervention, 68 control) Diagnosis: Depression (clinical diagnosis) Inclusion criteria: Municipalities: All general practices in 80 targeted municipalities of total of 428. Providers: All GPs in the targeted municipalities. Patients: Home-dwelling elderly patients; 65 years or older; ICD-10 diagnosis of mild, moderate, or severe depressive episode, recurrent depression, or dysthymia; consulted their practitioner within the last 6 months before the intervention Exclusion criteria: Providers or municipalities: NR. Patients: No ICD-10 depression diagnosis, diagnosis of dementia or bipolar disorder, resided in nursing homes, practitioner assessed patient to have low life expectancy	Content and format of intervention: Outreach visits to GPs; website that provided recommendations, tools to diagnose and manage elderly patients with depression, and online courses; CME course approved by the Norwegian Medical Association; tailored information based on profession or relation to the health care Implementation strategy: Developed software for the 5 electronic journal systems used by general practitioners in Norway Content and format of guidelines: Not specified Categorization of intervention: Education plus other components Comparator: UC Duration of intervention: NR Time points of outcome assessments from end of implementation phase: NR	Provider behaviors: Mean adherence to recommendations for the management of depression at 8 months* -Intervention to improve adherence vs. Control group, MD –5.00 (95% CI: –11.87, 1.87) Patient health outcomes: Adherence to antidepressant >0 at 8 months –Intervention to improve adherence vs. Control group, OR 1.33 (95% CI: 0.88, 2.00) GP assessed CGI-I at 8 months –Intervention to improve adherence vs. Control group, MD 0.03 (95% CI: –0.20, 0.26) HADS depression at 8 months –Intervention to improve adherence vs. Control group, MD –0.28 (95% CI: –1.87, 1.31) Patient assessed PGI at 8 months –Intervention to improve adherence vs. Control group, MD 0.10 (95% CI: –0.38, 0.58)

Study Details	Participants	Intervention and Treatment	Outcomes and Results
Parent study: Azocar, 2003 References: Azocar, 2003 Country: USA Setting: Managed Behavioral Health Care Organization (specialty care) Randomization unit: Provider Reported power calculation: No Study quality: Poor. Limited detail regarding randomization, allocation concealment, blinding of outcome assessment, and selective reporting of outcomes. Potential low risk for handling of incomplete outcome data and cross-over contamination but not specified. Blinding of personnel not possible.	Number of sites: NR Number of providers: 443 (162 guidelines only, 132 targeted guidelines, 149 control) Provider type: Provider only Provider target category: Mental health care provider Number of patients: 836 (273 guidelines only, 254 targeted guidelines, 309 control) Diagnosis: MDD Inclusion criteria: Providers: NR. Patients: All adult patients starting a new episode of care with a study clinician Exclusion criteria: Providers and patients: NR	Content and format of intervention: Two intervention Conditions: (1) general dissemination where clinicians were mailed treatment guidelines in a single mass mailing and (2) target dissemination where clinicians were mailed treatment guidelines to target a recently referred patient they diagnosed with major depression and a cover letter designed to enhance the sentinel presence of a managed behavioral health organization by emphasizing the importance of adherence in subsequent treatment review. Implementation strategy: N/A Content and format of guidelines: United Behavioral Health best practice guidelines, based on APA and AHRQ guidelines, for major depression Categorization of intervention: Distributing guidelines Comparator: UC Duration of intervention: Duration on intervention or its components NR Time points of outcome assessments from end of implementation phase: Provider and patient assessment 4 months after guidelines were mailed	Provider behaviors: Mean adjusted adherence rating (subjective) at 4 months* –General dissemination of guidelines vs. No dissemination, MD –0.03 (95% CI: Not calculable) –Target dissemination vs. No dissemination, MD 0.11 (95% CI: Not calculable) Units of service (indicators of guideline adherence): combined outpatient at 4 months –General dissemination of guidelines vs. No dissemination, MD 0.20 (95% CI: –0.65, 1.05) –Target dissemination vs. No dissemination, MD –0.40 (95% CI: –1.25, 0.45) Units of service (indicators of guideline adherence): outpatient medication at 4 months –General dissemination of guidelines vs. No dissemination, MD 0.00 (95% CI: –0.43, 0.43) –Target dissemination vs. No dissemination, MD –0.30 (95% CI: –0.74, 0.14) Units of service (indicators of guideline adherence): outpatient psychotherapy at 4 months –General dissemination of guidelines vs. No dissemination, MD 0.20 (95% CI: –0.62, 1.02) –Target dissemination vs. No dissemination, MD 0.10 (95% CI: –0.75, 0.95)
Parent study: Baker, 2001 References: Baker, 2001 Country: England Setting: Primary care office Randomization unit: Site Reported power calculation: Insufficient power Study quality: Good. Achieved adequate randomization, blinding of outcome assessment, and cross-over contamination.	Number of sites: 60 (30 intervention, 30 control) Number of providers: 64 (34 intervention, 30 control) Provider type: Provider only Provider target category: PCP Number of patients: 402 (210 intervention, 192 control) Diagnosis: Depression Inclusion criteria: Providers and practices: NR. Patients: Age 18 or above attending for their first consultation with new episodes of depression.	Content and format of intervention: Providers received a copy of the guidelines and a summary of the relevant evidence for each recommendation. Providers were interviewed for 25–45 minutes after dissemination of the guidelines to identify obstacles/barriers and guidelines were tailored to help providers overcome identified barriers. Interview and data about the performance of each included GP were discussed until consensus was reached about the particular psychological theory that best explained the observed obstacle. The implementation methods were delivered to each practitioner approximately 4 to 6 weeks after their interview. Implementation strategy: The interview was piloted with 2 GPs not taking part in the study Content and format of guidelines: Developed guidelines for management of depression from existing, high-quality guidelines and literature reviews	Provider behaviors: Antidepressant in therapeutic dose at 12 months –Tailored strategy to implement guidelines vs. Control group (received guidelines), OR 1.12 (95% CI: 0.99, 1.26) Diagnosis: 3 or more symptoms recorded at 12 months –Tailored strategy to implement guidelines vs. Control group (received guidelines), OR 1.25 (95% CI: 1.03, 1.53) Reviewed at 3 weeks and at 12 months –Tailored strategy to implement guidelines vs. Control group (received guidelines), OR 1.04 (95% CI: 0.92, 1.18) Suicide risk assessed at diagnosis and at 12 months –Tailored strategy to implement guidelines vs. Control group (received guidelines), OR 2.51 (95% CI: 1.93, 3.26) Those treated are to have 2 or more follow-up consultations at 12 months –Tailored strategy to implement guidelines vs. Control group (received guidelines), OR 1.32 (95% CI: 1.07, 1.64) Treated for 4 months at 12 months –Tailored strategy to implement guidelines vs. Control group (received guidelines), OR 1.28 (95% CI: 1.00, 1.63) Treated with antidepressant or cognitive therapy at 12 months* –Tailored strategy to implement guidelines vs. Control group (received guidelines), OR 1.03 (95% CI: 0.98, 1.08)

Study Details	Participants	Intervention and Treatment	Outcomes and Results
–Continued Parent study: Baker, 2001 Unclear risk for allocation concealment, handling of incomplete outcome data, and selective reporting of outcomes. Blinding of personnel not possible.	Exclusion criteria: Providers and practices: NR. Patients: Could not read or write English, had received treatment for depression in the previous 6 months.	Categorization of intervention: Distributing guidelines Comparator: Other (Control group received guidelines but did not receive implementation recommendations). Duration of intervention: Guidelines implemented over 6 weeks, at which point intervention group physicians were interviewed on implementation challenges. Based on their responses, they received implementation methods. Providers enrolled patients for 12 months after interviews. Time points of outcome assessments from end of implementation phase: Provider data collected before the interviews and 12 months later. Patient outcomes 4 and 6 weeks after initial consultation.	Patient health outcomes: BDI <11 at 16 weeks at 12 months –Tailored strategy to implement guidelines vs. Control group (received guidelines), OR 1.07 (95% CI: 0.77, 1.47) BDI <11 at 4 weeks at 12 months –Tailored strategy to implement guidelines vs. Control group (received guidelines), OR 0.83 (95% CI: 0.51, 1.34) BDI <11 at diagnosis at 12 months –Tailored strategy to implement guidelines vs. Control group (received guidelines), OR 0.61 (95% CI: 0.18, 2.14)
Parent study: Bosmans, 2006 References: Bosmans, 2006; Bijl, 2003 Country: Netherlands Setting: Primary care office Randomization unit: Site Reported power calculation: Insufficient power Study quality: Good. Achieved adequate outcome blinding, handling of incomplete outcome data, and low risk for cross-over contamination, but limited detail regarding randomization, allocation concealment, and selective reporting of outcomes. Blinding of personnel not possible.	Number of sites: 34 (18 intervention, 16 control) Number of providers: NR Provider type: Provider only Provider target category: PCP Number of patients: 145 (70 intervention, 75 control) Diagnosis: Depression (rating scale) Inclusion criteria: Providers: GPs of intervention patients had to agree with the diagnosis of major depression and be willing to prescribe an antidepressant. Patients: All consecutive patients 55 years and older visiting their GP, Geriatric Depression Scale-15 score of 5 or higher, PRIME-MD diagnosed major depression. Exclusion criteria: Providers: NR. Patients: Current use of antidepressants; current psychosis, bipolar disorder, or alcohol or drug abuse; severe social dysfunction, inability to communicate in Dutch, and impaired cognitive functioning.	Content and format of intervention: GPs attended a 4-hour training session consisting of education and information, drug therapy (20 mg of paroxetine once daily), and supportive contacts, based on the Dutch depression guideline. Implementation strategy: Two treatment phases: (1) an acute treatment phase during which patients were seen every 2 weeks by their GP for a period of 2 months, (2) a continuation phase during which patients were seen monthly for a period of 4 months. Content and format of guidelines: Dutch depression guideline Categorization of intervention: Education Comparator: UC Duration of intervention: 4-hour training session and 6 month implementation period Time points of outcome assessments from end of implementation phase: Provider and patient outcomes assessed after initial screening (baseline), and 2, 6, and 12 months after screening	Provider behaviors: Received some form of mental health care (antidepressant medication or referral during the follow-up period) at 12 months* –Practitioners training group vs. Control group, OR 6.64 (95% CI: 3.42, 12.90) Patient health outcomes: % (No.) Recovered (PRIME-MD) at 12 months –Practitioners training group vs. Control group, OR 0.90 (95% CI: 0.61, 1.33) Mean QALYs gained (EQ-5D) at 12 months –Practitioners training group vs. Control group, MD 0.05 (95% CI: –0.02, 0.12) Mean improvement in MADRS score at 12 months –Practitioners training group vs. Control group, MD –0.60 (95% CI: –3.76, 2.56)

