Evidence Report/Technology Assessment
Number 213

Communication and Dissemination Strategies To Facilitate the Use of Health-Related Evidence

Executive Summary

Introduction

The Agency for Healthcare Research and Quality (AHRQ) sponsors research to improve the quality, effectiveness, and safety of health care in the United States. Evidence reports and technology assessments generated through AHRQ's Effective Health Care Program provide science-based information about common, relevant health conditions and technologies to serve the needs of patients, clinicians, insurance payers, and other end users. Findings from clinical, health services, and comparative effectiveness studies—especially as assembled for systematic reviews and similar documents—need to be communicated and disseminated effectively to influence optimal and timely practice and health policies.[1]

Because systematic reviews evaluate multiple studies, they are inherently complex. Nuanced descriptions of benefits, harms, strengths of evidence, and uncertainties often make findings from evidence reports difficult for intended audiences to understand and use in decisionmaking. Evidence reports typically target scientific researchers in related fields, rather than the patients or clinicians who ultimately make health-related decisions. For this review, we view the evidence as moving along a continuum beginning with its collection and systematic review, followed by communicating and translating it for audiences as needed, diffusing and disseminating it, adopting and implementing it, and sustaining and evaluating its impact, with adjustments as needed. We define

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.

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Evidence-Based Practice

evidence as data that have been assembled, reviewed, and presented by evidence developers and that have been used to make recommendations. Our review included only the second and third phases in the evidence continuum: communication and dissemination.

Clear communication and active dissemination of evidence to all relevant audiences in easy-to-understand formats are critical to increasing awareness, consideration, adoption, and use of evidence, and to accomplishing AHRQ's mission. By evaluating the comparative effectiveness of communication techniques and dissemination strategies, this review informs efforts to make evidence reports summarizing current research both more easily accessible for evidence translators, health educators, patients, and clinicians and more likely to be used to influence individual decisions, change practice, and inform future research.

Due to the complexities of our topic, we present separate results for the three separate systematic reviews—one for communication, one for dissemination, and a third for uncertainty—each addressing a separate but related Key Question (KQ). Combined, these three separate reviews provide information on how to best translate and disseminate research-based evidence reports.

Objective

This systematic review has three related components; all focus on promoting informed decisions about health-related behaviors and decisions among patients and clinicians. First, it addresses the comparative effectiveness of *communicating evidence* in various contents and formats that increase the likelihood that target audiences will both understand and use the information. Second, it examines the comparative effectiveness of a variety of approaches for *disseminating evidence* from those who develop it to those who are expected to use it. Third, it examines the comparative effectiveness of various ways of *communicating uncertainty* associated with health-related evidence to different target audiences, including evidence translators, health educators, patients, and clinicians.

Key Question 1: Communication Strategies To Promote the Use of Health Care Evidence

Key Question 1:

a. What is the comparative effectiveness of communication strategies to promote the use of health and health care evidence by patients and clinicians?

b. How does the comparative effectiveness of communication strategies vary by patients and clinicians?

Government agencies and institutions, advocacy groups, media organizations, researchers, and other interested stakeholders can all carry out communication activities. They use various strategies to communicate evidence so that target audiences can better understand it; the strategies are meant to increase the probability that recipients pay attention to the messages conveyed.[2] Health communication, defined as "the study and use of communication strategies to inform and influence individual and community decisions that affect health,"[3] is increasingly recognized as a necessary element of efforts to improve personal and public health.

For purposes of our review, communication strategies fall into the broad area of "health communication" and focus on making evidence interpretable, persuasive, and actionable. The John M. Eisenberg Center for Clinical Decisions and Communications Science translates AHRQ's Comparative Effectiveness Review information to create a variety of materials ranging from evidence summaries to decision aids and other products.

