

### 3. Quality Improvement Interventions To Address Health Disparities

#### Closing the Quality Gap: Revisiting the State of the Science Executive Summary

#### Background

Health care disparities are the differences or gaps in care experienced by one population compared with another.<sup>1</sup> Disparities have been noted in health outcomes, including clinical outcomes such as mortality, process measures in the health care system, and disease prevalence. By definition, a disparity in health care quality or health outcomes is not due to differences in the health care needs or preferences of the patient but to other factors.<sup>2</sup> Such differences in health outcomes and their determinants are associated with certain social conditions and demographic attributes.<sup>3,4</sup>

Disparities that occur between identified populations are described by attributes such as race, ethnicity, language, sex, insurance status, socioeconomic status, and health literacy. These attributes and the disparities that may be associated with them are not mutually exclusive, and populations with disproportionately poor health outcomes often share multiple indicators of disparity. Despite what is known about disparities, it is not clear what strategies have the potential to improve the quality of care effectively and to reduce inequities for segments of the population.<sup>2</sup>

Quality improvement (QI) is a multidisciplinary, systems-focused, data-driven method of understanding and improving the efficiency, effectiveness, and reliability of health processes and outcomes of care. The QI process is designed to raise the standards of the delivery of preventive, diagnostic, therapeutic,

#### Evidence-based Practice Program

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-based Practice Centers (EPCs), sponsors the development of evidence reports and technology assessments to assist public- and private-sector organizations in their efforts to improve the quality of health care in the United States. The reports and assessments provide organizations with comprehensive, science-based information on common, costly medical conditions and new health care technologies. The EPCs systematically review the relevant scientific literature on topics assigned to them by AHRQ and conduct additional analyses when appropriate prior to developing their reports and assessments.

AHRQ expects that the EPC evidence reports and technology assessments will inform individual health plans, providers, and purchasers as well as the health care system as a whole by providing important information to help improve health care quality.

The full report and this summary are available at [www.effectivehealthcare.ahrq.gov/reports/final.cfm](http://www.effectivehealthcare.ahrq.gov/reports/final.cfm).

and rehabilitative measures to maintain, restore, or improve the health outcomes of individuals and populations. Given the potential for QI strategies to improve the quality of care across the population, interest has developed in whether they might be used to reduce specific disparities, potentially by having an amplified effect among disadvantaged groups.<sup>5</sup>

For this report, we defined a QI intervention as a change process in health care systems, services, or suppliers for the purpose of increasing the likelihood of optimal clinical quality of care, measured by positive health outcomes for individuals and populations. An intervention could also be described as a strategy aimed at reducing the quality gap (the difference between health care processes or outcomes observed in practice and those potentially obtainable based on current evidence-based knowledge) for a group of patients representative of those encountered in routine practice.<sup>5</sup>

## Objective

This review evaluates the effectiveness of QI interventions in reducing disparities in health and health care.

## Key Questions

Key Question 1. What evidence is available about the effectiveness of quality improvement strategies to reduce differences in health outcomes associated with selected disparities in patients with key conditions?

Key Question 2. What evidence is available about the harms related to quality improvement strategies to reduce differences in health outcomes associated with selected disparities in patients with key conditions?

## Analytic Framework

We developed the analytic framework (shown in Figure 1 of the full report) based on clinical expertise and refined it with input from a Technical Expert Panel (TEP). The analytic framework outlines the review of the available evidence on the effectiveness of QI strategies in the reduction of disparities in health outcomes and other measures of health care delivery for selected conditions and groups.

We explicitly defined eligibility criteria using a PICOTS (population, intervention, comparator, outcome, timing, and setting) structure. Broadly, we sought studies that described a QI intervention and measured potential changes in the inequity of care between patient groups with prespecified clinical conditions.

To measure potential changes in disparity between patient groups, studies had to include a target and referent population (e.g., for income disparity studies, they should include data for low- and high-income groups). We included studies that reported outcomes in terms of health care processes, individual health outcomes, and/or adverse outcomes or harms resulting from a QI intervention.

## Methods

### Input From Stakeholders

With input from our TEP, we drafted initial Key Questions (KQs), which were reviewed by the Agency for Healthcare Research and Quality. Our TEP also provided input during the project on issues such as setting, inclusion/exclusion criteria, and refining the analytic framework.

### Literature Search

We searched the following databases: MEDLINE® (PubMed® interface), the Cumulative Index of Nursing and Allied Health Literature (CINAHL), Web of Science Social Science Index, and PsycINFO (CSA Illumina interface). The search strategies for each of these databases included terms related to QI, disparity, and prespecified clinical conditions.<sup>6,7</sup>

Each search strategy used a combination of subject headings (i.e., controlled vocabulary) and keywords. (See Appendix A of the full report.) We carried out hand searches of the reference lists of recent systematic reviews related to QI studies and the reference lists of included papers.

### Paper Selection Process

We included studies that captured health outcome measures and/or process measures to answer KQ 1. For KQ 2, we sought studies that reported harms (e.g., negative unintended consequences, misallocation of effort, decreased patient satisfaction) of the QI intervention to individual participants. Table A summarizes the inclusion/exclusion criteria.

**Table A. Inclusion and exclusion criteria**

Category	Criteria
Population	Individuals receiving health care in the United States for a prespecified clinical condition: <ul style="list-style-type: none"> <li>• Asthma</li> <li>• Cancer:               <ul style="list-style-type: none"> <li>– Colorectal cancer (including screening)</li> <li>– Breast cancer (including screening)</li> </ul> </li> <li>• Cardiovascular disease               <ul style="list-style-type: none"> <li>– Congestive heart failure</li> <li>– Coronary artery disease (including ischemic heart disease, myocardial infarction, and acute coronary syndrome)</li> <li>– Hypertension</li> </ul> </li> <li>• Cystic fibrosis</li> <li>• Depression (major depressive disorder only)</li> <li>• Diabetes</li> <li>• End-stage renal disease</li> <li>• Pneumonia (including pneumococcal vaccination)</li> <li>• Pregnancy</li> </ul> Studies had to include data on characteristics known to be associated with health disparities: race or ethnicity, socioeconomic status, insurance status, sex, sexual orientation, health literacy/numeracy, and/or language barrier.
Intervention	QI strategy: (1) a formal broad organizational model or (2) a change process in health care systems, services, or suppliers for the purpose of increasing the likelihood of optimal clinical quality of care.
Comparator	Usual care or use of an alternate strategy.
Outcome(s)	Outcome measures of interest: health outcomes (e.g., morbidity and mortality, indirect health outcomes such as blood pressure and HbA1c); process measures (e.g., proportion of patients treated according to clinical guidelines); changes in disparity; and harms (i.e., any negative impact of the intervention on the individual patients or the health care system).
Time period	1983–present
Setting	Studies were based out of a hospital, provider office, and/or health care clinic.
Other criteria	Admissible designs: randomized controlled trials, including cluster randomized controlled trials; controlled trials, including quasi-randomized trials; controlled before-after studies; prospective and retrospective cohort studies; interrupted time series studies with comparison groups; and stepped-wedge design studies. Original research studies with sufficient detail to enable use and adjustment of the data and results. Inclusion of a target group and an internal or external referent group to measure changes in disparities. A minimum sample size of 50 individuals per study and intervention group or subgroup. Extractable data on relevant outcomes from text or tables. English-language publications only.