Study Details	Participants	Intervention and Treatment	Outcomes and Results
Parent study: Callahan, 1994 References: Callahan, 1994 Country: USA Setting: Primary care office Randomization unit: Patient Reported power calculation: Insufficient power Study quality: Poor. Limited detail regarding randomization, outcome blinding, allocation concealment, selective reporting of outcomes, and handling of incomplete outcome data. Low risk for cross-over contamination. Blinding of personnel not possible.	Number of sites: 1 Number of providers: 103 (number per experimental condition NR) Provider type: Provider only Provider target category: PCP Number of patients: 175 (100 intervention, 75 control) Diagnosis: Depression (rating scale) Inclusion criteria: Providers: NR. Patients: Age 60 and older who scored ≥ 16 on the CES-D and ≥ 15 on the HAM-D Exclusion criteria: Providers: NR. Patients: Prisoners, patients in nursing homes, non-English speaking, hearing impaired	Content and format of intervention: Physicians received a letter with the results of patient depression score interviews and medical record data, along with recommended care developed by an expert panel. The letter contained the clinical algorithm detailing the initiation, management, and monitoring of antidepressant medications in elderly patients. Implementation strategy: Three additional appointments were scheduled for intervention patient participants to address the patient's symptoms of depression. Content and format of guidelines: Antidepressant medication treatment recommendations based on literature review and expert panel consensus Categorization of intervention: Distributing guidelines Comparator: UC Duration of intervention: 3 visits over 3 months Time points of outcome assessments from end of implementation phase: Baseline, 1, 3, 6, and 9 months after screening	Provider behaviors: Received a depression diagnosis at 6 months –Intervention group vs. Control group, OR 2.67 (95% CI: 1.36, 5.23) Received a psychiatry referral at 6 months –Intervention group vs. Control group, OR 0.88 (95% CI: 0.41, 1.92) Remain on antidepressants at 6 months –Intervention group vs. Control group, OR 1.74 (95% CI: 1.01, 2.99) Started antidepressants at 6 months –Intervention group vs. Control group, OR 3.25 (95% CI: 1.41, 7.50) Stopped drugs associated with depression at 6 months* –Intervention group vs. Control group, OR 1.05 (95% CI: 0.60, 1.82) Patient health outcomes: HAM-D ≤10 at 6 months (responder) at 6 months –Intervention group vs. Control group, OR 1.08 (95% CI: 0.49, 2.40) HAM-D score at 1 month –Intervention group vs. Control group, MD 0.20 (95% CI: Not calculable) HAM-D score at 3 months –Intervention group vs. Control group, MD 0.00 (95% CI: Not calculable) HAM-D score at 6 months –Intervention group vs. Control group, MD 0.40 (95% CI: Not calculable) HAM-D score at 9 months –Intervention group vs. Control group, MD 0.60 (95% CI: Not calculable)
Parent study: Datto, 2003 References: Datto, 2003 Country: USA Setting: Primary care office Randomization unit: Site Reported power calculation: Insufficient power Study quality: Poor. Limited detail regarding randomization, allocation concealment, outcome blinding, selective reporting of outcomes, and handling of incomplete outcome data. Low risk for cross-over contamination due to randomization by practice. Blinding of personnel not possible.	Number of sites: 35 (17 diseases management, 18 education and guidelines) Number of providers: 151 (74 disease management, 77 education and guidelines) Provider type: Provider only Provider target category: Other general practitioner or clinician Number of patients: 61 (30 disease management, 31 education and guidelines) Diagnosis: Depression (rating scale) Inclusion criteria: Providers and practices NR. Patients: Significant depressive symptoms (CES-D ≥ 16)	Content and format of intervention: Provider education and distribution of practice guidelines without added disease management patient care from nurses Implementation strategy: Phone calls made to patients and feedback to providers was done in writing using assessment summary form letters sent via confidential faxes. Content and format of guidelines: AHRQ practice guidelines for major depression in primary care Categorization of intervention: Education Comparator: Other (Education and practice guidelines plus nurse disease management) Duration of intervention: Duration of intervention components NR. Intervention implemented for 12 weeks. Time points of outcome assessments from end of implementation phase: Reports of provider treatment recommendations at weeks 6 and 12 for intervention group; at week 16 for control group.	Provider behaviors: Clinical adherence, when controlling for symptom improvement at 16 weeks –Usual care (guidelines and training) vs. Telephone disease management, OR 0.18 (95% CI: 0.05, 0.67) Clinician adherence through 12 weeks at 16 weeks* –Usual care (guidelines and training) vs. Telephone disease management, OR 0.30 (95% CI: 0.08, 1.14) Clinician adherence through 12 weeks, including only patients who required treatment adjustment (n = 34) at 16 weeks –Usual care (guidelines and training) vs. Telephone disease management, OR 0.14 (95% CI: 0.02, 0.97) Patient adherence through 12 weeks at 16 weeks –Usual care (guidelines and training) vs. Telephone disease management, OR 0.16 (95% CI: 0.02, 1.39) Symptom improvement (CES-D <16) at 16 weeks –Usual care (guidelines and training) vs. Telephone disease management, OR 0.25 (95% CI: 0.08, 0.77) Symptom improvement (CES-D <16) when controlling for clinician adherence, active and passive adherence at 16 weeks –Usual care (guidelines and training) vs. Telephone disease management, OR 0.71 (95% CI: 0.10, 1.43) Patient health outcomes: CES-D score at 16 weeks –Usual care (guidelines and training) vs. Telephone disease management, MD 4.50 (95% CI: –0.90, 9.90)

Study Details	Participants	Intervention and Treatment	Outcomes and Results
–Continued Parent study: Datto, 2003	Exclusion criteria: Providers and practices NR. Patients: Significant suicidal risks, ongoing substance abuse problems, current psychotic symptoms, or evidence for bipolar affective disorder		Proportion meeting major depression (MINI) at 16 weeks –Usual care (guidelines and training) vs. Telephone disease management, OR 1.92 (95% CI: 0.49, 7.69) Proportion of patients below CES-D 11 at follow-up at 16 weeks –Usual care (guidelines and training) vs. Telephone disease management, OR 0.29 (95% CI: 0.07, 1.18) Proportion of patients below CES-D 16 at follow-up at 16 weeks –Usual care (guidelines and training) vs. Telephone disease management, OR 0.15 (95% CI: 0.04, 0.64) Proportion with at least 50% reduction in CES-D at 16 weeks –Usual care (guidelines and training) vs. Telephone disease management, OR 0.25 (95% CI: 0.06, 1.09
Parent study: Eccles, 2007 References: Eccles, 2007 Country: UK Setting: Primary care trusts Randomization unit: Site Reported power calculation: Yes Study quality: Fair. Achieved adequate randomization, blinding of outcome assessment, and cross-over contamination, but unclear risk for allocation concealment and selective reporting of outcomes. High risk for handling of incomplete outcome data. Blinding of personnel not possible.	Number of sites: 73 (36 intervention, 37 control) Number of providers: 266 (128 intervention, 138 control) Provider type: Provider only Provider target category: PCP Number of patients: NR Diagnosis: Unclear Inclusion criteria: Practices: All 73 practices in 2 primary care trusts in Newcastle and North Tyneside. Providers and patients: NR Exclusion criteria: NR	Content and format of intervention: Guidelines distributed to all GPs and intervention GPs received 1 to 2 outreach visits from pharmaceutical advisers to encourage implementation of the main messages from the guidelines, to explore GPs' knowledge and patterns of current activity, to offer clear behavioral objectives, and to acknowledge areas of controversy (such as differing treatment regimens and their cost). Implementation strategy: The guidelines were distributed through the primary care trust courier or postal system to each individual GP in both conditions. Content and format of guidelines: Guidelines on using cost-effective antidepressant medication to manage depression in primary care, developed by a multidisciplinary panel Categorization of intervention: Education Comparator: Other (Guideline distribution only) Duration of intervention: 2 visits between July and Dec 1999 from pharmaceutical advisers 4 to 6 weeks apart; visits lasted 20–45 minutes Time points of outcome assessments from end of implementation phase: Quarterly for 18 months following initial visit; from July 1999 to December 2000	Provider behaviors: Items prescribed per ASTROPU: MAOIs (mean difference between intervention and control) at 6 quarters –Outreach visits by pharma adviser vs. Control group, MD 0.00 (95% CI: –0.02, 0.02) Items prescribed per ASTROPU: SSRIs (mean difference between intervention and control) at 6 quarters –Outreach visits by pharma adviser vs. Control group, MD 0.03 (95% CI: –0.27, 0.34) Items prescribed per ASTROPU: lofepramine (mean difference between intervention and control) at 6 quarters –Outreach visits by pharma adviser vs. Control group, MD –0.02 (95% CI: –0.16, 0.11) Items prescribed per ASTROPU: other TCAs (mean difference between intervention and control) at 6 quarters* –Outreach visits by pharma adviser vs. Control group, MD –0.02 (95% CI: –0.46, 0.42) Number of items prescribed per ASTROPU: MAOIs at 12 months –Outreach visits by pharma adviser vs. Control group, MD –0.01 (95% CI: –0.04, 0.02) Number of items prescribed per ASTROPU: MAOIs at 15 months –Outreach visits by pharma adviser vs. Control group, MD 0.00 (95% CI: –0.03, 0.03) Number of items prescribed per ASTROPU: MAOIs at 3 months –Outreach visits by pharma adviser vs. Control group, MD 0.01 (95% CI: –0.03, 0.05) Number of items prescribed per ASTROPU: MAOIs at 6 months –Outreach visits by pharma adviser vs. Control group, MD 0.01 (95% CI: –0.02, 0.04) Number of items prescribed per ASTROPU: MAOIs at 9 months –Outreach visits by pharma adviser vs. Control group, MD 0.00 (95% CI: –0.03, 0.03) Number of items prescribed per ASTROPU: Other TCAs at 12 months –Outreach visits by pharma adviser vs. Control group, MD 0.23 (95% CI: –1.38, 1.84) Number of items prescribed per ASTROPU: Other TCAs at 15 months –Outreach visits by pharma adviser vs. Control group, MD 0.27 (95% CI: –1.36, 1.90) Number of items prescribed per ASTROPU: Other TCAs at 3 months –Outreach visits by pharma adviser vs. Control group, MD 0.27 (95% CI: –1.42, 1.96) Number of items prescribed per ASTROPU: Other TCAs at 6 months –Outreach visits by pharma adviser vs. Control group, MD 0.07 (95% CI: –1.64, 1.78) Number of items prescribed per ASTROPU: Other TCAs at 9 months –Outreach visits by pharma adviser vs. Control group, MD 0.42 (95% CI: –1.16, 2.00) Number of items prescribed per ASTROPU: SSRIs at 12 months –Outreach visits by pharma adviser vs. Control group, MD 0.41 (95% CI: –0.70, 1.52) Number of items prescribed per ASTROPU: SSRIs at 15 months –Outreach visits by pharma adviser vs. Control group, MD 0.50 (95% CI: –0.62, 1.62) Number of items prescribed per ASTROPU: SSRIs at 3 months –Outreach visits by pharma adviser vs. Control group, MD 0.33 (95% CI: –0.69, 1.35) Number of items prescribed per ASTROPU: SSRIs at 6 months –Outreach visits by pharma adviser vs. Control group, MD 0.30 (95% CI: –0.73, 1.33) Number of items prescribed per ASTROPU: SSRIs at 9 months –Outreach visits by pharma adviser vs. Control group, MD 0.24 (95% CI: –0.81, 1.29)