To our knowledge, no overarching framework of communication strategies exists to guide this part of our review. Multiple systematic reviews, however, have explicated key communication strategies that are of interest to the field. Key Informants for this review helped us select the most important communication techniques for comparison. These core constructs are:

- **Tailoring the message**—Communication designed for an individual based on information from the individual
- **Targeting the message to audience segments**—Communication designed for subgroups based on group membership or characteristics such as age, sex, race, cultural background, language, and other "psychographic" characteristics (e.g., a person's attitudes about a particular subject matter)
- **Using narratives**—Communication delivered in the form of a story, testimonial, or entertainment education
- **Framing the message**—Communication that conveys the same messages in alternative ways (e.g., emphasizing either what is gained or what is lost by taking an action or making a choice)

Key Question 2: Dissemination Strategies To Promote the Use of Health Care Evidence

Key Question 2:

a. What is the comparative effectiveness of dissemination strategies to promote the use of health and health care evidence for patients and clinicians?

b. How does the comparative effectiveness of dissemination strategies vary by patients and clinicians?

Dissemination of health-related information is the active and targeted distribution of information or interventions via determined channels using planned strategies to a specific public health or clinical practice audience.[4-6] Dissemination has been characterized as a necessary but not sufficient antecedent of adoption and implementation. In contrast to diffusion, which is a passive informal process, dissemination is a formal planned process with the intent of spreading knowledge and associated evidence-based interventions to stimulate adoption and enhance the integration of the evidence, information, intervention, or combinations of these into routine practice.[4,5,7-9]

Existing dissemination models and approaches identify several very broad goals or outcomes for the dissemination of evidence and information:[10]

- **Increase *reach* to a variety of audiences**—Distributing evidence widely to many audiences and across many settings (e.g., postal and electronic mail; electronic/digital, social, and mass media) to increase the reach of information
- **Increase *motivation* to use and apply such information**—Increasing interest in the evidence through champions (also known as "cheerleaders"), opinion/thought leaders, or social networks
- **Increase *ability* actually to use and apply evidence**—Providing additional resources about the evidence, such as how it can be incorporated into current practice or specific suggestions for change, to enhance a traditional dissemination strategy (e.g., providing additional resources or information; skills-building efforts)

In addition, it is common practice to combine multiple dissemination strategies to address a combination of reach, motivation, or ability goals. These combination strategies are labeled as *multicomponent* strategies in this review.

Key Question 3: Explaining Uncertain Evidence

Key Question 3: What is the comparative effectiveness of different ways of explaining uncertain health and health care evidence to patients and clinicians?

Uncertainty is inherent in health care and evidence about health care.[11] It stems from multiple sources, including imperfect knowledge about scientific evidence, patients' and clinicians' preferences and circumstances, and ways to apply judgment in decisionmaking.[11-14]

To date, the vast majority of work on communicating uncertainty has focused on the narrow realm of stochastic uncertainty (i.e., the likelihood or probability of an event occurring), with little research focusing on broader concepts of uncertainty related specifically to evidence translation. For our review, we developed a framework of uncertainty as it relates to evidence translation. This framework builds on concepts enumerated in multiple prior taxonomies of uncertainty,[11-18] but aligns these concepts with the information that AHRQ's Evidence-based Practice Center[19] (EPC) Program communicates about the quality and overall strength of evidence, including risk of bias, consistency, directness, and precision.[20] The framework also enumerates uncertainty related to key concepts used by guideline developers in deciding whether to recommend health care services: net benefit, applicability of evidence, and overall strength of recommendation. Uncertainty concepts addressed in this review are:

- **Overall strength of evidence**—Degree of confidence that the estimates of effects are correct and represent the true effect. When overall strength of evidence is insufficient or low, uncertainty is high.
- **Risk of bias**—Degree to which individual studies are protected from systematic errors or bias. When risk of bias is high, the quality of evidence is poor, leading to uncertainty.
- **Consistency**—Degree to which studies present findings similar in direction of effect, magnitude of effect, or both. Evidence lacking consistency includes studies with greatly differing or conflicting effect estimates.
- **Precision**—Degree of random error surrounding an effect estimate with respect to a given outcome. Studies express dispersion around a point estimate of risk, such as a confidence interval, which indicates the reproducibility of the estimate.
- **Directness**—Degree to which the evidence either directly links the interventions to the outcome of interest or directly makes the comparison of interest. When evidence indirectly links interventions to the outcomes most of interest, evidence is uncertain.
- **Net benefit**—Balance or tradeoffs in benefits and harms for prevention or treatment services. When the balance of benefit and harm is too close to call or when evidence is lacking, the appropriate course of action with regard to prevention or treatment is uncertain.
- **Applicability**—Whether a study intervention is expected to have the same effect in populations and settings where it was not studied but might be applied.
- **Overall strength of recommendation**—The overall judgment of policymakers that evidence should be applied in particular populations and settings.

