Applications of Comparative Effectiveness Research to Case Management

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ABSTRACT

Purpose/Objectives: This article is intended to update case managers on recent advances in comparative effectiveness research (CER) led by the Agency for Healthcare Research and Quality. The article explores potential implications and applications of CER findings to case management practice.

Primary Practice Settings: All case management settings.

Findings/Conclusions: An ongoing national movement to advance CER is intended to provide health care professionals with answers to questions about which diagnostic methods, therapies, devices, and services, among the available alternatives for a given disease or condition, may be most effective and safe for individual patients.

Implications for Case Management: Knowledge and application of CER findings may benefit case managers in their roles of improving resource utilization, controlling costs, providing stewardship, coordinating care, educating patients, and promoting treatment adherence and self-sufficiency. The findings from a 2013 study on the comparative effectiveness of outpatient case management programs have implications for improving case management models, reinforcing standards in the profession, and advancing research in the field. Continuing education on CER is important for promoting positive values and appropriate applications of its findings to case management practice.

Key words: Agency for Healthcare Research and Quality, case management, comparative effectiveness research, patient-centered outcomes research

In their various roles in planning and coordinating care, educating patients and their families, and controlling costs, case managers must critically evaluate information about medications, surgical approaches, medical devices, and health care services. Such evaluation is often ideally guided by evidence from research that compares the effectiveness and safety of different treatments for specific diseases or conditions. However, many conventional studies in health care are not designed to yield comprehensive comparative findings based on “head-to-head” trials, or the direct comparison of two or more alternative diagnostic or treatment approaches. For example, much of the available evidence on the efficacy of drug therapies comes from randomized clinical trials (RCTs) that compare a treatment of interest only with a placebo. Given the design of many RCTs, especially those primarily intended to meet requirements for U.S. Food and Drug Administration (FDA) approval, their findings often cannot answer questions about which therapies, among the available alternatives for a given disease or condition, would be better for individual patients.

In recent years, government-funded and private organizations in the United States have initiated or expanded programs to address the lack of comparative effectiveness research (CER). Whereas its utility has been the subject of ongoing discussion and debate, many experts view CER as essential for assisting stakeholders, including clinicians, patients, health management organizations, and policy makers, in supporting evidence-based decisions to improve patient and community health outcomes (Institute of Medicine, 2010; Keyhani, Woodward, & Federman, 2010; Schumock & Pickard, 2009; Umscheid, 2010). This article is intended to update case managers on recent initiatives in CER that have been led by the Agency for Healthcare Research and Quality.
by the Agency for Healthcare Research and Quality (AHRQ). The article is organized by sections that (1) provide examples of findings from CER reviews on treatments for chronic diseases as well as explore potential applications of the findings to case management practice; (2) summarize the methods, findings, and potential applications of a 2013 CER review that focused exclusively on the comparative effectiveness of outpatient case management programs; and (3) present preliminary outcomes from AHRQ-supported continuing education programs on CER, which have been especially well received by case managers.

**Summaries of AHRQ-Supported Comparative Effectiveness Reviews**

Since 2003, AHRQ has led national efforts to advance CER through its Effective Health Care Program (AHRQ, 2013a). Among other CER programs, AHRQ supports 11 evidence-based practice centers (EPC) in which leading medical researchers and statisticians conduct systematic literature reviews and analyses of published studies that compare the benefits and harms of different diagnostic technologies, medications, medical devices, surgical techniques, and health care services for diseases or conditions that significantly impact public health in this country.

The EPC investigators follow rigorous methods for conducting CER reviews (AHRQ, 2013b). Topics are nominated through an open process in which key questions are posted on a public website that solicits feedback from interested stakeholders. With input from designated technical experts, the feedback is used to revise and approve a final set of key questions that guide the systematic reviews and analyses. The investigators perform extensive literature searches, using comprehensive databases including MEDLINE, the Cochrane Central Register of Controlled Trials, and the Cumulative Index to Nursing and Allied Health Literature. At least two independent EPC reviewers assess to what extent each identified study meets designated inclusion criteria. In addition, independent reviewers use established scales to assess the methodological quality and strength of evidence of each study included in a CER review (AHRQ, 2013b). When the methods of individual studies are sufficiently homogeneous, the investigators perform quantitative pooled analyses, or meta-analyses, of the data. Before CER reports are published on the AHRQ Effective Health Care Program website, they undergo a formal peer review process.