Study Details	Participants	Intervention and Treatment	Outcomes and Results
–Continued Parent study: Eccles, 2007 References: Eccles, 2007			Number of items prescribed per ASTROPU: lofepramine at 12 months –Outreach visits by pharma adviser vs. Control group, MD 0.05 (95% CI: –0.28, 0.38) Number of items prescribed per ASTROPU: lofepramine at 15 months –Outreach visits by pharma adviser vs. Control group, MD 0.05 (95% CI: –0.32, 0.42) Number of items prescribed per ASTROPU: lofepramine at 3 months –Outreach visits by pharma adviser vs. Control group, MD 0.10 (95% CI: –0.23, 0.43) Number of items prescribed per ASTROPU: lofepramine at 6 months –Outreach visits by pharma adviser vs. Control group, MD 0.09 (95% CI: –0.28, 0.46) Number of items prescribed per ASTROPU: lofepramine at 9 months –Outreach visits by pharma adviser vs. Control group, MD 0.16 (95% CI: –0.17, 0.49)
Parent study: Freemantle, 2002 References: Freemantle, 2002; Nazareth, 2002 Country: UK Setting: General practices in health authorities (primary care) Randomization unit: Site Reported power calculation: Yes Study quality: Fair. Limited detail regarding randomization, outcome blinding, allocation concealment, and handling of incomplete outcome data. Low risk for cross-over contamination and selective reporting of outcomes. Blinding of personnel not possible.	Number of sites: 12 health authorities paired in groups of 2 randomized to receive 2 of 4 guidelines (3 pairs received antidepressant guidelines, 3 did not). 75 practices (intervention and control Ns NR) Number of providers: 162 (N per condition NR) Provider type: Provider only Provider target category: PCP Number of patients: 11,328 (N per condition not NR) Diagnosis: Unclear Inclusion criteria: NR Exclusion criteria: NR	Content and format of intervention: Pharmacists were trained over a 3-day period to deliver 2 of 4 guidelines to physicians via educational handouts and academic detailing (e.g., messages on pens and mugs) over the course of 2 outreach sessions (first covered 1 guideline, follow-up visit covered additional guideline). The antidepressant guideline recommended the routine first-line use of tricyclic antidepressants, with selective serotonin reuptake inhibitors reserved for second-line use. Implementation strategy: Community pharmacists were recruited to the study on a locum basis and undertook a 3-day training and orientation program that focused on the content of the guidelines and social marketing techniques, with extensive role-play and practice orientation. Content and format of guidelines: Developed using established techniques by the North of England Guidelines Development Project on the basis of systematic reviews undertaken by representative groups of health professionals. Examined (1) the use of aspirin antiplatelet therapy, (2) the use of angiotensin-converting enzyme inhibitors in heart failure, (3) the use of non-steroidal anti-inflammatory drugs in the treatment of pain due to osteoarthritis, and (4) choice of antidepressants in the treatment of depression (the guideline of interest in this review) Categorization of intervention: Education Comparator: Other (Practices in 12 health authorities were trained in 2 of 4 guidelines; 3 of 6 health authority pairs did not receive training in antidepressant guideline) Duration of intervention: Length of pharmacist-led outreach session NR. Intervention period lasted from Oct 1997 to June 1998. Time points of outcome assessments from end of implementation phase: Provider survey 6 months after the second pharmacist visit	Provider behaviors: Number of GPs reporting application of content at 6 months* –Academic detailing: Antidepressant vs. Academic detailing: not Antidepressant, OR 0.61 (95% CI: 0.42, 0.91)

Study Details	Participants	Intervention and Treatment	Outcomes and Results
Parent study: Gerrity, 1999 References: Gerrity, 1999 Country: USA Setting: Primary care office Randomization unit: Provider Reported power calculation: No Study quality: Fair. Limited detail regarding randomization, allocation concealment, selective reporting of outcomes, and cross-over contamination. Low risk for handling of incomplete outcome data and outcome blinding. Blinding of personnel not possible.	Number of sites: NR Number of providers: 56 (27 intervention, 29 control) Provider type: Provider only Provider target category: PCP Number of patients: 2 SPs played by 3 actors Diagnosis: Unclear Inclusion criteria: Providers: Practice primary care exclusively, practice at least 50% of the time, able to attend both workshop sessions, practice is open to new patients, agreement to see 2 SPs in the office. Patients: NA Exclusion criteria: NR	Content and format of intervention: Workshops included interactive lectures, review of video-taped interviews with depressed patients, reference materials, practice of communication skills, role-playing, case discussion, and feedback from facilitators. Implementation strategy: N/A Content and format of guidelines: Depression Education Program based on the AHRQ's CPG for Depression in Primary Care Categorization of intervention: Education Comparator: Wait-list Duration of intervention: Two 4-hour sessions given 2 weeks apart Time points of outcome assessments from end of implementation phase: SPs visited providers 2 to 6 weeks after the intervention	Provider behaviors: Physician discussed possibility of depression with "patient 1" at 6 weeks* –Physician education workshops vs. Wait list control, OR 1.48 (95% CI: 1.06, 2.06) Physician discussed possibility of depression with "patient 2" at 6 weeks* –Physician education workshops vs. Wait list control, OR 1.39 (95% CI: 0.86, 2.25) Physician prescribed antidepressants to "patient 1" at 6 weeks –Physician education workshops vs. Wait list control, OR 1.97 (95% CI: 0.85, 4.55) Physician prescribed antidepressants to "patient 2" at 6 weeks –Physician education workshops vs. Wait list control, OR 1.57 (95% CI: 0.89, 2.74) Physician scheduled follow-up within 2 weeks for "patient 1" at 6 weeks –Physician education workshops vs. Wait list control, OR 2.23 (95% CI: 1.26, 3.97) Physician scheduled follow-up within 2 weeks for "patient 2" at 6 weeks –Physician education workshops vs. Wait list control, OR 2.09 (95% CI: 1.19, 3.65) Physician assessed >5 criteria for major depression in "patient 1" at 6 weeks –Physician education workshops vs. Wait list control, OR 2.13 (95% CI: 1.26, 3.59) Physician assessed >5 criteria for major depression in "patient 2" at 6 weeks –Physician education workshops vs. Wait list control, OR 1.70 (95% CI: 0.87, 3.31) Physician assessed Stresses at home in "patient 1" at 6 weeks –Physician education workshops vs. Wait list control, OR 1.46 (95% CI: 1.09, 1.96) Physician assessed Stresses at home in "patient 2" at 6 weeks –Physician education workshops vs. Wait list control, OR 1.42 (95% CI: 0.96, 2.08) Physician assessed Suicidal ideation in "patient 1" at 6 weeks –Physician education workshops vs. Wait list control, OR 13.00 (95% CI: 1.82, 92.92) Physician assessed Suicidal ideation in "patient 2" at 6 weeks –Physician education workshops vs. Wait list control, OR 1.04 (95% CI: 0.39, 2.77)
Parent study: Goldberg, 1998 References: Goldberg, 1998; Horowitz, 1996 Country: USA Setting: Primary care office Randomization unit: Group practices within primary care clinics Reported power calculation: NA Study quality: Fair. Limited detail regarding randomization, outcome blinding, allocation concealment, but high risk for handling of incomplete outcome data. Low risk for cross-over contamination and selective reporting of outcomes. Blinding of personnel not possible.	Number of sites: 4 Number of providers: 95 (allocation to condition reported for 78 providers: academic detailing, 37 academic detailing + CQI team, 23 UC). Provider type: Provider only Provider target category: PCP Number of patients: 4,995 (allocation to condition reported for 4,051 patients: 1,073 academic detailing, 1,672 academic detailing + CQI team, 1,306 UC) Diagnosis: Depression (clinical diagnosis), Depression (rating scale) Inclusion criteria: Providers and practices: NR. Patients: Age 18 to 75 making clinic visits between February and July 1994	Content and format of intervention: Academic detailing focused on both depression and hypertension; included graphical educational handouts and educational sessions led by opinion leaders. Follow-up sessions from pharmacists to review guideline messages and review provider's prescribing behavior compared to peers Implementation strategy: N/A Content and format of guidelines: AHRQ's Quick Reference Guide for Clinicians regarding Depression in Primary Care: Detection, Diagnosis, and Treatment Categorization of intervention: Education plus other components Comparator: UC, Other (Two comparators: (1) Usual care and (2) Academic detailing plus continuous quality improvement teams [complex system-redesign]) Duration of intervention: 15-minute academic detailing sessions; 2 follow-up visits (duration unclear); intervention implemented over a 6-month period Time points of outcome assessments from end of implementation phase: 12 months before intervention and 12 months after 6-month intervention implementation period	Provider behaviors: % of eligible known depressives prescribed 1st-generation tricyclics, All clinics at 12 months –Academic detailing vs. AD + CQI, OR 0.93 (95% CI: 0.79, 1.10) –Academic detailing vs. Usual care, OR 1.12 (95% CI: 0.96, 1.30) % of eligible known depressives prescribed 2nd-generation tricyclics, All clinics at 12 months –Academic detailing vs. AD + CQI, OR 0.92 (95% CI: 0.72, 1.17) –Academic detailing vs. Usual care, OR 1.05 (95% CI: 0.83, 1.34) % of eligible known depressives prescribed SSRIs, All clinics at 12 months –Academic detailing vs. AD + CQI, OR 1.04 (95% CI: 0.95, 1.15) –Academic detailing vs. Usual care, OR 1.02 (95% CI: 0.93, 1.12) % of eligible unrecognized depressives prescribed antidepressants, All clinics at 12 months* –Academic detailing vs. AD + CQI, OR 1.01 (95% CI: 0.62, 1.64) –Academic detailing vs. Usual care, OR 0.94 (95% CI: 0.56, 1.59) Patient health outcomes: SCL score in known depressives, All clinics at 12 months –Academic detailing vs. AD + CQI, MD –0.12 (95% CI: Not calculable) –Academic detailing vs. Usual care, MD –0.09 (95% CI: Not calculable) SCL score in known depressives, Best-case clinic at 12 months –Academic detailing vs. AD + CQI, MD –0.27 (95% CI: Not calculable) –Academic detailing vs. Usual care, MD –0.22 (95% CI: Not calculable)