Analytic Framework

We present our analytic framework in Figure A. As noted in the box to the far left, we examined studies that used research-based evidence as the source of information for their communication strategies (KQ 1) and dissemination strategies (KQ 2). For all KQs, we struggled with the need to define the evidence base for the studied interventions. In the end, because our review was designed to assist evidence developers, we decided that interventions for KQs 1 and 2 must be based on evidence that was assembled, reviewed, and presented by evidence developers and that has been used to make recommendations. This allowed us to define a clear set of studies for communication and dissemination, and provided a measure of assurance that we captured all relevant literature pertinent to our questions. Further, it acknowledged the likely differences in the impact of studies designed using evidence from established guideline developers versus other single studies or composites of studies. For KQ 3, in contrast, we accepted any type of evidence presented, given the paucity of overall literature. Thus, we included studies that based their interventions on evidence from systematic reviews, consensus guidelines, randomized controlled trials (RCTs), cohorts, or quasi-experimental studies.

Figure A. Analytic framework for communicating and disseminating strategies and explaining uncertainty

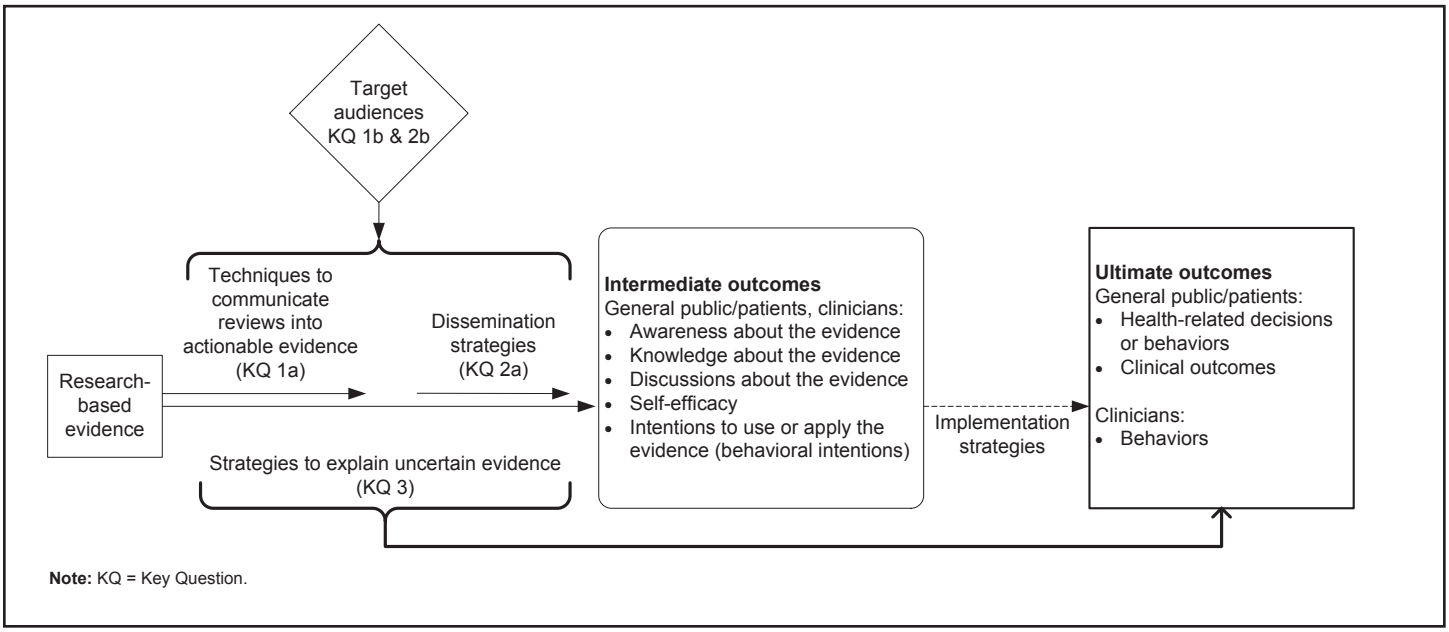


Figure A also details outcomes that we included in our review. We included studies that examined both intermediate and ultimate (distal) outcomes. Intermediate outcomes can be awareness of the evidence, knowledge of the evidence, discussions about the evidence, self-efficacy (or confidence) to use the evidence, and intentions to use or apply the evidence (behavioral intentions). Ultimate outcomes include the following: for patients—health-related decisions or behaviors and clinical outcomes; for clinicians—behaviors. We expected that most studies would be focused on intermediate outcomes because they occur sooner and thus are more practical to study. Further, we felt that these outcomes represented the key outcomes related to a spectrum of effective and preference-sensitive health care services.

Criteria for inclusion and exclusion of studies address both the PICOTS model (population, interventions, comparators, outcomes, timeframes, and settings) and other important study design and publication issues. The inclusion/exclusion criteria common to all three KQs is shown in Table 6 of the full report. Also, specific inclusion criteria were applied to admissible research evidence for KQ 1 and KQ 2 (shown in Table 7 of the full report) and other KQ-specific inclusion/exclusion criteria (shown in Tables 8–10 of the full report).