In the absence of published information (e.g., minimum effect size, standard error) to inform a power calculation, we derived the minimum sample size from expert opinion.

HbA1c = hemoglobin A1c; QI = quality improvement.

As health care systems, disparities, and groups subject to disparities vary geographically, we limited eligible papers to studies of patients in the U.S. health care system. Consistent with this inclusion criterion, only papers published in English were included. Searches were limited to papers published in 1983 or later, as seminal work regarding QI strategies began to be published in the early 1980s.

All studies were required to include a comparison group that did not receive the QI intervention or that received a different intervention. In addition, they were required to provide data that could be used to measure a disparity before and after the intervention based on one of the population characteristics specified in the protocol (Table A). These data could have included reference to an external referent group, but if so, the data needed to have been collected within 4 years of the enrollment of the target group and be from a source that was at the State or local level. We included randomized controlled trials (RCTs), including cluster randomized controlled trials; controlled trials, including quasi-randomized studies; controlled before-after studies; prospective and retrospective cohort studies; interrupted time series with comparison groups; and stepped-wedge designs.

We considered both formal QI models and QI strategies for the review. We did not include papers describing topics or interventions covered by other reports in the Closing the Quality Gap series (e.g., studies that target public reporting, payment bundling, and medication adherence).

We conducted screening in two phases: abstract and full-text screening. Two reviewers independently reviewed each abstract. All papers with inclusion or exclusion conflicts at the abstract review level or lacking adequate information to make a determination were promoted to full-text review. Two reviewers independently reviewed the full text of papers included at the abstract phase. Disagreements between reviewers at the full-text screening level were resolved by a senior investigator.

## Data Extraction

Two reviewers independently extracted relevant data (e.g., setting, condition, patient population, QI strategy, outcomes, and disparity) from all included papers using a predefined evidence table shell. A senior investigator reviewed the evidence tables for accuracy and completeness. The research team met regularly during the data extraction period and discussed global issues related to the process. The final evidence table is presented in Appendix I of the full report. When possible to identify, analyses resulting from the same study were grouped together.

## Quality Assessment

We assessed the quality of individual studies using specific tools for each type of study. For RCTs, we used the Cochrane Collaboration Risk of Bias tool,<sup>8</sup> which evaluates domains that include sequence generation, allocation concealment, blinding, outcome data reporting, and reporting bias.

For observational studies, we used the Newcastle-Ottawa scale<sup>9</sup> to assess three broad perspectives: (1) the selection of the study groups, (2) the comparability of the groups, and (3) the ascertainment of either the exposure for case-control studies or the outcome of interest for cohort studies.

We rated individual studies as good, fair, or poor quality. Several of the included papers reported data from a post hoc or secondary analysis of a previously completed RCT. Because the balance between groups achieved by randomization does not reliably extend to subgroups, we modified the risk of bias/quality assessment on a case-by-case basis, considering the methods of the individual paper and parent study methods when appropriate.

## Data Synthesis

Meta-analysis was not appropriate in this review due to the heterogeneity of the studies in population, clinical condition, disparity target, and outcome; therefore, all analysis is narrative and based on the evidence and summary tables. Studies are summarized in categories of clinical conditions, and where possible, by type of outcome studied (e.g., clinical or process).

## Results

### Literature Search Yield

Searches identified 4,278 titles and abstracts for screening. From this broad screening, 791 papers were identified as possibly related to our review and moved forward for full-text review. Nineteen papers met criteria; they represented 14 studies of cancer, cardiovascular disease, depression, and diabetes. All 14 studies included in the review addressed KQ 1, and none addressed KQ 2 (harms of interventions).

Of the 14 studies represented in the 19 included papers, 11 were RCTs, 10-21 including 2 cluster RCTs.<sup>10,11,22-25</sup> The remaining studies were cohort studies, including one prospective cohort study,<sup>26</sup> one retrospective cohort study,<sup>27</sup> and one cohort study with a historical control.<sup>28</sup>

Included papers targeted or described disparities associated with differences in race or ethnicity (n = 14),<sup>10-12,16,17,19-21,23,24,26-29</sup> socioeconomic status (n = 3),<sup>13,19,27</sup> insurance status (n = 2),<sup>14,21</sup> language (n = 2),<sup>15,21</sup> health literacy (n = 1),<sup>18</sup> and sex (n = 1).<sup>25</sup>

Outcomes included health care processes and health outcomes. All but one of the studies incorporated multiple components into their QI approach. Patient education was a part of most interventions (12 of 14), although the specific approach differed substantially across the studies. Ten of the studies incorporated self-management—for example, teaching individuals with diabetes to check their blood sugar regularly. Most (8 of 14) included some sort of provider education, which may have focused on the clinical issue or on raising awareness about disparities affecting the target population. Nonetheless, given the degree to which the interventions all included multiple components that were implemented as a system, it is not possible to tease apart the effects or implications of individual aspects.

We organize the results in two ways. First, the results are summarized by effect on particular disparities, which is the primary focus of the review; second, descriptions of the studies are organized by clinical condition as a reference for end users interested in implementing QI approaches in individual clinics or clinical specialties.

## Effects by Type of Disparity

Eleven studies provided data on the effects of QI interventions on racial or ethnic disparities in health care (Table B). Among interventions to reduce racial or ethnic disparities, one disease management and patient education program<sup>27</sup> was associated with a reduction in disparity between Black and White patients in HbA1c (hemoglobin A1c) testing when it was targeted in a geographic area with very high rates of diabetes. This study reported significant improvement among Black participants compared with no improvement among White participants, thus narrowing the gap. Other interventions did not demonstrate a significant reduction in disparity but demonstrated an amplified effect in the nonwhite populations. They included an additional patient education program for reduction in blood pressures<sup>16</sup> and a complex collaborative care model aimed at providers of patients with depression.<sup>10,23,24,29</sup> In the latter study, the intervention was more effective in the short term among minorities than among Whites, although the interaction was no longer significant after 1 year and the intervention was not effective overall at 5 and 9 years.