Study Details	Participants	Intervention and Treatment	Outcomes and Results
–Continued Parent study: Goldberg, 1998	Exclusion criteria: Providers and practices: NR. Patients: Noncompetent, non-English-speaking, without current address or phone numbers		
Parent study: Keeley, 2014 References: Keeley, 2014 Country: USA Setting: Primary care clinics at a federally qualified community health care system Randomization unit: Site Reported power calculation: No Study quality: Good. Achieved adequate randomization, handling of incomplete outcome data, and low risk for cross-over contamination. Limited detail regarding allocation concealment, selective reporting of outcomes, and outcome blinding. Blinding of personnel not possible.	Number of sites: 7 (3 motivational interviewing, 4 guideline only) Number of providers: 21 (10 motivational interviewing, 11 guideline only) Provider type: Provider only Provider target category: PCP Number of patients: 171 (85 motivational interviewing, 86 guideline only) Diagnosis: Depression (rating scale) Inclusion criteria: Providers: Working at 1 of 8 primary care clinics in the system, a minimum of 30% effort conducting outpatient clinical work, availability for a 1-day training in July 2009. Patients: English-speaking, 18 years or older, PHQ-9 score ≥ 10 Exclusion criteria: Providers: NR. Patients: Age < 18 years, taking medication for depression within 3 months or current psychotherapy, currently pregnant or breastfeeding, life-threatening physical disease, severe suicidal ideation, diagnosed bipolar disorder, current psychosis	Content and format of intervention: Providers received a copy of the APA's Practice Guideline for the Treatment of MDD and a summary slide show describing antidepressant therapy and evidence-based psychotherapy as primary treatments, with physical activity as a potentially beneficial adjunct. Guideline recommended specific course of treatment and plan for follow-up visits. The "control" group for our purposes received the guideline and training in motivational interviewing for depression. Implementation strategy: N/A Content and format of guidelines: APA's Practice Guideline for the Treatment of MDD Categorization of intervention: Distributing guidelines Comparator: Other (Guidelines plus motivational interviewing training) Duration of intervention: One-time distribution of guidelines Time points of outcome assessments from end of implementation phase: Provider outcomes assessed at each encounter though timing is not specified	Provider behaviors: Prescription for antidepressant medication at 24 months* –Control group (received guidelines) vs. Motivational interviewing training, OR 0.85 (95% CI: 0.43, 1.69) Provider recommendation for physical activity at 24 months –Control group (received guidelines) vs. Motivational interviewing training, OR 0.45 (95% CI: 0.20, 1.01) Patient health outcomes: Treatment adherence: Days physically active in past week at 24 months –Control group (received guidelines) vs. Motivational interviewing training, MD 1.21 (95% CI: 0.37, 2.05) Treatment adherence: Filled prescription at 24 months –Control group (received guidelines) vs. Motivational interviewing training, OR 0.79 (95% CI: 0.29, 2.08)
Parent study: Kurian, 2009 References: Kurian, 2009; Trivedi, 2004 Country: USA	Number of sites: 3 Number of providers: 4 (2 intervention, 2 control) Provider type: Provider only	Content and format of intervention: Providers received a 1-hour lecture reviewing current guidelines for the pharmacologic treatment for depression, another 2-hour introductory teleconference followed by a 2-hour on-site training session focusing on the Texas Medication Algorithm Project algorithm for MDD. Sessions included education on the program and hands-on practice with the computerized support decision system.	Provider behaviors: No. of treatment visits at 12 weeks* –Computerized decision support system vs. Usual care (guidelines and training), MD –1.30 (95% CI: –2.31, –0.29) Received an adequate antidepressant dose at 12 weeks* –Computerized decision support system vs. Usual care (guidelines and training), OR 1.05 (95% CI: 0.72, 1.54)

Study Details	Participants	Intervention and Treatment	Outcomes and Results
–Continued Parent study: Kurian, 2009 Setting: Primary care office Randomization unit: Provider Reported power calculation: No Study quality: Fair. Limited detail regarding randomization, allocation concealment, and selective reporting of outcomes. Low risk for cross-over contamination and outcome blinding. Potential low risk for handling of incomplete outcome data though not specified. Blinding of personnel not possible.	Provider target category: PCP Number of patients: 55 (32 intervention, 23 control) Diagnosis: MDD, Depression (rating scale) Inclusion criteria: Providers: NR. Patients: Age 18 years and older initially identified by their PCP as having nonpsychotic MDD (DSM-IV criteria) who also scored ≥ 14 on HDRS-17 Exclusion criteria: Providers: NR. Patients: Current Axis I diagnosis of somatization disorder, anorexia nervosa, bulimia, or obsessive-compulsive disorder; current alcohol or substance dependence; women with a positive pregnancy test or who were lactating; women of child-bearing potential who were not practicing a clinically accepted method of contraception; general medical conditions that contraindicated antidepressant medications; a clinical status requiring inpatient or day hospital treatment	Implementation strategy: Ongoing teleconferences to help with implementation and additional education Content and format of guidelines: APA practice guidelines and consensus expert opinion, developed in the Texas Medication Algorithm Project, for treatment of various psychiatric disorders Categorization of intervention: Education plus other components Comparator: Other (UC that included initial 1-hour training on guidelines) Duration of intervention: 1 hour lecture, 2-hour teleconference, 2-hour on-site training; regular teleconferences for an indeterminate length of time were provided throughout Time points of outcome assessments from end of implementation phase: Baseline, every 6 weeks for up to 24 weeks	Treatment augmentation (algorithm approved) at 12 weeks –Computerized decision support system vs. Usual care (guidelines and training), OR 0.96 (95% CI: 0.24, 3.88) Treatment switch (new antidepressant) at 12 weeks –Computerized decision support system vs. Usual care (guidelines and training), OR 2.52 (95% CI: 0.57, 11.02) Patient health outcomes: Rate of remission on HDRS (HDRS≤7) at 12 weeks –Computerized decision support system vs. Usual care (guidelines and training), OR 1.13 (95% CI: 0.59, 2.15) Rate of response on HDRS (50% decrease in symptom severity) at 12 weeks –Computerized decision support system vs. Usual care (guidelines and training), OR 0.97 (95% CI: 0.63, 1.50) Rate of response on QIDS-SR (≥50% decrease in symptom severity) at 12 weeks –Computerized decision support system vs. Usual care (guidelines and training), OR 1.58 (95% CI: 0.70, 3.53)
Parent study: Lin, 2001 References: Lin, 2001; Katzelnick, 2000 Country: USA Setting: Primary care office Randomization unit: Provider Reported power calculation: Insufficient power	Number of sites: 15 Number of providers: 109 (53 intervention, 56 UC) Provider type: Provider only Provider target category: PCP Number of patients: 124,893 (60,689 intervention, 64,204 UC) Diagnosis: MDD, Other depression diagnosis (dysthymic, adjustment, depression NOS)	Content and format of intervention: Educational format including small group interactive discussion, role-play, academic detailing, feedback, and review of patient progress with a psychiatric consultant. Contents included detailed DSM-IV criteria identification, criteria for making referrals, indications and cautions for pharmacotherapy, algorithm for antidepressant pharmacotherapy, patient education to increase adherence, training in brief strategies for patient activation, and importance of regular follow-up with patients Implementation strategy: N/A Content and format of guidelines: DSM-IV, major depression, structured diagnostic assessment Categorization of intervention: Education plus other components Comparator: UC	Provider behaviors: 12 weeks continuous medication at 12 months* –Physician education vs. Usual care, OR 0.98 (95% CI: 0.81, 1.20) New antidepressant prescriptions / 100 visits at 12 months* –Physician education vs. Usual care, IRR 1.07 (95% CI: 0.90, 1.26)