The Agency for Healthcare Research and Quality publishes CER technical reports, along with separate research summaries for clinicians and consumers, on diseases or conditions grouped in the following areas: arthritis and nontraumatic joint disorders; cancer; cardiovascular disease; dementia, including Alzheimer’s disease; depression and other mental health disorders; developmental delays, attention-deficit/hyperactivity disorder, and autism; diabetes mellitus; functional limitations and disability; infectious diseases, including HIV/AIDS; obesity; peptic ulcer disease and dyspepsia; and pregnancy, including preterm birth (AHRQ, 2013a). In the following section, we summarize and comment on findings from AHRQ’s comparative effectiveness reviews on therapies for type 2 diabetes mellitus (T2DM) and rheumatoid arthritis (RA)—two complex chronic diseases that are often managed by case managers.

**Comparative Effectiveness of Insulin Analogues in Premixed Formulations for Adults With T2DM**

Although oral antidiabetic drugs are used as an initial approach to ameliorate glycemic control in patients with T2DM, many patients will eventually require insulin to achieve treatment goals. The development of insulin analogues, including various premixed formulations that are designed to mimic physiologic insulin activity, has advanced diabetes management and afforded patients more convenient treatment options. However, comprehensive evidence-based analyses of the comparative effectiveness and safety of premixed insulin analogues have not been available until recent years. In 2008, AHRQ published a systematic review on the benefits and harms of FDA-approved premixed insulin analogues compared with other insulin preparations and noninsulin antidiabetic drugs for treating T2DM in adults (Qayyum et al., 2008). The review was conducted by investigators at the Johns Hopkins EPC. After excluding 2,202 unique citations, the investigators identified 45 studies for the review, with the majority being RCTs. No studies were identified that evaluated microvascular and macrovascular complications, as well as outcomes of adherence and quality of life (QOL). Many comparisons did not yield firm conclusions due to a lack of studies or weak evidence. Key findings from pooled analyses of studies with sufficient evidence and a moderate or high strength of evidence are summarized as follows:

- Premixed insulin analogues were more effective than long-acting insulin analogues and noninsulin antidiabetic drugs in lowering postprandial glucose and hemoglobin A1c (HgA1c); however, premixed analogues were associated with higher rates of hypoglycemia and more weight gain.
- Long-acting analogues alone were more effective than premixed analogues in lowering fasting
blood glucose and were associated with lower rates of hypoglycemia and less weight gain.

In all, the systematic review findings revealed that the comparative effectiveness and safety of premixed insulin analogues vary by comparator therapies and outcomes of interest; thus, appropriate applications of the findings to making treatment decisions depend on individual patient circumstances. Moreover, the review indicates trade-offs between benefits and harms, especially when premixed insulin analogues are compared with long-acting insulin analogues and noninsulin antidiabetic drugs. In clinical applications, a balance must be achieved between optimal glycemic control and the adverse effects of hypoglycemia and weight gain (Qayyum et al., 2008).

**Applications of CER Findings on Diabetes Therapies to Case Management Practice**

The U.S. health care system has become a melting pot of ethnic and cultural populations, many of which perpetuate a growing chasm of health care disparities. Considering the diverse needs of underserved populations, patients with chronic diseases may be among those most likely to benefit from case management services. Underserved populations face many barriers to health care that include limited income, lower rates of formalized education, lack of adequate health care insurance, low health literacy, and limited community health care resources. Case managers can have a significant impact in this population by providing resource utilization, stewardship, care coordination, patient education, adherence, and promotion of self-sufficiency to maximize patient outcomes.

Diabetes is among the most common chronic diseases impacting underserved populations. Data from AHRQ’s 2011 National Healthcare Disparities Report indicate that, among civilian noninstitutionalized adults (ages 40–64 years) with diabetes, Hispanics were less likely than non-Hispanic Whites to receive at least two HgA1c tests, an eye examination, and a foot examination within the past year (AHRQ, 2011). Multivariate analyses revealed that non-Hispanic Blacks and Hispanics were less likely than non-Hispanic Whites to receive four recommended services for diabetes on an annual basis. The factors that predicted poor receipt of recommended services included low family income, low levels of education, and lack of health insurance (AHRQ, 2011).