**Table B. Summary of effects on disparities in health outcomes associated with race or ethnicity**

Author, Year, Study Design, Clinical Condition(s)	QI Intervention Characteristic(s)	Effect on Health Disparity
Arean et al., 2005 <sup>12</sup> RCT Depression	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Provider education</li> <li>• Promotion of self-management</li> <li>• Facilitated relay of clinical data to provider</li> <li>• Other (collaborative care model)</li> </ul>	<ul style="list-style-type: none"> <li>• No disparity in depression severity existed by race or income at baseline.</li> <li>• The intervention was effective in all racial subgroups, with no interaction by race and no amplified effect in any group.</li> <li>• In subgroup analysis, the intervention was associated with greater use of psychotherapy but not pharmacotherapy within the Black population.</li> </ul>
Bao et al., 2011 <sup>19</sup> RCT Depression	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Provider education</li> <li>• Promotion of self-management</li> <li>• Provider reminder system</li> <li>• Other (collaborative care model)</li> </ul>	<ul style="list-style-type: none"> <li>• At baseline within the usual-care group, 22% of minorities had adequate antidepressant use, compared with 39% of Whites.</li> <li>• The intervention had no effect on this disparity, and ethnic minorities did not receive greater benefit from intervention compared with Whites during any time period.</li> </ul>

**Table B. Summary of effects on disparities in health outcomes associated with race or ethnicity (continued)**

Author, Year, Study Design, Clinical Condition(s)	QI Intervention Characteristic(s)	Effect on Health Disparity
Bosworth et al., 2011 <sup>16</sup> RCT Cardiovascular disease: hypertension	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Promotion of self-management</li> </ul>	<ul style="list-style-type: none"> <li>• The race by time by treatment group effect model suggested differential intervention effects on BP over time for Whites vs. nonwhites for both SBP (p = 0.08) and DBP (p = 0.01).</li> <li>• Compared with usual care, the combination of home BP monitoring and tailored behavioral intervention continued to be effective in nonwhite participants at 24 months (p = 0.04).</li> </ul>
Coberley et al., 2007 <sup>2</sup> Retrospective cohort Diabetes	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Promotion of self-management</li> <li>• Organizational change (disease management)</li> </ul>	<ul style="list-style-type: none"> <li>• Initial racial disparity in HbA1c testing between the diabetes HDZ group (higher than expected prevalence of diabetes) and non-HDZ group was 12%.</li> <li>• Disparity was not significantly reduced after 12 months (p = 0.06).</li> <li>• Within the HDZ zone, testing increased by 15% among Black participants but not among White participants, resulting in a reduction in disparity in this subgroup analysis.</li> </ul>
Connett and Stamler, 1984 <sup>17</sup> RCT Cardiovascular disease: coronary artery disease and hypertension	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Promotion of self-management</li> </ul>	<ul style="list-style-type: none"> <li>• At baseline, Black participants had higher rates of smoking than White participants (68.7% vs. 63%; p &lt; .001).</li> <li>• Both racial groups experienced significant reductions in smoking, close to 50% in the intervention group and more than 35% in the usual-care group.</li> <li>• The baseline disparity persisted in the intervention group but was apparently reduced in the usual-care group.</li> <li>• A statistically significant but clinically insignificant disparity in DBP and SBP by race was present at baseline.</li> <li>• Blood pressures were reduced in both the intervention and control groups, with greater change observed in the intervention group.</li> <li>• The small disparity observed at baseline was further reduced at followup in the intervention group but not the control group.</li> </ul>
Lasser et al., 2011 <sup>2</sup> RCT Cancer: CRC screening	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Promotion of self-management</li> <li>• Patient reminder system</li> </ul>	<ul style="list-style-type: none"> <li>• No disparity in CRC screening rates existed at baseline by race or ethnicity.</li> <li>• The intervention was more effective in White and Black individuals relative to those of other or unknown race.</li> </ul>
Mahotiere et al., 2006 <sup>26</sup> Prospective cohort Diabetes	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Provider education</li> <li>• Promotion of self-management</li> <li>• Audit and feedback</li> <li>• Other (community intervention)</li> </ul>	<ul style="list-style-type: none"> <li>• The disparity in biennial lipid profile testing at baseline was 19%.</li> <li>• The biennial lipid profile testing rate improved by 26.2% in African-American fee-for-service Medicare beneficiaries with diabetes in the intervention areas following implementation of the QI program.</li> <li>• The disparity in performance of biennial lipid profile between African-American and White Medicare fee-for-service beneficiaries was reduced to 9.2% following implementation of the QI program.</li> <li>• An analysis of the direct impact of the selected interventions on reducing the disparity in this uncontrolled database analysis was not feasible.</li> </ul>

**Table B. Summary of effects on disparities in health outcomes associated with race or ethnicity (continued)**

Author, Year, Study Design, Clinical Condition(s)	QI Intervention Characteristic(s)	Effect on Health Disparity
<p>Miranda et al., 2003;<sup>10</sup>                      Miranda et al., 2004;<sup>29</sup>                      Wells et al., 2007;<sup>23</sup> Wells et al., 2004<sup>24</sup>                      Cluster RCT                      Depression</p>	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Provider education</li> <li>• Promotion of self-management</li> <li>• Audit and feedback</li> <li>• Facilitated relay of clinical data to provider</li> <li>• Other (collaborative care model)</li> </ul>	<ul style="list-style-type: none"> <li>• The intervention was associated with decreases in probable depressive disorder among minorities but not White patients at 12 months (Latino, <math>p = 0.02</math>; African-American, <math>p = 0.01</math>).</li> <li>• At 12 months, among intervention recipients, the baseline disparity had increased from 6.7% to 7.7% between Latino and White patients and decreased from 9.2% to 6.7% between African-American and White patients.</li> <li>• Although a statistically significant interaction was seen between intervention and ethnicity at 6 months when minorities were grouped and contrasted with White patients, no such interaction persisted at 12 months.</li> <li>• The overall effect of the intervention on depression status was not significant at 5 and 9 years, but an interaction with race was seen in the overall model of effectiveness. The intervention was associated with improvements in the Mental Health Inventory among minorities (<math>p = 0.008</math>) but not among White patients (<math>p = 0.59</math>).</li> <li>• In subanalysis at 5 years, QI–Therapy but not QI–Meds was effective within the minority population.</li> </ul>
<p>Olomu et al., 2010<sup>28</sup>                      Retrospective cohort (historic controls)                      Cardiovascular disease: coronary artery disease</p>	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Provider education</li> <li>• Promotion of self-management</li> <li>• Other (guideline adherence)</li> </ul>	<ul style="list-style-type: none"> <li>• The American College of Cardiology’s Acute Myocardial Infarction Guidelines Applied in Practice strategy was associated with increased inpatient use of beta-blockers among nonwhite patients.</li> <li>• Racial disparities in the use of cardiac catheterization and percutaneous coronary intervention appeared after implementation of the GAP QI strategy despite overall improvements in care.</li> <li>• The admission tool and inpatient aspirin were more often used post-GAP vs. pre-GAP in both White and nonwhite patients.</li> </ul>
<p>Sequist et al., 2010<sup>11</sup>                      Cluster RCT                      Diabetes</p>	<ul style="list-style-type: none"> <li>• Provider education</li> <li>• Audit and feedback</li> </ul>	<ul style="list-style-type: none"> <li>• Disparities between Black and White patients were present at baseline in HbA1c levels, BP control, and LDL level.</li> <li>• The intervention showed no effect overall in either racial group.</li> <li>• The intervention did not reduce the disparity.</li> </ul>
<p>Siddiqui et al., 2011<sup>20</sup>                      RCT                      Cancer: CRC screening</p>	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Promotion of self-management</li> <li>• Patient reminder system</li> </ul>	<ul style="list-style-type: none"> <li>• No disparity in CRC screening rates existed at baseline by race or ethnicity.</li> <li>• No statistically significant difference in screening rates existed between Whites and African-Americans in the control group.</li> <li>• When intervention groups were combined, the screening rate was significantly higher in Whites than African-Americans.</li> </ul>