Study Details	Participants	Intervention and Treatment	Outcomes and Results
–Continued Parent study: Lin, 2001 Study quality: Poor. Limited detail regarding randomization, allocation concealment, blinding of outcome assessment, handling of incomplete outcome data, and selective reporting of outcomes. Potential high risk of cross-over contamination. Blinding of personnel not possible.	Inclusion criteria: Providers: from 15 selected primary clinics in 2 large HMOs in Seattle, WA, and Madison, WI. Patients: From the HMOs between ages 18 and 64 whose ambulatory visits were below the top 15th percentile for the prior 2 consecutive years Exclusion criteria: Providers: refused to participate or were soon to retire. Patients: depressed patients who frequently used services.	Duration of intervention: 2-hour training session, implemented over 3 months Time points of outcome assessments from end of implementation phase: 12 months before training, 12 months after the 3-month training	
Parent study: Linden, 2008 References: Linden, 2008 Country: Germany Setting: Psychiatry private practice (specialty care) Randomization unit: Provider Reported power calculation: No Study quality: Poor. Limited detail regarding randomization, allocation concealment, selective reporting of outcomes, cross-over contamination, and handling of incomplete outcome data. Potential low risk for outcome blinding but not specified. Blinding of personnel not possible.	Number of sites: NR Number of providers: 103 (20 guidelines plus training, 20 guidelines only, 43 control) Provider type: Provider only Provider target category: Mental health care provider Number of patients: 497 (100 guidelines plus training, 196 guidelines only, 202 control) Diagnosis: Unclear Inclusion criteria: Providers: NR. Patients: Included after the physicians had made the decision to prescribe mirtazapine and deemed appropriate according to their clinical judgment Exclusion criteria: Providers and patients: NR	Content and format of intervention: Two intervention groups (guidelines plus training, guidelines only). Providers in both groups received the 2-page WHO depression guideline, an educational package, symptom checklist and assessments, pocket-sized information cards and drug reference material, and patient information booklet. Guidelines plus training group received additional daylong seminar, during which they were trained to use the guidelines. Implementation strategy: N/A Content and format of guidelines: WHO depression guideline, detailed recommendations on patient counseling and management Categorization of intervention: Education, Distributing guidelines Comparator: UC Duration of intervention: Daylong seminar. Implementation of the interventions lasted 12 weeks. Time points of outcome assessments from end of implementation phase: First visit when mirtazapine was prescribed, then 1 to 2 weeks, 8 to 8 weeks, and 10 to 12 weeks following that initial visit	Provider behaviors: Adverse drug reactions at 12 weeks –Information: WHO guideline only vs. Control group, MD –0.01 (95% CI: –0.04, 0.02) –Intervention: WHO guideline + training vs. Control group, MD –0.01 (95% CI: –0.04, 0.01) Prescribed dosages of mirtazapine, mean mg/day at 12 weeks* –Information: WHO guideline only vs. Control group, MD –1.41 (95% CI: –2.87, 0.05) –Intervention: WHO guideline + training vs. Control group, MD –2.38 (95% CI: –4.07, –0.69) Patient health outcomes: CGI severity at 12 weeks –Information: WHO guideline only vs. Control group, MD –0.07 (95% CI: –0.29, 0.15) –Intervention: WHO guideline + training vs. Control group, MD –0.31 (95% CI: –0.57, –0.05) Patient depression rating at 12 weeks –Information: WHO guideline only vs. Control group, MD –1.13 (95% CI: –2.63, 0.37) –Intervention: WHO guideline + training vs. Control group, MD –1.53 (95% CI: –3.33, 0.27) Psychiatrist depression rating at 12 weeks –Information: WHO guideline only vs. Control group, MD –2.27 (95% CI: –4.49, –0.05) –Intervention: WHO guideline + training vs. Control group, MD –3.23 (95% CI: –5.89, –0.57)
Parent study: Nilsson, 2001 References: Nilsson, 2001 Country: Sweden	Number of sites: 6 health care centers and 3 CME groups Number of providers: 50 (40 participated: 18 in hypertension group, 8 in peptic ulcer/dyspepsia group, 14 in depression group)	Content and format of intervention: Three meetings with a pharmacotherapy education group consisting of feedback on individual prescribing rates and interactive problem-oriented educational material. Four- to 6-page summary of material distributed. The depression-targeted intervention focused on improved diagnostic strategies and continuous evaluation of tricyclic antidepressants, selective serotonin reuptake inhibitors, monoamine oxidase type-A inhibitors, and other antidepressants, but there was a greater emphasis on increasing prescribing rather than influencing the choice of drugs.	Provider behaviors: Fractional prescribing rate: Selective serotonin reuptake inhibitors at 12 months -Educational outreach and feedback vs. Control group, MD –3.80 (95% CI: –12.96, 5.36) Fractional prescribing rate: Tricyclic antidepressants at 12 months* -Educational outreach and feedback vs. Control group, MD 2.70 (95% CI: –6.08, 11.48) Prescribed DDDs / 1000 patients per year at 12 months* -Educational outreach and feedback vs. Control group, IRR 0.78 (95% CI: 0.75, 0.81) Prescribed DDDs / GP at 12 months -Educational outreach and feedback vs. Control group, IRR 1.00 (95% CI: 0.97, 1.03)

Study Details	Participants	Intervention and Treatment	Outcomes and Results
–Continued Setting: Continuing medical education groups and health care centers (primary care) Randomization unit: Provider Reported power calculation: No Study quality: Poor. Limited detail regarding randomization, outcome blinding, allocation concealment, selective reporting of outcomes, and cross-over contamination. High risk for handling of incomplete outcome data. Blinding of personnel not possible.	Provider type: Provider only Provider target category: Other general practitioner or clinician Number of patients: 45,982 Diagnosis: Unclear Inclusion criteria: NR Exclusion criteria: NR	Implementation strategy: A pharmacotherapy education group was formed and consisted of 4 teacher-physicians, hospital specialists, and clinical pharmacologists. The group created the education material delivered to the GPs. Content and format of guidelines: Pharmacotherapy education group developed guidelines based on data from RCTs and recent national and local recommendations on treatment. Categorization of intervention: Education Comparator: Other (delivery of education and feedback regarding non-depression control areas [hypertension and peptic ulcers]) Duration of intervention: 3 visits, 1–1.5 hour per visit, over 2 to 11 months between April 1997 and February 1998 Time points of outcome assessments from end of implementation phase: Data collected from electronic patient records 1 year before and 1 year after the intervention	
Parent study: Rollman, 2001 References: Rollman, 2001; Rollman, 2002 Country: USA Setting: Academically affiliated primary care practice Randomization unit: Provider Reported power calculation: Insufficient power	Number of sites: 1 Number of providers: 17 (16 enrolled: 6 active care, 5 passive care, 5 usual care) Provider type: Provider only Provider target category: PCP Number of patients: 227 (78 active care, 78 passive care, 71 usual care) Diagnosis: Depression (clinical diagnosis) Inclusion criteria: Providers: Board certified PCPs at one practice site. Patients: Screened positive for major depression on the Mood Module component of the PRIME-MD, had 2 or fewer positive responses on the CAGE alcohol screening questionnaire,	Content and format of intervention: Active care PCPs at each encounter received one or more patient-specific advisory messages based on the AHRQ's practice guidelines with a suggestion to further review treatment advice. They were exposed to prompts offering to schedule a follow-up appointment with their study patients. Passive care PCPs received a reminder of their patients' depression diagnosis during each visit, a message encouraging the PCP to treat the depressive episode but offered no details on how to do so, and an option to review detailed information for treating depression based on the AHRQ's depression treatment guidelines. Implementation strategy: Logician (Version 4.2) was installed as the ambulatory EMR for the study site. PCPs entered their patient notes into the EMR. PCPs could obtain instant access to their patients' medical information via computer terminals placed in the examination rooms, common clinic work areas, or their own office located away from the practice site. PCPs were given a printed summary for each patient prior to an encounter. Content and format of guidelines: AHRQ's Depression Panel's Guideline for the treatment of major depression	Provider behaviors: # of contacts with any PCP at 3 months –EMR - Active care vs. EMR - Usual care, MD –0.23 (95% CI: Not calculable) –EMR - Passive care vs. EMR - Usual care, MD 0.09 (95% CI: Not calculable) # of contacts with any PCP at 6 months –EMR - Active care vs. EMR - Usual care, MD –0.50 (95% CI: Not calculable) –EMR - Passive care vs. EMR - Usual care, MD 0.08 (95% CI: Not calculable) # of contacts with usual PCP at 3 months –EMR - Active care vs. EMR - Usual care, MD –0.27 (95% CI: Not calculable) –EMR - Passive care vs. EMR - Usual care, MD 0.00 (95% CI: Not calculable) # of contacts with usual PCP at 6 months* –EMR - Active care vs. EMR - Usual care, MD –0.40 (95% CI: Not calculable) –EMR - Passive care vs. EMR - Usual care, MD –0.09 (95% CI: Not calculable) # of office visits with usual PCP at 3 months –EMR - Active care vs. EMR - Usual care, MD –0.54 (95% CI: Not calculable) –EMR - Passive care vs. EMR - Usual care, MD –0.37 (95% CI: Not calculable) # of office visits with usual PCP at 6 months –EMR - Active care vs. EMR - Usual care, MD –0.91 (95% CI: Not calculable) –EMR - Passive care vs. EMR - Usual care, MD –0.69 (95% CI: Not calculable) ≥3 contacts with usual PCP at 3 months –EMR - Active care vs. EMR - Usual care, OR 1.27 (95% CI: 0.90, 1.79) –EMR - Passive care vs. EMR - Usual care, OR 1.11 (95% CI: 0.77, 1.59) ≥3 contacts with usual PCP at 6 months –EMR - Active care vs. EMR - Usual care, OR 1.58 (95% CI: 1.12, 2.21) –EMR - Passive care vs. EMR - Usual care, OR 1.50 (95% CI: 1.06, 2.11) Antidepressant medication not offered at 3 months –EMR - Active care vs. EMR - Usual care, OR 1.48 (95% CI: 0.98, 2.24) –EMR - Passive care vs. EMR - Usual care, OR 1.46 (95% CI: 0.97, 2.19) Antidepressant medication not offered at 6 months -EMR - Active care vs. EMR - Usual care, OR 1.48 (95% CI: 0.93, 2.36) –EMR - Passive care vs. EMR - Usual care, OR 1.45 (95% CI: 0.92, 2.29)