In addition to the systematic review of research on premixed insulin analogues, AHRQ has published several other CER reports on diabetes medications, including oral antidiabetic agents (AHRQ, 2013a). Case managers who are familiar with findings from comparative effectiveness studies on diabetes treatment and management can have an especially positive impact in situations involving underserved populations. Special considerations that need to be addressed among diabetes patients of racial and ethnic minorities include costs, side effects, and comparative risks and benefits of medications, as well as the health literacy status of patients and their family members.

Costs of therapies are a primary consideration in underserved populations because cost can significantly impact adherence. Patients in racial and ethnic minority populations often do not have the resources to purchase expensive medications or cover expensive co-pays. When patients must choose between paying for medications or groceries, they often forgo necessary medications. Case managers can use the best available evidence to compare the costs of diabetes therapies and offer recommendations to patients and their providers about the most cost-effective, efficacious therapies to achieve an individualized approach to care.

Side effects of medications are an important consideration because patients in racial and ethnic minority populations often have mistrust toward health care professionals and medical treatments. As a result, these patients may be more likely to stop taking their medications if they experience side effects. Likewise, case managers can assess the risk–benefit profiles of comparable medications, using CER findings to determine which diabetes medications may cause weight gain. Because the incidence of obesity is disproportionately high among underserved populations, weight gain can be a significant barrier to adherence in this population. By applying the results of CER findings, case managers can recommend an individualized plan of care that minimizes weight gain and maximizes adherence. Addressing risk–benefit issues, the AHRQ CER reports on diabetes treatments can also provide case managers with evidence-based research to help answer questions about which therapies are better for lowering fasting glucose, postprandial glucose, or HgA1c, and which therapies are better for avoiding hypoglycemia.

The Agency for Healthcare Research and Quality’s clinician and consumer summaries on CER topics can assist case managers (and other health care professionals) in talking with patients about health care decisions. Many of the consumer summaries are written in Spanish. Case managers who are engaged in culturally appropriate, shared decision making can have a significant impact in helping patients overcome fears and concerns about health care treatments. Patients’ apprehensions can be acknowledged and discussed in an open and collaborative manner, which can lead to improved patient education, trust, and adherence, ultimately resulting in improved outcomes.
COMPARATIVE EFFECTIVENESS OF MEDICATIONS FOR RHEUMATOID ARTHRITIS

In June 2012, AHRQ published an update to a 2007 CER review on drug therapy for adults with RA (Donahue et al., 2012). The CER was conducted by investigators at the Research Triangle Institute–University of North Carolina EPC. Current treatments for RA include corticosteroids; conventional oral disease-modifying antirheumatic drugs (DMARDs), including leflunomide, methotrexate, and sulfasalazine; and biologic DMARDs, including five agents that inhibit tumor necrosis factor-α (adalimumab, certolizumab, etanercept, golimumab, and infliximab) and four agents that act through other anti-inflammatory mechanisms (abatacept, anakinra, rituximab, and tocilizumab). With a wide variety of treatment options available in these DMARD classes, consensus is lacking about the comparative effects of available therapies. In addition, questions remain about the effectiveness and safety of various DMARD combinations and the short- and long-term safety risks of RA medications, especially in different patient populations such as the elderly, pregnant women, patients with comorbidities, and different ethnic groups (Donahue et al., 2012).

Of the 3,868 citations identified by the CER investigators, 258 published articles reporting on 211 studies met inclusion criteria for the review. The studies included 31 head-to-head RCTs, 1 head-to-head nonrandomized controlled trial, 44 placebo-controlled trials, 28 meta-analyses or systematic reviews, and 107 observational studies. The CER addressed questions about the comparative effectiveness of RA medications in reducing disease activity, slowing or limiting the progression of joint damage as assessed by radiographic changes, or maintaining remission. In addition, the investigators sought to determine whether RA drug therapies differed in their effects on patient-reported symptoms, functional capacity, or QOL. In the clinical trials included in the review, disease activity was commonly assessed by American College of Rheumatology 20/50/70 response criteria. This instrument is used to evaluate whether, in response to treatment, a patient has had at least 20%, 50%, or 70% improvement in swollen and tender joint counts along with comparable measures in at least three of the following five endpoints: patient assessment, physician assessment, pain, acute-phase reactant levels (such as erythrocyte sedimentation rate), and functional disability as assessed by the Health Assessment Questionnaire Disability Index.