BP = blood pressure; CRC = colorectal cancer; DBP = diastolic blood pressure; GAP = American College of Cardiology’s Acute Myocardial Infarction Guidelines Applied in Practice; HbA1c = hemoglobin A1c; HDZ = health disparity zone; LDL = low-density lipoprotein; QI = quality improvement; RCT = randomized controlled trial; SBP = systolic blood pressure.

Two studies examined a difference in outcomes associated with insurance status (Table C). In both studies, the intervention was equally successful at increasing cancer screening in publicly and privately insured participants. In the first study, a patient reminder system for breast cancer screening improved mammography rates in all women. In the second study, language-concordant assistance

by a patient navigator who promoted self-management strategies, patient education, and reminders were associated with significantly increased colorectal cancer screening among both privately insured and publicly insured participants compared with usual care but was more effective in the privately insured group.

**Table C. Summary of effects on disparities in health outcomes associated with insurance status**

Author, Year, Study Design, Clinical Condition	QI Intervention Characteristic(s)	Effect on Health Disparity
Barr et al., 2001 <sup>14</sup> RCT Cancer: breast cancer screening	<ul style="list-style-type: none"> <li>• Patient reminder system</li> </ul>	<ul style="list-style-type: none"> <li>• No disparity in mammography screening rates was observed at baseline.</li> <li>• The intervention was successful in both groups.</li> <li>• Reminder interventions improved the likelihood of screening mammography in both commercially insured women (p = 0.001) and women covered by Medicare (p = 0.01), with no difference in improvement between groups.</li> </ul>
Lasser et al., 2011 <sup>21</sup> RCT Cancer: CRC screening	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Promotion of self-management</li> <li>• Patient reminder system</li> </ul>	<ul style="list-style-type: none"> <li>• No disparity in CRC screening rates was measured at baseline by race or ethnicity.</li> <li>• The intervention increased screening rates in both the private and public insurance groups compared with individuals in the usual-care group.</li> <li>• The intervention was associated with a better screening rate for the privately insured group than the publicly insured group.</li> </ul>

CRC = colorectal cancer; QI = quality improvement; RCT = randomized controlled trial.

Two studies examined the effects of QI strategies on disparities associated with language (Table D). Both of them studied language concordance, in which strategies are provided in the native or preferred language of the participant (e.g., in Spanish for native Spanish speakers). One study examined the degree to which a language-concordant patient education strategy was associated with increased cancer screening (breast and colorectal) among English- and Spanish-speaking patients. For breast cancer screening, Spanish speakers were more likely to be up to date at baseline than English speakers (odds ratio [OR], 1.46; 95% confidence interval [CI]: 1.16 to 1.84). The intervention was associated with increased rates of screening overall, with subgroup analysis indicating a greater effect in the Spanish-speaking group (OR, 1.85; 95% CI: 1.38 to 2.47) than the English-speaking group (OR, 1.18; 95% CI: 0.82 to 1.71). However, the overall multivariate analysis failed to confirm these results, and providing the intervention in Spanish to Spanish speakers did not make it any more effective in this group. For

colorectal screening, there was no difference in up-to-date status at baseline, the intervention was again effective overall, and there was no language-by-intervention effect.

A second study included language-concordant assistance by a patient navigator promoting self-management strategies, and providing patient education and reminders to facilitate adherence to colorectal cancer screening for individuals speaking English as their primary language and individuals speaking a language other than English. The patient navigator intervention was associated with increased colorectal cancer screening among individuals whose primary language was not English (28.9 percent vs. 18.9 percent; p = 0.04) but not among patients whose primary language was English (26.8 percent vs. 21.4 percent; p = 0.35).<sup>21</sup> These studies combined may suggest that targeted language-concordant interventions could warrant further examination, with results suggesting a significantly different effect for non-English speakers and English speakers in one study, and a clinically but not statistically different effect in the other.



**Table D. Summary of effects on disparities in health outcomes associated with language barrier**

Author, Year, Study Design, Clinical Condition	QI Intervention Characteristic(s)	Effect on Health Disparity
Beach et al., 2007 <sup>15</sup> RCT Cancer: CRC and breast cancer screening	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Promotion of self-management</li> <li>• Patient reminder system</li> </ul>	<ul style="list-style-type: none"> <li>• At baseline, Spanish speakers were more likely to be up to date on breast cancer screening.</li> <li>• The intervention was effective at increasing rates of breast cancer screening overall, with greater effect among Spanish speakers.</li> <li>• The difference between observed effects for breast cancer screening in the two language groups was not significant.</li> <li>• No disparity in CRC screening rate was observed at baseline.</li> <li>• The intervention was associated with increases in CRC screening in both groups, with neither group having a greater effect of the intervention.</li> <li>• Although there was no evidence that the intervention might reduce known disparities, the intervention was effective at increasing CRC screening for both groups.</li> </ul>
Lasser et al., 2011 <sup>21</sup> RCT Cancer: CRC screening	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Promotion of self-management</li> <li>• Patient reminder system</li> </ul>	<ul style="list-style-type: none"> <li>• No disparity in CRC was measured at baseline.</li> <li>• English-speaking participants had a similar incidence of CRC screening during 1 year of followup in the intervention group as compared with usual care.</li> <li>• Intervention was particularly beneficial for non-English-language participants.</li> </ul>

CRC = colorectal cancer; QI = quality improvement; RCT = randomized controlled trial.

In one study focused on improving provider-patient communication in Department of Veterans Affairs clinics, colorectal cancer screening increased among individuals with limited health literacy (55.7 percent vs. 30 percent) but not among individuals with adequate health literacy

(39 percent vs. 36 percent) in the 20-percent subsample that underwent literacy assessment (Table E). The intervention itself included a workshop and feedback sessions for providers and educational materials for patients that included a video.