Study Details	Participants	Intervention and Treatment	Outcomes and Results
–Continued Parent study: Rollman, 2001 Study quality: Good. Achieved adequate randomization, blinding of outcome assessment, and handling of incomplete data. Unclear indication of cross-over contamination given all providers were in the same practice but intervention was delivered via electronic records. Unclear risk of allocation concealment and selective reporting of outcomes. Blinding of personnel not possible.	HDRS score ≥12, report no alcohol or other substance abuse disorder within the past 2 months, be medically stable as determined from a medical record review and the baseline telephone assessment, have no plans to leave the study practice within the next 6 months, not presently be receiving treatment for depression from a mental health professional Exclusion criteria: Providers: NR. Patients: Language or other communication barrier; no obvious dementia, psychotic illness, or unstable medical condition; history of bipolar disorder; active suicidal ideation; previous enrollment in the protocol	Categorization of intervention: Distributing guidelines Comparator: UC Duration of intervention: Duration of intervention unknown (i.e., how long PCPs spent reviewing feedback and guidelines per patient encounter). Intervention implemented from April 1997 to December 1998. Time points of outcome assessments from end of implementation phase: PCPs were introduced to the study at the same time and the study began one month later as patients were recruited. Outcome assessments at 3 and 6 months after screening	Antidepressant meds baseline regimen continued without modification at 3 months –EMR - Active care vs. EMR - Usual care, OR 2.43 (95% CI: 0.68, 8.76) –EMR - Passive care vs. EMR - Usual care, OR 3.25 (95% CI: 0.95, 11.11) Antidepressant meds baseline regimen continued without modification at 6 months –EMR - Active care vs. EMR - Usual care, OR 2.43 (95% CI: 0.68, 8.76) –EMR - Passive care vs. EMR - Usual care, OR 2.66 (95% CI: 0.75, 9.38) Antidepressant meds suggested/prescribed or baseline regimen modified at 3 months –EMR - Active care vs. EMR - Usual care, OR 1.20 (95% CI: 0.85, 1.71) –EMR - Passive care vs. EMR - Usual care, OR 1.11 (95% CI: 0.77, 1.59) Antidepressant meds suggested/prescribed or baseline regimen modified at 6 months –EMR - Active care vs. EMR - Usual care, OR 1.14 (95% CI: 0.83, 1.56) –EMR - Passive care vs. EMR - Usual care, OR 1.11 (95% CI: 0.81, 1.52) Depression mentioned in ≥3 contacts with usual PCP at 3 months –EMR - Active care vs. EMR - Usual care, OR 1.82 (95% CI: 0.89, 3.76) –EMR - Passive care vs. EMR - Usual care, OR 1.38 (95% CI: 0.64, 2.96) Depression mentioned in ≥3 contacts with usual PCP at 6 months –EMR - Active care vs. EMR - Usual care, OR 1.74 (95% CI: 0.91, 3.31) –EMR - Passive care vs. EMR - Usual care, OR 1.77 (95% CI: 0.94, 3.35) Depression mentioned in any contact with usual PCP at 3 months –EMR - Active care vs. EMR - Usual care, OR 1.03 (95% CI: 0.84, 1.27) –EMR - Passive care vs. EMR - Usual care, OR 1.12 (95% CI: 0.93, 1.36) Depression mentioned in any contact with usual PCP at 6 months* –EMR - Active care vs. EMR - Usual care, OR 1.07 (95% CI: 0.88, 1.29) –EMR - Passive care vs. EMR - Usual care, OR 1.17 (95% CI: 0.99, 1.40) Depression treatment mentioned in ≥3 contacts with usual PCP at 3 months –EMR - Active care vs. EMR - Usual care, OR 1.60 (95% CI: 0.72, 3.54) –EMR - Passive care vs. EMR - Usual care, OR 1.33 (95% CI: 0.58, 3.04) Depression treatment mentioned in ≥3 contacts with usual PCP at 6 months –EMR - Active care vs. EMR - Usual care, OR 1.33 (95% CI: 0.67, 2.63) –EMR - Passive care vs. EMR - Usual care, OR 1.29 (95% CI: 0.65, 2.56) Mental health referral suggested at 3 months –EMR - Active care vs. EMR - Usual care, OR 0.67 (95% CI: 0.37, 1.22) –EMR - Passive care vs. EMR - Usual care, OR 0.98 (95% CI: 0.58, 1.64) Mental health referral suggested at 6 months –EMR - Active care vs. EMR - Usual care, OR 0.75 (95% CI: 0.44, 1.25) –EMR - Passive care vs. EMR - Usual care, OR 1.01 (95% CI: 0.64, 1.59) PCP counsels patient for depression at 3 months –EMR - Active care vs. EMR - Usual care, OR 1.22 (95% CI: 0.63, 2.36) –EMR - Passive care vs. EMR - Usual care, OR 0.96 (95% CI: 0.47, 1.94) PCP counsels patient for depression at 6 months –EMR - Active care vs. EMR - Usual care, OR 1.19 (95% CI: 0.63, 2.25) –EMR - Passive care vs. EMR - Usual care, OR 0.95 (95% CI: 0.49, 1.87) Response to electronic flags in patient chart at 5 months –Active advice vs. Usual care, OR 1.06 (95% CI: 0.96, 1.16) –Passive advice vs. Usual care, OR 0.86 (95% CI: 0.74, 0.99) Patient health outcomes: HRS-D score at 3 months –EMR - Active care vs. EMR - Usual care, MD –1.50 (95% CI: Not calculable) –EMR - Passive care vs. EMR - Usual care, MD 0.50 (95% CI: Not calculable) HRS-D score at 6 months –EMR - Active care vs. EMR - Usual care, MD –1.50 (95% CI: Not calculable) –EMR - Passive care vs. EMR - Usual care, MD –1.50 (95% CI: Not calculable) Recovery rate (HDRS ≤7) at 6 months –EMR - Active care vs. EMR - Usual care, OR 0.98 (95% CI: 0.50, 1.91) –EMR - Passive care vs. EMR - Usual care, OR 1.05 (95% CI: 0.55, 2.00)

Study Details	Participants	Intervention and Treatment	Outcomes and Results
Parent study: Shirazi, 2013 References: Shirazi, 2013; Shirazi, 2009 Country: Iran Setting: Primary care office Randomization unit: Provider Reported power calculation: Yes Study quality: Fair. Limited detail regarding randomization, allocation concealment, selective reporting of outcomes, and outcome blinding. Low risk for cross-over contamination and handling of incomplete outcome data. Blinding of personnel not possible.	Number of sites: NR Number of providers: 192 (96 intervention, 96 control) Provider type: Provider only Provider target category: PCP Number of patients: 10 SPs Diagnosis: Other depression diagnosis (SPs with depressive symptoms) Inclusion criteria: Providers: Iranian GPs with a clinic within the catchment area of Tehran University of Medical Sciences (TUMS) Exclusion criteria: Providers: NR, other than not having a clinic or not working within the catchment area	Content and format of intervention: GPs completed a 2-day course delivered by continuing medical education teachers and based on GPs' stage of change. Seventy-four GPs in attitude stage of change (i.e. awareness of problem but no commitment to change) received education in a large group where diagnosis of depression disorders was emphasized. Twenty-two GPs in intention stage of change (i.e., prepared for change) received a small group workshop where the treatment and differential diagnosis of depression disorders were stressed. Implementation strategy: Eight CME were trained at a 1-day workshop on the application of interactive educational methods that were then delivered to GPs. Content and format of guidelines: Evidence-based guidelines for GPs regarding the diagnosis and treatment of depression disorders, compiled by members of the research group as an update of WHO documents and recent research on depressive disorders Categorization of intervention: Education plus other components Comparator: Other (Guidelines and education without tailoring to stage of change) Duration of intervention: 8 hours of teaching in small groups for intervention and control, plus 4 additional hours of collaborative small group learning for the intention intervention group. Timing of teaching for attitude group not specified Time points of outcome assessments from end of implementation phase: Visit by an unannounced standardized patient 2 months before and 2 months after the intervention	Provider behaviors: Performance score on appropriate treatment (prescription, lab tests, referrals) at 2 months* –Intervention - large group vs. Control - large group, MD –24.00 (95% CI: –44.08, –3.92) –Intervention - small group vs. Control - small group, MD –36.00 (95% CI: –46.76, –25.24) –Tailored education vs Conventional education, MD –27.00 (95% CI: –35.60, –18.40)
Parent study: Simon, 2000 References: Simon, 2000 Country: USA Setting: Primary care office Randomization unit: Patient Reported power calculation: NA	Number of sites: 5 Number of providers: NR Provider type: Provider only Provider target category: PCP Number of patients: 613 Diagnosis: Depression (clinical diagnosis)	Content and format of intervention: Providers received a detailed report on each patient 8 and 16 weeks after initial prescription that contained patient data and treatment recommendations on the basis of a computerized algorithm Implementation strategy: NA Content and format of guidelines: Antidepressant treatment recommendation from computer algorithm (no other information specified) Categorization of intervention: Education plus other components	Provider behaviors: Mental health visits to non-prescribing provider at 6 months –Feedback only vs. Feedback plus care management, MD –0.10 (95% CI: –0.93, 0.73) –Feedback only vs. Usual care, MD 0.22 (95% CI: –1.11, 1.55) Mental health visits to prescribing provider at 6 months* –Feedback only vs. Feedback plus care management, MD –0.04 (95% CI: –0.48, 0.40) –Feedback only vs. Usual care, MD –0.01 (95% CI: –0.49, 0.47) Patients who receive adequate pharmacotherapy (low dose, >90 days) at 6 months* –Feedback only vs. Feedback plus care management, OR 0.91 (95% CI: 0.74, 1.13) –Feedback only vs. Usual care, OR 1.10 (95% CI: 0.87, 1.39) Patients who receive adequate pharmacotherapy (moderate dose, >90 days) at 6 months –Feedback only vs. Feedback plus care management, OR 0.70 (95% CI: 0.50, 0.98) –Feedback only vs. Usual care, OR 1.17 (95% CI: 0.79, 1.73)

Study Details	Participants	Intervention and Treatment	Outcomes and Results
–Continued Parent study: Simon, 2000 Study quality: Fair. Achieved adequate randomization and blinding of outcome assessment, but unclear risk for handling of incomplete outcome data, allocation concealment, and selective reporting of outcomes. Potential cross-over contamination given that patients were randomized within clinics. Blinding of personnel not possible.	Inclusion criteria: Providers: NR. Patients: All patients at participating 5 primary care clinics who had received new prescriptions for antidepressants, with "new" defined as no antidepressant use in the previous 120 days Exclusion criteria: Providers: NR. Patients: Had not been diagnosed with depression at any visit (non-depression indication for prescription) had been diagnosed with bipolar disorder or psychotic disorder in the previous 2 years, had been diagnosed with alcohol or other substance misuse in the previous 90 days, had visited a psychiatrist in the previous 90 days	Comparator: UC, Other (Feedback intervention plus care management) Duration of intervention: Duration unclear Time points of outcome assessments from end of implementation phase: Outcomes assessed 3 and 6 months after the initial prescription	Patient health outcomes: Depression score at 3 months –Feedback only vs. Feedback plus care management, MD 0.14 (95% CI: Not calculable) –Feedback only vs. Usual care, MD –0.01 (95% CI: Not calculable) Depression score at 6 months –Feedback only vs. Feedback plus care management, MD 0.14 (95% CI: Not calculable) –Feedback only vs. Usual care, MD –0.01 (95% CI: Not calculable) Major depression by DSM-IV at 3 months –Feedback only vs. Feedback plus care management, OR 0.74 (95% CI: 0.47, 1.15) –Feedback only vs. Usual care, OR 1.11 (95% CI: 0.75, 1.62) Major depression by DSM-IV at 6 months –Feedback only vs. Feedback plus care management, OR 0.53 (95% CI: 0.30, 0.94) –Feedback only vs. Usual care, OR 1.00 (95% CI: 0.63, 1.58) Probability of showing 50% decrease in depression score at 3 months –Feedback only vs. Feedback plus care management, OR 0.79 (95% CI: 0.61, 1.03) –Feedback only vs. Usual care, OR 1.15 (95% CI: 0.85, 1.55) Probability of showing 50% decrease in depression score at 6 months –Feedback only vs. Feedback plus care management, OR 0.79 (95% CI: 0.65, 0.95) –Feedback only vs. Usual care, OR 1.10 (95% CI: 0.88, 1.38)
Parent study: Sinnema, 2015 References: Sinnema, 2015 Country: Netherlands Setting: General practices (solo practices, group practices or health centers) (primary care) Randomization unit: Site Reported power calculation: Yes Study quality: Good. Achieved adequate randomization, allocation concealment, handling of incomplete outcome data, and no indication of cross-over contamination. Unclear risk for blinding of outcome assessment and selective reporting of outcomes. Blinding of personnel not possible.	Number of sites: 23 (12 intervention, 11 control) Number of providers: 46 (23 intervention, 23 control) Provider type: Provider only Provider target category: PCP Number of patients: 444 (198 intervention, 246 control) Diagnosis: Depression (rating scale) Inclusion criteria: Providers: Willingness to participate in training program. Patients: 18 years or older attending participating practices, screen positive (≥ 20) on Extended Kessler 10 screening instrument	Content and format of intervention: 1-day training from experts on implementing guidelines focused on recognition, diagnosis, treatment, and patient education for depression and anxiety. Then GPs were interviewed about their personal barriers to implementation of guidelines in their practices and a tailored intervention was then delivered using two 2.5-hour peer group supervision sessions and 15-minute personalized telephone consultation every 2 months for 1 year. Implementation strategy: Tailored intervention was based on interviewers' documenting local implementation processes by making notes and offering advice to the GPs. Interviewers offered potential solutions to barriers. Content and format of guidelines: Dutch College of GP's guidelines for depression and anxiety Categorization of intervention: Education plus other components Comparator: Other (1-day training from experts on implementing guidelines but no tailored intervention on barriers) Duration of intervention: 1-day training and additional tailored intervention components (two 2.5-hour sessions, 15-minute phone calls every 2 months for 1 year). Implementation of intervention between June 2010 and June 2011	Provider behaviors: Number of consultations at 6 months* –Tailored program vs. Control group, IRR 1.78 (95% CI: 1.14, 2.78) Prescribing antidepressants at 6 months* –Tailored program vs. Control group, OR 1.07 (95% CI: 0.52, 2.19) Referral to specialist mental health services at 6 months –Tailored program vs. Control group, OR 1.62 (95% CI: 0.72, 3.64) Patient health outcomes: 4DSQ Depression at 3 months –Tailored program vs. Control group, MD –0.25 (95% CI: –0.82, 0.32) 4DSQ Depression at 6 months –Tailored program vs. Control group, MD 0.06 (95% CI: –0.52, 0.64) WHODAS-II at 3 months –Tailored program vs. Control group, MD 3.64 (95% CI: 0.56, 6.72) WHODAS-II at 6 months –Tailored program vs. Control group, MD 1.02 (95% CI: –2.08, 4.12)