Methods

Literature Search and Retrieval Process

We systematically searched, reviewed, and synthesized the scientific evidence for each KQ separately. Databases included MEDLINE®, the Cochrane Library, Cochrane Central Trials Registry, PsycINFO®, and the Web of Science. We did not conduct additional searches for gray literature.

We used a variety of medical subject headings (MeSH terms) and major headings, and used free-text and title and abstract text-word searches. Search results were limited to studies on humans published from January 1, 2000, to March 15, 2013, for communication and dissemination. Given the lack of prior reviews related to communicating uncertainty, we searched from January 1, 1966, to March 15, 2013.We hand-searched bibliographies of included articles. In addition, in an effort to avoid retrieval bias, we manually searched the reference lists of landmark studies and background articles on this topic to look for any relevant citations that electronic searches might have missed.

Article Review and Data Abstraction

We used standard EPC methods for dual review of abstracts and full text of articles to determine article inclusion. After determining article inclusion, one reviewer entered data about studies into evidence tables and a second, senior member of the team reviewed all abstractions against the accompanying article(s) for completeness and accuracy.

Risk-of-Bias Assessment of Individual Studies

Two reviewers independently rated the risk of bias of studies (low, medium, or high) using criteria designed to detect selection bias (including attrition bias), measurement bias (such as performance bias and detection bias), confounding, and inadequate power. We also assessed potential biases in reporting. Reviewers resolved all disagreements about risk-of-bias ratings by discussion and consensus or by consulting a third, senior member of the team. We did not retain studies with high risk of bias for analysis, presentation in the results chapters, or strength-of-evidence grading. Studies with a high risk of bias were those with at least one major flaw that was likely to cause significant bias and thus might have invalidated the results. Major flaws preclude the ability to draw causal inferences between the intervention and the outcome.

Data Synthesis and Grading Strength of Evidence

Studies included in our review compared a wide range of interventions and a plethora of outcomes; they were sufficiently heterogeneous to preclude meta-analysis. Thus, we synthesized the data qualitatively by KQ. We paid particular attention to moderators of study effects as a way to explain any seemingly disparate findings. Possible moderators of interest for all KQs included risk of bias, study size, and target audience.