**Table E. Summary of effects on disparities in health outcomes associated with health literacy**

Author, Year, Study Design, Clinical Condition	QI Intervention Characteristic(s)	Effect on Health Disparity
Ferreira et al., 2005 <sup>18</sup> RCT Cancer: CRC screening	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Provider education</li> <li>• Audit and feedback</li> </ul>	<ul style="list-style-type: none"> <li>• Patients with limited health literacy were significantly more likely to be screened for CRC when treated at the VA clinic implementing the QI strategy compared with patients treated at the usual-care clinic (55.7% vs. 30.0%; p = 0.002).</li> <li>• Patients with adequate health literacy were equally likely to pursue CRC screening when treated at the VA clinic implementing the QI strategy compared with patients treated at the usual-care clinic (39.0% vs. 36.0%; p = 0.65).</li> <li>• Although the effect of the intervention on disparity was not measured directly, the intervention improved the incidence of up-to-date CRC screening among those with limited health literacy but not among those with higher health literacy, suggesting that it might be a useful tool for reducing literacy-related disparity.</li> </ul>

CRC = colorectal cancer; QI = quality improvement; RCT = randomized controlled trial; VA = Veterans Affairs.

In the two studies that assessed differences in effect by socioeconomic status, no effect was seen by income, but individuals with less education experienced greater benefits

of collaborative care for depression than did those with higher education (Table F).

**Table F. Summary of effects on disparities in health outcomes associated with socioeconomic status**

Author, Year, Study Design, Clinical Condition	QI Intervention Characteristic(s)	Effect on Health Disparity
Arean et al., 2007 <sup>13</sup> RCT Depression	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Provider education</li> <li>• Promotion of self-management</li> <li>• Facilitated relay of clinical data to provider</li> <li>• Other (collaborative care model)</li> </ul>	<ul style="list-style-type: none"> <li>• Both low-income populations and those with high/middle income experienced a very small benefit from the collaborative care intervention: fewer depression symptoms (adjusted OR, -0.41; 95% CI: -0.49 to -0.33 for high/middle income; adjusted OR, -0.39; 95% CI: -0.5 to -0.27 for low income; comparator: usual care). However, no disparities in depressive symptoms had existed at baseline.</li> </ul>
Bao et al., 2011 <sup>19</sup> RCT Depression	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Provider education</li> <li>• Promotion of self-management</li> <li>• Provider reminder system</li> <li>• Other (collaborative care model)</li> </ul>	<ul style="list-style-type: none"> <li>• No disparity in depressive symptoms was present at baseline.</li> <li>• At 24 months, participants with no college education had a greater reduction in depression than participants with college education.</li> </ul>

CI = confidence interval; OR = odds ratio; QI = quality improvement; RCT = randomized controlled trial.

Finally, one analysis examined the degree to which a collaborative care model for depression could reduce known disparities by sex in accessing care and in outcomes (Table G). At baseline, women were more likely to have current single or double depression (62 percent) than men (53 percent) and had more symptoms of depression and lower mental health–related quality of life. Women

had higher rates of appropriate depression care compared with men at 2 years ( $p = 0.0001$ ). A medication–focused intervention and a therapy–focused intervention decreased a disparity gap between men and women in probable unmet need from 10 percent to 1 percent (QI–Meds) and 3 percent (QI–Therapy) at 24 months.

**Table G. Summary of effects on disparities in health outcomes associated with sex**

Author, Year, Study Design, Clinical Condition	QI Intervention Characteristic(s)	Effect on Health Disparity
Sherbourne et al., 2004 <sup>25</sup> Cluster RCT Depression	<ul style="list-style-type: none"> <li>• Patient education</li> <li>• Provider education</li> <li>• Promotion of self-management</li> <li>• Audit and feedback</li> <li>• Facilitated relay of clinical data to provider</li> <li>• Other (collaborative care model)</li> </ul>	<ul style="list-style-type: none"> <li>• At baseline, women were more likely to have depression (62%) than men (53%) and had more depression symptoms and lower mental health–related quality of life.</li> <li>• Women had higher rates of appropriate depression care compared with men at 2 years (<math>p = 0.0001</math>).</li> <li>• QI–Meds and QI–Therapy decreased “probable unmet need” disparity gap between men and women from 10% to 1% (QI–Meds) and 3% (QI–Therapy) at 24 months.</li> </ul>

QI = quality improvement; RCT = randomized controlled trial.

## Studies by Clinical Condition

### Cancer

Five RCTs with subgroup analyses explored the effects of various QI strategies on health care disparities in cancer screening, including one examining breast cancer screening,<sup>14</sup> three assessing screening for colorectal cancer,<sup>18,20,21</sup> and one assessing both breast and colorectal cancer screening.<sup>15</sup> Disparities that served as the focus of these analyses included race or ethnicity,<sup>20,21</sup> insurance status,<sup>14,21</sup> health literacy,<sup>18</sup> and language.<sup>15,21</sup>

The QI strategies included provision of mail or telephone reminders to patients,<sup>14</sup> education and feedback for clinicians,<sup>18</sup> and language-concordant telephone support calls from prevention care managers to patients.<sup>15</sup> All five RCTs took place in the United States, with study settings including a large academic medical center,<sup>20</sup> a primary care research network,<sup>21</sup> 1 large group-model health maintenance organization (HMO),<sup>14</sup> 2 Department of Veterans Affairs (VA) clinics,<sup>18</sup> and 11 community health centers.<sup>15</sup>

All studies employed an internal usual-care comparison group. Compared with usual care, a language-concordant intervention<sup>15</sup> was more effective in increasing breast cancer screening among Spanish-speaking women than English-speaking women, but the observed difference between

the two groups (English and Spanish speaking) was not significant. The language-concordant intervention did not have a similar effect on colorectal cancer screening.<sup>15</sup> Compared with usual care, a strategy targeting health literacy facilitated colorectal cancer screening among those with limited health literacy more effectively than among those with high health literacy.<sup>18</sup> A reminder intervention for breast cancer screening had no differential effect on mammography disparities by insurance status.<sup>14</sup>

### Cardiovascular Disease

One post hoc analysis of an RCT<sup>17</sup> and one retrospective cohort study<sup>28</sup> explored the effects of various QI strategies on racial health care disparities in coronary artery disease (CAD). The RCT addressed reduction of CAD risk factors,<sup>17</sup> while the retrospective cohort examined management of acute myocardial infarction (AMI).<sup>28</sup> QI strategies included patient education and facilitation of self-management,<sup>17</sup> and a multifactorial provider- and systems-focused strategy.<sup>28</sup> Both studies were collaborations of academic and community health centers.<sup>17,28</sup> The studies each employed an internal usual-care comparison group.

One study of cardiovascular risk factor modification showed no meaningful reduction in health disparities seen in smoking rates, although both Black and White

participants had substantially lower rates of smoking after intervention.<sup>17</sup> In the other study, intervention in AMI treatment reduced disparities in one aspect of treatment, which exacerbated disparities in other areas, including use of the discharge tool and cardiac catheterization rates.<sup>28</sup> The strength of evidence was insufficient.