Study Details	Participants	Intervention and Treatment	Outcomes and Results
–Continued Parent study: Sinnema, 2015	Exclusion criteria: Providers: NR. Patients: Suicidal ideation and behavior; dementia and other severe cognitive disorders; psychotic disorder; bipolar disorder; dependence on alcohol or drugs; a severe, unstable somatic condition diagnosed by their GP; insufficient knowledge of the Dutch language; having received psychological treatment in the 6 months before the start of the study; having been diagnosed with anxiety or depression by a GP in the 6 months before the start of the study	Time points of outcome assessments from end of implementation phase: Provider outcomes 6 months before and 6 months after patients completed the extended version of the Kessler-10. Patient self-report outcomes measured at baseline, and 3 and 12 months after baseline	
Parent study: van Eijk, 2001 References: van Eijk, 2001 Country: Netherlands Setting: GPs and pharmacists in peer review groups (primary care) Randomization unit: Site Reported power calculation: Yes Study quality: Fair. Achieved adequate handling of incomplete outcome data and low risk for cross-over contamination, but limited detail regarding randomization, allocation concealment, selective reporting of outcomes, and outcome blinding. Blinding of personnel not possible.	Number of sites: 21 (7 individual intervention, 7 group intervention, 7 control) Number of providers: 122 (70 GPs and 14 pharmacists in individual intervention, 52 GPs and 9 pharmacists in group intervention, 68 GPs and 13 pharmacists in control) Provider type: Team Provider target category: N/A Number of patients: 46,078 Diagnosis: Unclear Inclusion criteria: Providers and practices: NR. Patients: All people age 60 years old or over on January 1, 1996 (about 50 000 people) living in the southwest Netherlands health district and insured through OZ zorgverzekeringen Exclusion criteria: Providers, practices, and patients: NR	Content and format of intervention: Two intervention groups (individual and group). Initial academic detailing session emphasizing the unique therapeutic difficulties of treating older people and problems of anticholinergic side effects, leaflet containing evidence-based summary of information, data on overall prescribing rates. Follow-up included review of personal/group performance. Sessions were individual (individual intervention) or during a full education program meeting for the peer review groups (group intervention) Implementation strategy: N/A Content and format of guidelines: Not specified, focused on prescribed anticholinergic antidepressants among elderly Categorization of intervention: Education plus other components Comparator: UC Duration of intervention: Initial 20-minute academic detailing visit, follow-up 20-minute session 4 months later Time points of outcome assessments from end of implementation phase: Pre-intervention (about 4 months before first visit), during intervention (time between first and second visit, roughly 4 months), and post-intervention (about 4 months following second visit)	Provider behaviors: Rate of incident prescriptions of less anticholinergic antidepressants after intervention at 4 months* –Group educational visits vs. Control group, IRR 1.66 (95% CI: 0.97, 2.85) –Individual educational visits vs. Control group, IRR 2.02 (95% CI: 1.24, 3.30) Rate of incident prescriptions of highly anticholinergic antidepressants after intervention: prescriptions/1,000-patient years at 4 months –Group educational visits vs. Control group, IRR 1.79 (95% CI: 0.87, 3.57) –Individual educational visits vs. Control group, IRR 1.47 (95% CI: 0.85, 2.56)

Study Details	Participants	Intervention and Treatment	Outcomes and Results
Parent study: Worrall, 1999 References: Worrall, 1999 Country: Canada Setting: Family practice research networks (primary care) Randomization unit: Provider Reported power calculation: NA Study quality: Fair. Achieved adequate randomization and cross-over contamination, but high risk for blinding of outcome assessment and unclear risk for allocation concealment, handling of incomplete outcome data, and selective reporting of outcomes. Blinding of personnel not possible.	Number of sites: NR Number of providers: 42 Provider type: Provider only Provider target category: PCP Number of patients: 147 Diagnosis: Depression (rating scale) Inclusion criteria: Providers and patients: NR Exclusion criteria: Providers and patients: NR	Content and format of intervention: Physicians attended a 3-hour psychiatrist- and academic family physician-led workshop on CPGs. Discussed prepared cases and consulted with physicians on relevant cases. After workshop, a psychiatrist made available for consultation. Implementation strategy: Physicians kept a log of new diagnoses of depression and were contacted by a research assistant regularly to encourage protocol compliance Content and format of guidelines: CPGs for the detection and treatment of depression, developed by the Canadian Medical Association Categorization of intervention: Education plus other components Comparator: Other (Receipt of clinical practice guidelines without education) Duration of intervention: 3-hour education session, implemented for 6 months between July and December 1997 Time points of outcome assessments from end of implementation phase: Initial visit and 6 months following first visit	Provider behaviors: Mean no. of office visits per patient at months* –Physician education vs. Control group, MD 0.60 (95% CI: –1.94, 3.14) No. of patients prescribed an antidepressant on first visit at 6 months* –Physician education vs. Control group, OR 1.02 (95% CI: 0.91, 1.14) No. of referrals to other mental health professional at 6 months –Physician education vs. Control group, OR 10.53 (95% CI: 0.62, 179.01) No. of referrals to psychiatrist at 6 months –Physician education vs. Control group, OR 1.85 (95% CI: 0.39, 8.83) Patient health outcomes: CES-D score - patient at 6 months –Physician education vs. Control group, MD 2.80 (95% CI: –1.35, 6.95) CES-D score gain - patient at 6 months –Physician education vs. Control group, MD –3.80 (95% CI: –8.70, 1.10) No. of patients taking medication at 6-month follow-up –Physician education vs. Control group, OR 1.43 (95% CI: 0.98, 2.07) No. of patients who took antidepressant for full 6 months at 6 months –Physician education vs. Control group, OR 1.23 (95% CI: 0.82, 1.84)

Study Details	Participants	Intervention and Treatment	Outcomes and Results
Parent study: Yawn, 2012 References: Yawn, 2012 Country: USA Setting: Family medicine research network practices (primary care) Randomization unit: Site Reported power calculation: NA Study quality: Fair. Limited detail regarding randomization, allocation concealment, selective reporting of outcomes, and handling of incomplete outcome data. Low risk for cross-over contamination and blinding of outcome data. Blinding of personnel not possible.	Number of sites: 28 (14 intervention, 14 control) Number of providers: NR Provider type: Team Provider target category: N/A Number of patients: 2,343 (1353 intervention, 990 control) Diagnosis: Depression (rating scale) Inclusion criteria: Practices: Provided maternity or well-baby care to more than 30 individuals in the previous year and to not be routinely screening for postpartum depression Providers: NR. Patients: Women who spoke English or Spanish, were age at least 18 years, were 5 to 12 weeks' postpartum, and were receiving continuing care at the family medicine practice where they enrolled. Exclusion criteria: Providers and practices: NR. Patients: Teenage mothers	Content and format of intervention: Education and a set of tools to facilitate diagnosis, follow-up, and management of postpartum depression Implementation strategy: N/A Content and format of guidelines: Not specified where tools were generated from Categorization of intervention: Education plus other components Comparator: UC Duration of intervention: Two 1-hour sessions with a refresher session 6 weeks later Time points of outcome assessments from end of implementation phase: Patient outcomes at 6 and 12 months after introduction of the intervention	Provider behaviors: Medication plus counseling at 12 months –Practice-based training vs. Usual care, OR 1.62 (95% CI: 1.32, 2.00) Received second call after successful first call (women diagnosed with depression) at 12 months* –Practice-based training vs. Usual care, OR 103.48 (95% CI: 6.43, 1665.63) Received counseling at 12 months –Practice-based training vs. Usual care, OR 1.82 (95% CI: 1.13, 2.93) Treatment with medication at 12 months –Practice-based training vs. Usual care, OR 1.60 (95% CI: 1.28, 1.98) Patient health outcomes: Improved PHQ-9, if History of depression at 12 months –Practice-based training vs. Usual care, OR 1.24 (95% CI: 0.86, 1.79) Improved PHQ-9, if Postpartum depression was diagnosed at 12 months –Practice-based training vs. Usual care, OR 1.10 (95% CI: 0.77, 1.56)

NOTE: * indicates a selected main adherence provider outcome in KQ1 analyses; CME = continuing medical education; UC = usual care; NR = not reported; GP = general practitioner PCP = primary care physician/provider; HADS = Hospital Anxiety and Depression Scale; PGI = Patient Global Impression Scale; IRR = incident rate ratio; OR = odds ratio; MD = mean difference; CI = confidence interval; AD = academic detailing; ASTROPU = Age, Sex and Temporary Resident Originated Prescribing Units; PHQ-9 = Patient Health Questionnaire-9; PRIME-MD = PRIMary care Evaluation of Mental Disorders; TCA = Tricyclic antidepressants; WHODAS-II = World Health Organization Disability Assessment Schedule; 4DSQ = The Four-Dimensional Symptom Questionnaire; HDRS/HAM-D = Hamilton Depression Rating Scale; CES-D = Center for Epidemiologic Studies Depression Scale; EMR = electronic medical record; ICD-10 = International Statistical Classification of Diseases and Related Health Problems – 10th revision; QALY = quality adjusted life year; MADRS = Montgomery-Asberg Depression Rating Scale; DDD = daily defined dose; AD = academic detailing; BDI = Beck Depression Inventory. For reported power calculation: Yes indicates study included provider outcome calculations; NA indicates patient outcome calculations but not provider; Insufficient power indicates insufficient power reported for either patient or provider outcomes; and No indicates no power calculation reported at all.