The investigative team jointly discussed and graded the overall body of literature and generated recommendations for future research. We graded the strength of evidence on the basis of guidance established for the EPC Program.[21,22] The EPC approach incorporates four required domains: risk of bias (including study design and aggregate quality), consistency, directness, and precision of the evidence. Two reviewers independently rated the four domains for each intervention for each key outcome (listed in the analytic framework depicted in Figure A). Conflicts were resolved by group consensus. Two reviewers also independently derived the overall strength-of-evidence grade, resolving conflicts in the same way.

Results

Search Results and Included Studies

We identified 4,152 articles from all sources (after removing duplicates) for all three KQs. After we applied the inclusion and exclusion criteria, 445 articles were retained for full-text review. The majority of the full-text articles were classified to one or more KQs: 106 articles pertained to KQ 1, 163 articles pertained to KQ 2, 84 articles pertained to KQ 3, and 98 articles were classified as overlap. Each overlap article potentially applied to two or more KQs and was not classified into one KQ category. Of the full-text articles, we excluded 386, leaving 61 articles for data abstraction. Nine articles (representing 7 studies) are relevant to KQ 1; 42 articles (representing 38 studies) are relevant to KQ 2; and 10 articles (representing 9 studies) are relevant to KQ 3.

Key Question 1: Communication Strategies

Of the 106 articles pertinent to KQ 1, we retained nine articles after full-text review that met inclusion criteria.[23-31] The investigators tested these interventions in study populations in the United States and Hong Kong. Sample sizes ranged from 174 participants to 5,500 participants. Several trials used convenience samples. They reported on seven unique trials about communication strategies. Some trials compared two strategies directly with each other (e.g., targeting vs. tailoring); others used a combination of strategies (e.g., targeting and tailoring vs. tailoring).

Specifically, the trial testing various approaches to framing against either targeting audiences or using narrative (i.e., anecdotal) or statistical evidence did not show long-term

differences between groups, and evidence was insufficient for drawing any conclusions. Four trials tested targeting against tailoring messages for individuals or groups or against a combination of both targeting and tailoring, but none produced statistically significant differences between groups in obtaining screening or changing diet and nutritional behaviors. All received grades of low or insufficient strength of evidence (SOE).

The included trials chiefly involved targeting and tailoring. Investigators hypothesized that tailored interventions would be more effective than targeted interventions in promoting screening because they are more personalized. Three trials directly compared the effectiveness of targeting to tailoring,[26,28, 29, 31] but they produced mixed results. One trial26 expected that the combination of tailoring and targeting would be more effective than targeting alone, but this was not the case.

In several cases, investigators used some combination of the four communication strategies when developing their interventions instead of comparing only a single strategy with another single strategy. Because comparisons were not one to one, it was more challenging to isolate the effects of each strategy. Additionally, in one trial, investigators enhanced the communication strategy by also varying the communication channel for the intervention (i.e., using a lay health worker). While this tactic creates the potential for a more powerful effect, it also complicates determining the effect of each strategy relative to the other.

Key points for communication strategies are as follows:

- Framing (gain/loss) versus narratives (yes/no)—Loss-framed messages used in conjunction with narratives were more persuasive than (1) loss-framed messages in conjunction with statistical information alone or (2) gain-framed messages in conjunction with either narratives or statistical information (1 trial; insufficient SOE).
- Framing (gain/loss) versus targeting (yes/no)—The loss-framed message used in combination with nontargeting (i.e., a broader appeal either culturally or societally, such as a collectivist appeal) was most persuasive relative to any other combination of framing and targeting, but the results held only in the short term for one of the trials and the targeting was done on different factors across the trials (2 trials; insufficient SOE).
- argeting (yes/no) versus tailoring (yes/no)—Findings were mixed; that is, they were nonsignificant or counterintuitive for the three studies that compared targeting with tailoring. In all three studies, investigators hypothesized that the tailored version of the intervention would have a greater effect on the outcome than the targeted version. However, there were no significant differences in outcomes between those receiving the targeted or tailored version of the intervention in two studies. In a third study, the targeted version was associated with greater likelihood of self-reported screening relative to the tailored version. The authors attributed this unexpected finding to either a possible "boomerang effect" (because the tailored letter may have been too alarming) or insufficient customization of the tailored version. Across the three studies, investigators targeted and tailored the interventions based on different factors (3 trials; insufficient SOE).
- Targeting (yes/no) and tailoring (yes/no) versus targeting only—Investigators found no statistically significant differences when they targeted an intervention to the subpopulation and personally tailored it to each study participant compared with a version of the intervention that was only targeted. They attributed the lack of differential impact to a possible "ceiling effect" in the study population, given the fairly high baseline screening rates, about 80 percent (1 trial; low SOE).