Two post hoc analyses of RCTs explored the effects of various QI strategies on racial health care disparities in hypertension.<sup>16,17</sup> The RCTs addressed management of hypertension<sup>16</sup> and reduction of CAD risk factors, including hypertension.<sup>17</sup> QI strategies were patient education<sup>16</sup> and facilitation of self-management.<sup>16,17</sup> The studies took place in university clinics<sup>16</sup> and multicenter collaborations of academic and community health centers.<sup>17</sup> The studies each employed an internal usual-care comparison group.

One study had no significant intervention effect on a clinically insignificant disparity in blood pressure measures present at baseline after patient education and promotion of self-management.<sup>17</sup> In the second study, a home-based self-management strategy, including home blood pressure monitoring and tailored self-management strategies, was more effective in the Black population than in the White population, although the study design precludes determination of a clear causal effect from the intervention.<sup>16</sup>

## Depression

Three studies evaluated the effect of QI interventions on disparities in depression outcomes. Racial disparities were of interest in all three, but interim analyses were also performed based on sex,<sup>25</sup> income,<sup>13</sup> and educational status.<sup>19</sup> All three studies used a collaborative care model, which involved collaboration among multiple clinical providers to provide a coordinated set of interventions. The model in all three studies generally included a dedicated mental health coordinator (nurse or case manager); creation of mental health teams (composed of primary provider, facility nurses, and psychiatrists); evidence-based pharmacotherapy and psychotherapy; extensive provider education; and longitudinal patient followup to evaluate clinical status and adherence. Each intervention was designed to address known barriers to the receipt of quality mental health care. All three studies were prospective RCTs, with randomization occurring at the practice level and referring to training provided to the providers. However, individual providers and patients retained the ability to select the treatment provided to the individual patient. All three trials took place in the United States.

The collaborative care models described in this report were all associated with improvements in mental health outcomes, including depression scores, severity, and functioning, but none specifically demonstrated a reduction in disparity caused by the intervention. In part, this was because few disparities were measurable at baseline. The studies showed that there was no significant difference in the effect in groups defined by income, race, or education. Nonetheless, there were some notable differences in effectiveness that might inform future research. For example, one study demonstrated a greater effect on clinical outcomes in the less educated group,<sup>19</sup> and the effect of a second intervention was amplified in minorities on some measures.<sup>23</sup> Although no change in disparity was associated with the interventions, improvements occurred across the board, and no harms were reported in any of the studies.

## Diabetes

Three good-quality studies assessed the effect of QI interventions on disparities in diabetes outcomes. One was an RCT,<sup>11</sup> one was a prospective cohort study,<sup>26</sup> and one was a retrospective cohort study.<sup>27</sup> All of these studies reported on surrogate clinical outcomes, clinical risk factors for diabetes comorbidities, and process measures. In two of three studies, disparities were reduced in one or more outcomes for at least one subgroup, but the study designs were such that the reduction could not be shown to be caused by the intervention.<sup>26,27</sup> In one study of a patient reminder system, racial disparities were reduced when HbA1c testing increased substantially among Black participants relative to no change among White participants. In a broad systems-level program in New York State, a disparity of 19 percent in biennial lipid testing between Black and White Medicare recipients was reduced to 9.2 percent after intervention of a QI program.

## Discussion

We identified individual studies that suggest benefits in particular subgroups known to suffer from disparities in health and health care, but evidence is unavailable to guide QI efforts specifically to reduce disparities. Although there is limited evidence available, several strategies are worthy of future study and possibly wider implementation. These strategies include the collaborative care model and targeted patient education, including language and literacy concordance. Data are insufficient to support universal implementation of these strategies, but the strategies may be suitable for implementation if an appropriate plan is in place to monitor their effectiveness and potential adverse effects.

Most studies have focused on racial or ethnic disparities. Some targeted interventions have demonstrated greater effect in racial minorities: specifically, supporting individuals in tracking their blood pressure at home to reduce blood pressure and collaborative care to improve depression care. Language concordance was evaluated in only one study, but a language-concordant breast cancer screening intervention was helpful in promoting mammography in Spanish-speaking women. The collaborative care model in depression was more effective in less educated individuals than in those with more education, and was more effective in women than in men for some depression care outcomes. None of the evidence is adequate to be confirmatory, but these studies suggest areas for future evaluation and targeted approaches.

Despite positive results seen in specific studies on specific clinical outcomes in some or all study populations, the strength of the evidence for QI interventions reviewed in this report to affect disparities is insufficient. Although adequate evidence exists from other sources to suggest the benefit of QI interventions in improving outcomes for a clinical population, the degree to which these interventions might be used to close an existing disparity gap has not been clearly demonstrated.

Our assessment is consistent with at least one prior review (from 2006),<sup>30</sup> and despite a larger body of literature on QI today and the presence of research demonstrating the effectiveness of QI interventions across populations, evidence for the effects of QI interventions on gaps in care related to disparities remains limited. Few studies focus specifically on reducing gaps in the availability, accessibility, and quality of health care between any two populations. Authors of studies in this review have attempted to address the question by conducting post hoc analyses of RCTs intended to study the effectiveness of QI interventions; however, in doing so, they have broken what randomization existed and have been unable to make the comparison necessary to tie observed improvements to the QI intervention conclusively.

One of the challenges in conducting a systematic review of the degree to which QI interventions can address disparities is the substantial breadth and heterogeneity of clinical conditions of interest, populations with the clinical conditions, QI intervention strategies, comparators, important clinical outcomes, surrogate outcomes, and disparities of interest. Compounding this heterogeneity are challenges to indexing QI strategies in the medical literature databases. For example, the subject term “Quality Improvement” was added to the National Library of Medicine’s Medical Subject Heading Database (MeSH) only in 2011; before this time, myriad subject terms were

used to index the various strategies described by authors of the QI literature, understandably leading to tremendous variability in how similar studies are categorized in the database. This partially reflects a lack of consistency about what constitutes a QI intervention; information on QI interventions available in the literature is often not clearly identified as such, and interventions may be multifaceted and thus difficult to evaluate or compare with other interventions. Many studies identified in the literature as including QI interventions also include non-QI interventions, such as broader public health initiatives; thus, the potential impact of the QI intervention may be masked or difficult to isolate.

Further challenges to studying changes in disparities are the poor documentation of disparities and the fact that many individuals experience multiple and overlapping disparities. Many of the studies we found that might have been able to empirically assess a disparity change were unable to demonstrate any existing disparity at baseline. Future studies will require much broader populations that include enough individuals from diverse backgrounds to capture and assess disparities over time empirically.

## **Applicability**

Although we reviewed fairly large studies conducted in diverse areas of the United States, all of the studies had substantial gaps in applicability to one or more populations of patients likely to present with the condition under study. Therefore, health systems or clinicians wishing to replicate any of these interventions should carefully assess whether the interventions apply or must be modified to suit their particular patient population, clinical setting, and available resources.