The CER investigators judged much of the available study evidence to be of low or moderate strength. In addition, for many planned comparisons of therapies, the evidence was lacking to reach firm conclusions. However, for comparisons based on sufficient evidence, the review produced the following key findings:

- Among patients treated with methotrexate and sulfasalazine, there were no differences in measures of disease activity, radiographic changes, or functional capacity.
- Improvement in functional capacity was better for patients treated with leflunomide versus sulfasalazine.
- Among patients treated with methotrexate, sulfasalazine, or leflunomide, there were no differences in discontinuation rates due to adverse events.
- Several efficacy trials showed that combinations of oral DMARDs were superior to monotherapy for slowing joint damage and improving functional capacity.
- Head-to-head comparisons of biologic DMARD monotherapies generally revealed no differences in treatment effectiveness; however, for some outcomes, individual biologic agents were associated with superior results.
- Among patients on biologic DMARD monotherapy who were methotrexate-naive or had not used methotrexate recently, the combination of a biologic DMARD with methotrexate was associated with better clinical outcomes, functional capacity gains, and improved QOL.
- Rates of side effects were similar for both biologic and oral DMARD combinations compared with monotherapy; however, long-term safety data are lacking for many newer biologic therapies.

The CER authors concluded that consensus is lacking on the key question of whether early initiation with a biologic DMARD will improve the long-term prognosis of RA. In addition, the authors pointed to a need for new studies of longer duration and research on subpopulations defined by age and coexisting conditions. Future research should also ensure that QOL and other patient-centered outcomes are measured in addition to clinician-focused endpoints such as joint erosion.

APPLICATIONS OF CER FINDINGS ON RA THERAPIES TO CASE MANAGEMENT PRACTICE

The treatment and management of RA has evolved rapidly in recent years, underscoring the need for two AHRQ comparative effectiveness reviews, published in 2007 and 2012. During this time, case managers who coordinate care for RA patients have been challenged to keep pace with new data, treatment
approaches, methods for disease monitoring, and quality indicators initiated by health policy. As a result, the current demand on health care professionals to assimilate comparative evidence on RA therapies may be greater than ever.

Fundamentally, case managers are responsible to maximize RA patient outcomes through an individualized plan of care, while controlling costs through responsible allocation of resources. Conventional and biologic DMARDs for RA are among the specialty pharmacy drugs driving costs and escalating the need for evidence-based, comparative effectiveness decisions regarding utilization management. Knowledge about the comparative effectiveness of available therapies is also essential for case managers to provide patients with accurate, relevant, and meaningful education to promote medication adherence.

Under the Patient Protection and Affordable Care Act of 2010, case managers are also challenged to track and measure improvements in quality of care, which includes ensuring that patients with RA receive the right treatment at the right time. Important changes to patient outcome measures will affect how the Centers for Medicare & Medicaid Services reimburse health plans that cover patients with RA. This reality has important implications for how managed care plans make decisions about RA treatment, because the percentage of patients receiving biologic DMARDs could influence a Medicare Advantage plan’s Star ratings (Kaiser Family Foundation, 2011). As a result, managed care case managers can assist the health plan in improving quality ratings by using sound comparative evidence to guide decisions in the medication management of patients with RA.

The CER findings on RA drug therapies can assist case managers in identifying important quality outcomes, such as whether individualized treatment strategies prevent disease progression and reduce the physical damage/joint destruction incurred by patients over time. Case managers are also responsible to educate the treatment team when evidence-based decisions are lacking such that patient outcomes could be adversely affected. Evidence suggests that adherence to accepted RA clinical guidelines and recommendations among health care professionals is relatively low, ranging from 27% to 67% in some studies (Cabana et al., 1999; Grol, 2001; Lugtenberg, Zegers-van Schaick, Westert, & Burgers, 2009). In a 3-year study that analyzed Healthcare Effectiveness Data and Information Set records from more than 93,000 patients with RA enrolled in Medicare-managed health care plans, less than 45% received a DMARD for management of their disease (Schmajuk et al., 2011).

The CER investigators acknowledged that their comparative effectiveness review on RA medications was somewhat limited by a lack of well-designed head-to-head comparison trials and by studies designed to determine whether patients might benefit from early initiation with a biologic DMARD. However, research on RA therapies is currently advancing at a rapid rate. Case managers who have learned how to apply CER to their practice can further integrate findings from current and future head-to-head trials. Through staying abreast of the evolving evidence, case managers can continually assess the comparative safety and efficacy of different treatments and share the information with RA patients and coordinated care teams to facilitate individualized treatment optimization.