Appendix D. Critical Appraisal Table

Study ID	Random Sequence Generation (selection bias)	Allocation Concealment (selection bias)	Blinding of Participants and Providers (performance bias)	Blinding of Outcome Assessors (detection bias)	Completeness of Reporting Outcome Data (attrition bias)	Selective Outcome Reporting (reporting bias)	Cross-overs/contamination (contamination bias)	**1. Organizational Motivation** *Organizational problem/reason or motivation for intervention*	**2. Intervention Rationale** *Rationale linking the intervention to expected effects*	**3. Intervention** *Specific changes in health care delivery organization/structure*	**4. Organizational Characteristics** *Organizational demographics and basic characteristics*	**5. Implementation** *Approach to designing and/or introducing organizational changes*	**6. Study Design** *Study design and comparator*	**7. Comparator** *Information about comparator care processes*	**8. Data Source** *Data sources and outcome definition*	**9. Timing** *Timing of intervention and evaluation*	**10. Adherence/Fidelity** *Adherence to the intervention*	**11. Health Outcomes** *Patient health-related outcome*	**12. Organizational Readiness** *Organizational readiness for the studied intervention*	**13. Penetration/Reach** *Penetration/reach of the intervention*	**14. Sustainability** *Potential for intervention maintenance or sustainability*	**15. Spread** *Ability to be spread or replicated*	**16. Limitations** *Quality of the interpretation of findings*	**Summary Rating**
Aakhus, 2016	Low	U	High	Low	Low	Low	U	Met	Met	Met	Met	Met	Met	Not met	Met	Not met	Not met	Met	Met	Met	Not met	Not met	Met	Good
Azocar, 2003	U	U	High	U	U	U	U	Met	Met	Not met	Met	Met	Met	Not met	Met	Not met	Met	Not met	Met	Met	Not met	Not met	Met	Poor
Baker, 2001	Low	U	High	Low	U	U	Low	Met	Met	Met	Met	Met	Met	Met	Met	Not met	Met	Met	Met	Met	Met	Met	Met	Good
Bosmans, 2006	U	U	High	Low	Low	Low	Low	Met	Met	Met	Met	Met	Met	Met	Met	Not met	Met	Not met	Not met	Not met	Not met	Not met	Met	Good
Callahan, 1994	U	U	High	U	U	U	Low	Met	Met	Met	Met	Met	Met	Met	Met	Not met	Met	Met	Not met	Met	Not met	Not met	Met	Poor
Datto, 2003	U	U	High	U	U	U	Low	Met	Met	Met	Met	Met	Met	Met	Met	Not met	Met	Met	Met	Met	Not met	Not met	Met	Poor
Eccles, 2007	Low	U	High	Low	High	U	Low	Met	Met	Met	Met	Met	Met	Not met	Met	Met	Not met	Not met	Met	Not met	Not met	Not met	Met	Fair
Freemantle, 2002	Low	U	High	U	U	Low	Low	Met	Met	Met	Met	Met	Met	Met	Not met	Not met	Not met	Not met	Met	Met	Not met	Not met	Met	Fair
Gerrity, 1999	U	U	High	Low	Low	U	U	Met	Met	Met	Not met	Met	Met	Not met	Met	Met	Met	Not met	Not met	Not met	Not met	Not met	Met	Fair
Goldberg, 1998	U	U	High	U	High	Low	Low	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Not met	Not met	Met	Fair

Study ID	Random Sequence Generation (selection bias)	Allocation Concealment (selection bias)	Blinding of Participants and Providers (performance bias)	Blinding of Outcome Assessors (detection bias)	Completeness of Reporting Outcome Data (attrition bias)	Selective Outcome Reporting (reporting bias)	Cross-overs/contamination (contamination bias)	**1. Organizational Motivation** *Organizational problem/reason or motivation for intervention*	**2. Intervention Rationale** *Rationale linking the intervention to expected effects*	**3. Intervention** *Specific changes in health care delivery organization/structure*	**4. Organizational Characteristics** *Organizational demographics and basic characteristics*	**5. Implementation** *Approach to designing and/or introducing organizational changes*	**6. Study Design** *Study design and comparator*	**7. Comparator** *Information about comparator care processes*	**8. Data Source** *Data sources and outcome definition*	**9. Timing** *Timing of intervention and evaluation*	**10. Adherence/Fidelity** *Adherence to the intervention*	**11. Health Outcomes** *Patient health-related outcome*	**12. Organizational Readiness** *Organizational readiness for the studied intervention*	**13. Penetration/Reach** *Penetration/reach of the intervention*	**14. Sustainability** *Potential for intervention maintenance or sustainability*	**15. Spread** *Ability to be spread or replicated*	**16. Limitations** *Quality of the interpretation of findings*	**Summary Rating**
Keeley, 2014	Low	U	High	U	Low	U	Low	Met	Met	Met	Met	Met	Met	Met	Met	Not met	Not met	Met	Not met	Met	Not met	Not met	Met	Good
Kurian, 2009	U	U	High	Low	U	U	U	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Not met	Not met	Not met	Met	Fair
Lin, 2001	U	U	High	U	U	U	High	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Not met	Not met	Met	Not met	Not met	Met	Poor
Linden, 2008	U	U	High	U	U	U	U	Met	Met	Met	Met	Met	Met	Met	Met	Not met	Not met	Met	Not met	Not met	Not met	Not met	Met	Poor
Nilsson, 2001	U	U	High	U	High	U	U	Met	Met	Met	Met	Met	Met	Met	Met	Not met	Met	Not met	Not met	Met	Not met	Met	Met	Poor
Rollman, 2001	Low	U	High	Low	Low	U	High	Met	Met	Met	Met	Met	Met	Met	Met	Not met	Met	Met	Met	Not met	Not met	Met	Met	Good
Shirazi, 2013	U	U	High	U	Low	U	Low	Met	Met	Met	Met	Met	Met	Met	Met	Not met	Met	Not met	Not met	Met	Not met	Not met	Met	Fair
Simon, 2000	Low	U	High	Low	U	U	High	Met	Met	Met	Met	Met	Met	Met	Met	Met	Not met	Met	Not met	Not met	Not met	Not met	Met	Fair
Sinnema, 2015	Low	Low	High	U	Low	U	Low	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Not met	Not met	Met	Good
van Eijk, 2001	U	U	High	U	Low	U	Low	Met	Met	Met	Not met	Met	Met	Not met	Met	Met	Not met	Not met	Not met	Not met	Not met	Not met	Met	Fair
Worrall, 1999	Low	U	High	High	U	U	Low	Met	Met	Met	Met	Met	Met	Met	Not met	Not met	Not met	Met	Not met	Not met	Not met	Not met	Met	Fair
Yawn, 2012	U	U	High	Low	U	U	Low	Met	Met	Not met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Not met	Not met	Not met	Met	Fair

NOTE: U = unclear risk of bias, Low = low risk of bias, High = high risk of bias.
All studies were de facto considered high risk for personnel blinding.

Appendix E. Sensitivity Analyses for High-Quality Studies

Figure E.1. Odds of Achieving Provider Adherence (Main Indication) Compared to Usual Care Practice (Good-Quality Studies Only)

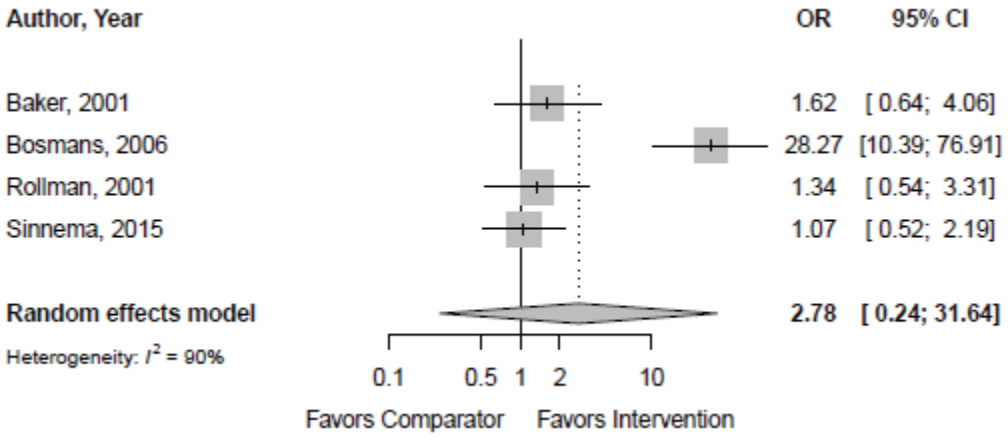
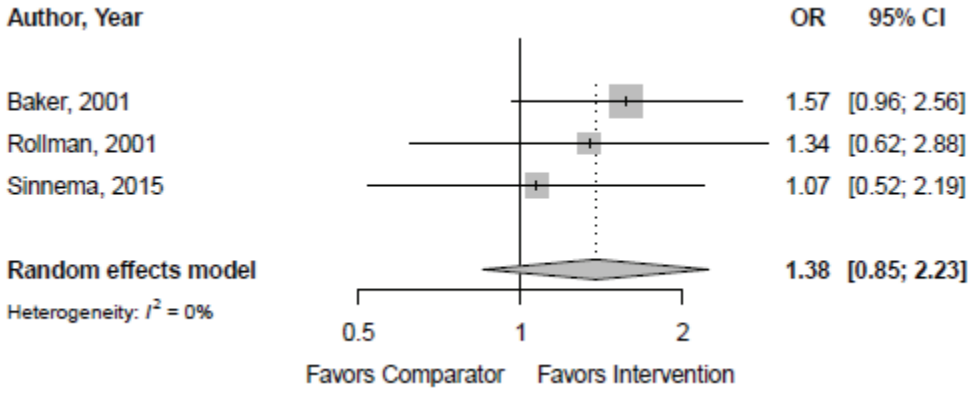


Figure E.2. Odds of Improved Medication Prescribing Compared to Usual Care (Good-Quality Studies Only)



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