The overall insufficient strength of evidence suggests that decisions about whether to replicate interventions in this study and under what circumstances they should be replicated must be made without confidence in the degree to which disparities might be narrowed. By far the largest proportion of the literature focused on the ability of QI interventions to reduce racial disparities, with some suggestions that targeted programs could have some greater effects among racial minorities in both diabetes<sup>27</sup> and hypertension.<sup>16</sup> Far less information is available about QI interventions targeting other disparities, and the degree to which available evidence is applicable to other clinical conditions, other disparities, and other interventions is an area of potentially rich research. Health systems and individuals wishing to apply QI strategies are likely to be concerned about their applicability within clinical conditions, given the structure of the health system. Therefore, we summarize applicability by clinical focus below.

## Cancer

Studies included patients cared for at community clinics in New York City, men treated at two VA clinics in Chicago, and women enrolled in a large group-model HMO in the northeastern United States. These settings were appropriate for cancer screening interventions, as the bulk of cancer screening recommendations focus on the clinic setting. However, it is uncertain how well the results of these studies can be generalized to other populations or settings.

The tested interventions varied substantially, ranging from patient reminders to provider education with audit and feedback. These interventions could be replicated, although they generally required significant organizational resources to develop and implement and may not be feasible in other settings. Barriers to care may also differ in other settings, and the interventions likely would need to be adapted to the needs of the target population. In each study, usual care served as the comparator, and this too may differ in other practice settings. Thus, the marginal benefit of each intervention likely would be different in different settings.

Study outcomes consisted only of short-term process measures (i.e., receipt of cancer screening during followup). No long-term outcomes or clinical outcomes, such as diagnosis of malignancies, were reported. Thus the long-term clinical impact of such interventions is unclear.

## Cardiovascular Disease

Studies of CAD risk factor control included men with CAD risk factors at clinical centers in 18 U.S. cities and patients with hypertension cared for at two university-affiliated clinics in North Carolina. A study involving AMI treatment included patients hospitalized at academic and community hospitals in Michigan. The study involving men only has limited applicability to women, as patterns of CAD risk factors differ by sex. Moreover, its enrollment occurred between 1973 and 1975, limiting applicability to present-day practice. Of the other two studies, one's results are applicable to patients in academic primary care practices, and the other's results are applicable to academic or community hospitals.

The interventions for CAD risk factor control included intensive patient education and self-management, along with medication titration in one study. The intervention for AMI treatment involved provider education, practice feedback, and implementation of a toolkit. These all required significant institutional resources, and the CAD risk factor interventions in particular may not be feasible in routine clinical practice. The AMI treatment initiative, although requiring institutional commitment, has already

been disseminated extensively around the United States as a professional society initiative (American College of Cardiology Guidelines Applied in Practice); thus, its replication is confirmed to be feasible. In each of these studies, usual care served as the comparator. As this varies across practice settings, the effect of the interventions may differ in other environments.

For studies of cardiovascular risk factor control, outcomes consisted of intermediate clinical variables (hypertension, cholesterol, smoking, weight). Outcome assessment in the AMI treatment study was extensive but focused on measures of process and proximal utilization (e.g., prescription of evidence-based medications, use of cardiac catheterization).

## Depression

Two of the three studies focused on elderly patients in primary care. One included a range of ages in adulthood. All included both men and women and were racially diverse. Nonetheless, these patient groups may represent a small proportion of the individuals who struggle with depression because of the limited range of health care settings represented in these studies. It is unclear whether the observed results apply to patient populations who receive their primary and mental health care outside of a managed care system or to individuals who do not receive regular medical care. Additionally, given the settings in which the studies took place, they also may not apply to vulnerable populations receiving care through public health systems.

The interventions were all intensive in terms of demand on resources and required strong communication between care providers. In one study, enrolled practices committed to an intervention cost-sharing arrangement, with the understanding that the long-term implementation would fall on the organization of practice itself. The degree to which this is likely to be feasible is unclear.

All of the studies compared the intervention with usual care, although usual care was not ever completely described and therefore would be expected to vary.

Generally speaking, outcome measures were appropriate and reflected those that would and could be used in practice. They included changes in depressive symptoms, incidence of probably depressive disorder, mental health-related quality of life, functional impairment, and receipt of appropriate depression care.

All of the studies were conducted in primary care practices associated with larger health care organizations. It is unclear whether results would apply to other settings,

including individual practices without the resources of a larger organization or assisted living facilities (pertinent because of the focus on the elderly population).

## Diabetes

Studies included people cared for by primary care clinicians in ambulatory health centers in eastern Massachusetts, diabetes disease management program members living in socioeconomically disparate areas throughout the United States, and Medicare patients in New York State. The results may or may not be applicable to other populations in other regions.

Interventions evaluated included cultural competency training for clinicians and race-stratified performance reports with recommendations for Black patients with diabetes, patient telephone reminders in health disparity zones (defined as areas with diabetes prevalence above the national average for minorities), and Medicare New York State Quality Improvement Organization (IPRO) multifaceted provider and community interventions. The interventions may not be available in other regions and settings, since they required significant programmatic and implementation resources. The usual-care comparators described in these studies may not be applicable to other settings and regions.

Studies reported surrogate clinical outcomes (i.e., HbA1c control), clinical risk factors for diabetes comorbidities (i.e., blood pressure and lipid control), and process measures (i.e., HbA1c and low-density lipoprotein measurements). Duration of studies was generally 1 year. No studies reported any critically important clinical outcomes of diabetes, such as death or microvascular and/or macrovascular complications. Results from surrogate outcomes may not apply to important long-term clinical outcomes in people with diabetes.

Studies were conducted in ambulatory health centers in eastern Massachusetts, in diabetes disease management programs across the United States, and in New York State. As much diabetes care is delivered in primary care ambulatory settings, the evidence would be applicable. However, specialty clinic settings were not reported and the evidence may not apply to them.

## Conclusions

The literature on QI interventions generally and their ability to improve health and health care is large. Whether those interventions are effective at reducing disparities remains unclear. This report should not be construed to assess the general effectiveness of QI in the health care setting; rather, QI has not been shown specifically to reduce known disparities in health care or health outcomes. In a few

instances, some increased effect is seen in disadvantaged populations; these studies should be replicated and the interventions studied further as having potential to address disparities.