**AHRQ’s Comparative Effectiveness Review on Outpatient Case Management**

In January 2013, AHRQ published a systematic review of research on the comparative effectiveness of case management programs (Hickam et al., 2013). The review was conducted by investigators at the Oregon EPC, which is affiliated with the Oregon Health and Science University. The EPC team was advised by technical experts and peer reviewers in health care policy and administration as well as by a national leader in case management. Recognizing the marked diversity of case management programs and the patients they serve, the investigators limited the scope of the review and categorized selected studies by distinct patient populations and diseases. Specifically, the review focused on long-term outpatient programs for patients with chronic medical illnesses and complex care needs. Studies were excluded if they primarily addressed a psychiatric disorder other than dementia or if they investigated short-term case management programs (provided for 30 days or less). The investigators synthesized findings from studies sorted by the following population/disease categories: older adults with one or more chronic diseases (20 studies); frail elderly (14 studies); dementia (15 studies); congestive heart failure (CHF; 12 studies); diabetes mellitus (12 studies); cancer (6 studies); chronic infections (HIV or tuberculosis; 15 studies); and other medical problems (15 studies).

In most of the studies that met the reviewers’ inclusion criteria, case management programs were compared with usual care, defined as clinical care without a supplemental case management component (Hickam et al., 2013). Some of the studies directly compared the effectiveness of different types of case management programs. The key questions that motivated the review are summarized as follows:

1. For adults with chronic medical illness and complex health care needs, what are the...
comparative effects of case management on patient-centered outcomes, quality of care, and resource utilization? Patient-centered outcomes included mortality, disease-specific measures, QOL, patient satisfaction, and avverting placement in a nursing home. Quality of care was assessed by the extent to which patients received recommended health care services, therapy adherence, and patient self-management and health behaviors. Measures of resource utilization included overall health care costs and costs for hospitalization, emergency department use, and clinic visits.

2. Does the effectiveness of case management programs differ in relation to specific characteristics of patients? For this question, the investigators separately analyzed outcomes for patients with different diseases and conditions, numbers or types of comorbidities, ages, and levels of socioeconomic status, social support, or health risks.

3. Does the effectiveness of case management programs differ in relation to characteristics of interventions? For this question, intervention characteristics included different practice settings; specific functions and levels of experience, training, or skills among case managers; program intensity and duration; and interprofessional care models.

Through a comprehensive literature search that identified 5,645 citations and 1,201 full-text articles, the EPC investigators judged 153 articles, reporting 109 studies, to meet inclusion criteria. As evaluated by the investigators, the strength of evidence in these studies varied widely. In addition, the patient populations and case management interventions were highly heterogeneous across studies; thus, the investigators were not able to perform pooled quantitative analyses of the research. The following summary of the CER findings and conclusions is based on outcomes for which the investigators identified a sufficient number of studies with somewhat consistent results. For many outcomes of interest and patient populations, firm conclusions were precluded by a lack of studies or highly inconsistent findings. Unless otherwise noted as follows, comparisons are based on case management programs versus usual care.

**Mortality**

Case management was not associated with lower rates of overall mortality or with improved survival; this conclusion is based on results from 35 studies that included patients with a wide variety of diseases or conditions.

**Disease-Specific Outcomes**

The effects of case management on specific disease-related outcomes varied by diseases as well as by study designs and endpoints. For patients with cancer, some studies indicated that case management was associated with reductions in pain and fatigue. Among patients with T2DM, studies indicated that case management did not confer additional benefits for improving lipid status or reducing body mass index/weight. The systematic review included eight randomized trials that evaluated glucose control as measured by changes in HgA1c. Whereas most of these trials reported no extra benefits of case management versus usual care, there were notable exceptions. In several trials, greater reductions in HgA1c were observed among patients in the case management groups. In synthesizing the results across studies, the investigators concluded that case management improves hyperglycemic control, although the findings are heterogeneous and the strength of evidence is low.

**QOL and Functional Status**

The investigators concluded that case management often improves QOL and function, especially when the interventions target specific outcomes. For example, in an analysis of six studies on patients with CHF, interventions that targeted CHF-related QOL were associated with better outcomes than observed for usual care. In 13 studies on programs for caregivers of patients with dementia, case management was associated with lower rates of caregiver depression and burden. However, the investigators concluded that case management had less influence on QOL and functional status when the interventions were not specific to patients’ diseases or conditions.

**The effects of case management on specific disease-related outcomes varied by diseases as well as by study designs and endpoints.**
Avoidance of Placement in a Nursing Home

Based on nine studies on patients with dementia and two studies on frail elderly patients, the CER investigators reached the overall conclusion that case management did not delay or reduce nursing home admissions. In the studies on patients with dementia, all but one of the interventions lasted less than 2 years. The exception was a study on patients with Alzheimer’s disease in which case managers provided support for family caregivers over periods up to 10 years (Mittelman, Haley, Clay, & Roth, 2006). The study authors estimated that nursing home admission was delayed by an average of approximately 18 months among patients whose families had case management services.

Patient Satisfaction

Based on evidence from seven studies on patients with CHF or cancer, case management was associated with enhanced patient satisfaction with care.

Quality of Care

Relatively few studies that evaluated quality of care met the reviewers’ inclusion criteria. However, the overall findings indicated positive effects of case management when programs were designed to improve specific aspects of quality. For example, in programs that targeted cancer treatment, patients enrolled in case management programs received radiation therapy that was consistent with established clinical guidelines. The CER findings indicate that case management is effective in improving self-management behaviors in patients with CHF, receipt of appropriate therapy in patients with cancer, and outcomes for treatment of tuberculosis among vulnerable patient populations.

Resource Utilization

On the whole, studies included in the review indicated that case management did not reduce health care costs or utilization of services. Hospitalization rates were not reduced among older adults with chronic diseases (17 studies on overall hospitalizations) or frail elderly (11 studies on acute hospitalizations). Moreover, health care expenditures were not lowered for patients with dementia (six studies) or cancer (five studies). However, in three studies on homeless individuals or patients with chronic obstructive pulmonary disease, case management was associated with fewer emergency department visits.

Analyses by Patient Characteristics

A lack of studies or inconsistent findings limited the investigators from reaching conclusions about whether the effectiveness of case management depends on patient-specific characteristics.

Analyses by Intervention Characteristics

Few studies were identified that addressed the comparative effectiveness of different types of case management interventions and different levels of practitioner experience, training, and skills. Based on the available research, the investigators concluded that...
the effectiveness of case management did not differ across settings including integrated health systems, home health agencies, and outpatient clinics. However, better patient outcomes were observed when (a) case managers had specific training before targeted interventions, (b) protocols or scripts were used to guide clinical management, (c) the interaction between a case manager and a physician was effective, and (d) case management interventions were longer and provided more face-to-face interaction with patients (Hickam et al., 2013).

**Implications and Applications of the CER Findings for the Case Management Profession**

The AHRQ CER provides a comprehensive systematic review of research on long-term outpatient case management programs for patients with chronic medical illnesses and complex care needs, which may represent the most ambitious study on the effectiveness of case management to date (Hickam et al., 2013). However, the investigators identified several methodological limitations and a generally low strength of evidence in the studies that were included in the review. These factors may restrict the extent to which case managers and other healthcare professionals can apply the evidence to practice. Several challenges were acknowledged by investigators, including the heterogeneity of case management programs, study design limitations, insufficient data, and variations in defining the roles of the individuals performing case management services.

The CER findings must be viewed in light of the variety of interventions that are often associated with the term “case management” in health care delivery, lack of consensus about the core components of case management, and the interchange in terminology, with “case management” often associated with other forms of chronic illness management interventions, including “disease management” and “self-management support” (Hickam et al., 2013). As identified in the CER findings, case managers perform several care coordination functions, such as providing resource utilization and assisting patients to navigate health care services. Case managers also perform clinical functions, such as medication management and reconciliation, disease-oriented assessment and monitoring, and patient education. The variation in practice related to these functions poses significant challenges in performing research and drawing research-related conclusions regarding case management or in making evidence-based conclusions about quantitative and qualitative results of case management interventions.

The CER review’s key question and findings regarding whether the effectiveness of case management differs in relation to characteristics of interventions, especially the training and skill level of practitioners, is important to consider. Health policy and stakeholder organizations such as URAC support the importance of advanced-practice certification and experience among case managers by recognizing and requiring case managers to be certified as part of its accreditation guidelines for organizations’ case management programs. The Commission for Case Manager Certification and the American Nurses Credentialing Center’s Nursing Case Management certification provide case managers with a validated body of knowledge and evidence-based guidelines to promote professional practice and reduce variation. Certified case managers follow standards of practice that include evidence-based decision making to guide clinical and patient management. The CER findings can encourage continued elevation of the practice...
of case management into a profession identified by advanced-practice education, training, and certification. The CER findings support this notion, identifying more successful outcomes when case managers had specific training before targeted interventions and when protocols or scripts were used to guide clinical management.