## References

1. Agency for Healthcare Research and Quality. National Healthcare Disparities Report: 2009. AHRQ Publication No. 10-0004. Rockville, MD: Agency for Healthcare Research and Quality; March 2010. [www.ahrq.gov/qual/qdr09.htm](http://www.ahrq.gov/qual/qdr09.htm).
2. Smedley BD, Stith AY, Nelson AR, eds. Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care. Washington: National Academies Press; 2003.
3. Centers for Disease Control and Prevention. Health Disparities and Inequalities Report--United States, 2011. MMWR. 2011;60(Suppl). PMID: 21430612.
4. Carter-Pokras O, Baquet C. What is a "health disparity"? Public Health Rep. 2002 Sep-Oct;117(5):426-34. PMID: 12500958.
5. Shojania KG, McDonald KM, Wachter RM, et al. Closing the Quality Gap: A Critical Analysis of Quality Improvement Strategies, Volume 1-Series Overview and Methodology. AHRQ Publication No. 04-0051-1. Rockville, MD: Agency for Healthcare Research and Quality; 2004. [www.ahrq.gov/clinic/tp/qgap1tp.htm](http://www.ahrq.gov/clinic/tp/qgap1tp.htm).
6. Relevo R, Balshem H. Finding Evidence for Comparing Medical Interventions. Agency for Healthcare Research and Quality; January 2011. Methods Guide for Comparative Effectiveness Reviews. [www.effectivehealthcare.ahrq.gov](http://www.effectivehealthcare.ahrq.gov).
7. Wilczynski NL, Haynes RB. Optimal search filters for detecting quality improvement studies in Medline. Qual Saf Health Care. 2010 Dec;19(6):e31. PMID: 20671080.
8. Higgins J, Green S. Cochrane Handbook for Systematic Reviews of Interventions, Version 5.1.0. The Cochrane Collaboration; 2011. [www.cochrane-handbook.org](http://www.cochrane-handbook.org).
9. Wells G, Shea B, O'Connell D, et al. The Newcastle-Ottawa Scale (NOS) for Assessing the Quality of Nonrandomised Studies in Meta-Analyses. [www.ohri.ca/programs/clinical\\_epidemiology/oxford.asp](http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp). Accessed August 2011.
10. Miranda J, Duan N, Sherbourne C, et al. Improving care for minorities: can quality improvement interventions improve care and outcomes for depressed minorities? Results of a randomized, controlled trial. Health Serv Res. 2003 Apr;38(2):613-30. PMID: 12785564.
11. Sequist TD, Fitzmaurice GM, Marshall R, et al. Cultural competency training and performance reports to improve diabetes care for black patients: a cluster randomized, controlled trial. Ann Intern Med. 2010 Jan 5;152(1):40-6. PMID: 20048271.

12. Arean PA, Ayalon L, Hunkeler E, et al. Improving depression care for older, minority patients in primary care. *Med Care*. 2005 Apr;43(4):381-90. PMID: 15778641.
13. Arean PA, Gum AM, Tang L, et al. Service use and outcomes among elderly persons with low incomes being treated for depression. *Psychiatr Serv*. 2007 Aug;58(8):1057-64. PMID: 17664516.
14. Barr JK, Franks AL, Lee NC, et al. A randomized intervention to improve ongoing participation in mammography. *Am J Manag Care*. 2001 Sep;7(9):887-94. PMID: 11570022.
15. Beach ML, Flood AB, Robinson CM, et al. Can language-concordant prevention care managers improve cancer screening rates? *Cancer Epidemiol Biomarkers Prev*. 2007 Oct;16(10):2058-64. PMID: 17932353.
16. Bosworth HB, Olsen MK, Grubber JM, et al. Racial differences in two self-management hypertension interventions. *Am J Med*. 2011 May;124(5):468.e1-8. PMID: 21531237.
17. Connett JE, Stamler J. Responses of black and white males to the special intervention program of the Multiple Risk Factor Intervention Trial. *Am Heart J*. 1984 Sep;108(3 Pt 2):839-48. PMID: 6475754.
18. Ferreira MR, Dolan NC, Fitzgibbon ML, et al. Health care provider-directed intervention to increase colorectal cancer screening among veterans: results of a randomized controlled trial. *J Clin Oncol*. 2005 Mar 1;23(7):1548-54. PMID: 15735130.
19. Bao Y, Alexopoulos GS, Casalino LP, et al. Collaborative depression care management and disparities in depression treatment and outcomes. *Arch Gen Psychiatry*. 2011 Jun;68(6):627-36. PMID: 21646579.
20. Siddiqui AA, Sifri R, Hyslop T, et al. Race and response to colon cancer screening interventions. *Prev Med*. 2011 Mar-Apr;52(3-4):262-4. PMID: 21256149.
21. Lasser KE, Murillo J, Lisboa S, et al. Colorectal cancer screening among ethnically diverse, low-income patients: a randomized controlled trial. *Arch Intern Med*. 2011 May 23;171(10):906-12. PMID: 21606094.
22. Miranda J, Cooper LA. Disparities in care for depression among primary care patients. *J Gen Intern Med*. 2004 Feb;19(2):120-6. PMID: 15009791.
23. Wells KB, Sherbourne CD, Miranda J, et al. The cumulative effects of quality improvement for depression on outcome disparities over 9 years: results from a randomized, controlled group-level trial. *Med Care*. 2007 Nov;45(11):1052-9. PMID: 18049345.
24. Wells K, Sherbourne C, Schoenbaum M, et al. Five-year impact of quality improvement for depression: results of a group-level randomized controlled trial. *Arch Gen Psychiatry*. 2004 Apr;61(4):378-86. PMID: 15066896.
25. Sherbourne CD, Weiss R, Duan N, et al. Do the effects of quality improvement for depression care differ for men and women? Results of a group-level randomized controlled trial. *Med Care*. 2004 Dec;42(12):1186-93. PMID: 15550798.
26. Mahotiere T, Ocepek-Welikson K, Daley MB, et al. A program to reduce the disparity in the rate of biennial lipid profiles between African-American and white Medicare beneficiaries with diabetes mellitus in New York City. *J Community Health*. 2006 Aug;31(4):263-88. PMID: 16894826.
27. Coberley CR, Puckrein GA, Dobbs AC, et al. Effectiveness of disease management programs on improving diabetes care for individuals in health-disparate areas. *Dis Manag*. 2007 Jun;10(3):147-55. PMID: 17590145.
28. Olomu AB, Grzybowski M, Ramanath VS, et al. Evidence of disparity in the application of quality improvement efforts for the treatment of acute myocardial infarction: the American College of Cardiology's Guidelines Applied in Practice Initiative in Michigan. *Am Heart J*. 2010 Mar;159(3):377-84. PMID: 20211298.
29. Miranda J, Schoenbaum M, Sherbourne C, et al. Effects of primary care depression treatment on minority patients' clinical status and employment. *Arch Gen Psychiatry*. 2004 Aug;61(8):827-34. PMID: 15289281.
30. Beach MC, Gary TL, Price EG, et al. Improving health care quality for racial/ethnic minorities: a systematic review of the best evidence regarding provider and organization interventions. *BMC Public Health*. 2006 Apr;6:104. PMID: 16635262.

## Full Report

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