The CER’s focus on only one class of programs—long-term outpatient care coordination for patients with chronic medical illnesses—should be considered when applying the findings to practice because the intended goals and outcomes of case management are likely to be different for a hospital case manager than for a long-term outpatient case manager. For example, resource utilization analyses included in the CER indicate that case management did reduce emergency department visits (low strength of evidence) but did not reduce hospital readmissions (low strength of evidence) or hospitalization rates (low and moderate strength of evidence). Goals of long-term outpatient case management include improving transitions of care for patients from one level of service to another, meaning that case managers who perform these services would be responsible to coordinate timely and efficient transitions from the outpatient to the inpatient setting when the need arises for acute-care services and to maintain ongoing communication with the hospital case manager. However, the responsibility to manage hospital lengths of stay and to facilitate a safe and timely discharge to avoid readmissions would be that of the hospital case manager. Studies regarding hospital case management were not included in the CER.

The CER findings that case management was not associated with lower rates of overall mortality or improved survival are not surprising, because case management does not primarily focus on quantity of life but rather on quality of life and quality of care. The findings indicate that case management is effective in improving quality of care, including patients’ adherence to self-management behaviors in CHF (moderate strength of evidence), ensuring that patients receive evidence-based, guideline-recommended cancer treatment (moderate strength of evidence), and improving rates of successful treatment for tuberculosis in vulnerable populations (moderate strength of evidence). Likewise, the CER findings indicate that case management is effective in improving QOL, including satisfaction among patients with CHF (high strength of evidence) and patients with cancer (moderate strength of evidence). In addition, case management improved patients’ perceptions of the coordination of their care (high strength of evidence).

Case managers and those designing or managing case management programs across all practice settings can elucidate relevant information from the CER findings with a goal to identify improvements in case management models and processes that may quantitatively or qualitatively improve outcomes for patients and the health care system. The inclusion of widely accepted guidelines to define case management practice, such as the CMSA Standards of Practice for Case Management, may improve future studies.

CONTINUING EDUCATION ON CER: OUTCOMES AMONG CASE MANAGERS

In 2010, PRIME Education, Inc. (the affiliation of this article’s authors), was awarded a 3-year contract from AHRQ to develop and disseminate 45 continuing education programs based on the agency’s comparative effectiveness reviews on specific diseases or conditions. The project’s main goals were to enhance awareness about CER and to promote appropriate applications of its findings to practice across a wide spectrum of health care disciplines. All of the programs have been produced and offered at no cost on AHRQ’s continuing education website on a rolling
basis since 2011 (AHRQ, 2013c). The programs are multiaccredited for the interprofessional team, including case managers, as well as physicians, nurse practitioners, pharmacists, and other health care professionals. The programs are designed in various educational formats, including evidence-based simulations, video case vignettes, feedback-based video, monographs, and peer-reviewed journal articles. Faculty presenters and authors are leading experts in their therapeutic fields; for many programs, the faculty experts are the EPC principal investigators or key informants for the CER studies.

Part of PRIME’s work with AHRQ involves assessing the outreach and educational impact of the CER programs. To earn continuing education credits, participants complete baseline and postprogram surveys with multiple-choice questions and Likert-type scales that assess, among other outcomes, factual knowledge about CER findings; awareness, attitudes, and values regarding CER; confidence in applying CER to practice; and intended practice applications of CER. From April 2011 (the release date of the first program) to December 2012, 34,749 continuing education certificates were issued to health care professionals who completed various programs in numerous topic areas. This total includes 7,443 certificates earned by 1,376 case managers (average of 5.4 programs completed per case manager). In a comparison of certificates earned across disciplines in the same time frame, case managers ranked second (see Table 1).

The following summaries of key educational outcomes are based on the 7,443 baseline and postprogram surveys completed by case managers who participated in the available CER educational programs in various topic areas from April 2011 to December 2012. Response data for each survey question were averaged across 39 of the 45 programs (complete data sets are not available for the other six programs). Chi-square tests were performed to analyze the statistical reliability of differences in response frequencies on baseline versus postprogram survey questions that assessed participants’ value of CER and confidence in applying CER to practice. A $p$ value less than .05 was considered significant.

### Awareness About AHRQ’s CER Programs

For each program, participants were asked whether they were aware of AHRQ’s comparative effectiveness review on the related topic. At baseline, 22% of case managers answered “yes” to this question. Given that awareness building about AHRQ’s CER programs was a primary goal of the project, the absolute increase of 78% of case managers who gained awareness is noteworthy.

### Value of CER

Whether health care professionals will routinely and appropriately apply CER findings in their practice fundamentally depends on their attitudes and values regarding the utility of this form of research. To assess the impact of the CER educational programs on these outcomes, we asked participants, “How valuable is comparative effectiveness research for educating patients about treatment and management options (1 = not valuable at all; 5 = extremely valuable)?” In baseline surveys, 57% of case managers chose Level 4 or 5 (see Figure 1). In postprogram surveys, the percentage of respondents who indicated these higher levels of value increased to 67% ($p < .0001$). Thus, although the majority of case managers did not initially know about AHRQ-supported CER,

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**TABLE 1**

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<tr>
<th>Discipline</th>
<th>Number of Certificates</th>
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<td>Case managers</td>
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<td>Psychologists</td>
<td>37</td>
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**FIGURE 1**

Case managers’ ratings of the value of comparative effectiveness research for educating patients ($p < .0001$ for comparison of baseline vs. postprogram response frequencies at levels 4 or 5).
they were generally aware of CER and recognized its potential value in clinical applications.

Confidence in Applying CER to Practice

Another prerequisite to applying CER is confidence that its practical application is feasible for the health care provider. Accordingly, we asked participants to indicate their level of confidence in applying CER to practice (1 = lowest confidence; 5 = highest confidence). As shown in Figure 2, across the baseline to postprogram surveys, the percentage of case managers who reported confidence at Level 4 or 5 increased from 5% to 25% (p < .0001). The number of responses at Level 3 nearly doubled across this period (27%–51%; p < .0001). After the educational programs, 76% of case managers indicated at least a moderate level of confidence in applying CER to practice.

Intention to Change Practice

Given constraints on directly and objectively measuring the impact of continuing education on clinical practice, a common approach in outcomes assessment is to ask learners to self-report their intentions to change practice and, in follow-up surveys, their implementations of specific changes. The survey included a postprogram question about the extent to which participants planned to implement information from the CER programs into their practice (1 = no implementation; 5 = extensive implementation). The majority of case managers responded at Level 3 or higher: Level 1 or 2 (24%), Level 3 (39%), and Level 4 or 5 (37%).

The survey results indicate that the majority of case managers are generally interested in CER, value its potential practical applications, and report intentions to implement its findings into practice. Moreover, educational programs on CER can enhance confidence in applying findings to case management practice.

Summary and Conclusions

Backed by the U.S. government and leading public health organizations, a national movement is well under way to advance CER and its applications to health care practice. In addition to AHRQ’s programs, large-scale CER projects are currently being supported by the National Institutes of Health and the Department of Health and Human Services. Moreover, as a provision of the Patient Protection and Affordable Care Act of 2010, a new organization called the Patient-Centered Outcomes Research Institute (2013) has been formed with the mission of developing and funding CER projects. Given the essential utility of comparative evidence in planning and coordinating care, educating patients and their families, and containing costs, case managers are ideally suited to benefit from, as well as contribute to, advances in patient-centered CER. A guiding principle for such application is reflected in the words of Dr. Carolyn M. Clancy, director of AHRQ: “We will need to remain vigilant that CER findings offer clinicians tools, not rules, so that CER gives us the potential to create a fairer, more transparent, patient-centered health system. Everyone who engages in this research believes firmly that every patient presents a unique set of clinical circumstances that should be considered when making treatment decisions, and that nothing should compromise the best-possible care for each individual” (Clancy, 2010, p. 4).

References


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<th></th>
<th>Baseline</th>
<th>Postprogram</th>
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<tr>
<td>% of Respondents</td>
<td></td>
<td></td>
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<tr>
<td>1 (Lowest confidence)</td>
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<tr>
<td>2</td>
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<td>5 (Highest confidence)</td>
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FIGURE 2
Case managers’ ratings of their confidence in applying comparative effectiveness research findings to practice (p < .0001 for comparisons of baseline vs. postprogram response frequencies at Level 3 and levels 4 or 5).


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