Key Question 2: Dissemination Strategies

We included 42 articles reporting on 38 studies that focused on evidence dissemination to clinicians or patients (broadly defined) and that used strategies that focused on increasing reach, ability, or motivation, or used a multicomponent approach to enhance health-related decisions or behaviors, clinical outcomes, or knowledge. We divided the trials by dissemination strategies and by outcomes for clinicians and patients.

Some trials compared strategies directly with each other (e.g., ability strategies vs. motivation strategies) and can be regarded as head-to-head trials for comparative effectiveness analyses. Some trials compared strategies with a usual-care or no-treatment control group, but we included them in our analysis if they had at least two trial arms that addressed our inclusion criteria and if we believed that we might glean information about the relative effectiveness of one strategy versus another. In many cases in which there was not a direct comparison, significant tests or confidence intervals were likely also not reported, and we note this in the summary tables in the full report.

The 38 trials reported a wide variety of primary and secondary outcomes that spanned a range of health-related or clinical problems. The trials were conducted in the United States, Canada, England, Germany, Finland, the Netherlands, Scotland, and Spain. Sample sizes ranged from 114 participants to 3,293 participants. For the cluster RCTs, cluster sizes ranged from 9 to 249.

Evidence was low, inconsistent, or not statistically significant for many comparisons for clinicians and patients related to behaviors, clinical outcomes, and knowledge, resulting in a low or insufficient SOE judgment for most categories we compared. In addition, the SOE often was low or insufficient because only a single trial addressed a specific comparison. However, by and large, the most successful strategy identified in this review was the use of a multicomponent dissemination approach for clinicians when trying to change their behaviors. The findings about the positive impact of multicomponent dissemination efforts is consistent with earlier research and prior reviews showing that dissemination strategies that are passive or involve only a single component do not perform as well as more active multicomponent approaches.[28,32,33]

We did not find evidence that any particular single strategy directed at increasing ability or motivation was better than reach strategies. Here again, there were many single studies in these categories that influenced the SOE ratings.

Key Points: Disseminating Evidence to Clinicians

- Ability strategies are not more effective than reach strategies related to clinician behavior (4 trials; low SOE).
- Multicomponent strategies that address a combination of reach, ability, or motivation appear to be more effective than one strategy alone for affecting clinician behaviors, particularly guideline adherence (7 trials; moderate SOE) and for clinical outcomes, although many comparisons examining clinical outcomes were not significant (6 trials; low SOE).
- The SOE is low or insufficient for most comparisons related to clinical outcomes and knowledge for clinicians because we had only single trials in each case.

Key Points: Disseminating Evidence to Patients

- Evidence is inconsistent for determining the benefit of reach, ability, motivation, or multicomponent approaches for patients focused on changing health-related decisions and behaviors (12 trials; insufficient SOE).
- Evidence is insufficient for determining the benefit of reach, ability, motivation, or multicomponent approaches for patients focused on changing clinical outcomes (2 trials; 1 low SOE, 1 insufficient SOE due to 1 trial in each category).
- Evidence is insufficient for determining the benefit of reach, ability, motivation, or multicomponent approaches for patients focused on changing knowledge outcomes (3 trials; insufficient SOE due to inconsistent findings or 1 trial in a category).

Key Points: Disseminating Evidence to Patients and Clinicians

- Evidence is inconsistent for determining the benefit of reach, ability, motivation, or multicomponent strategies that target both providers and patients for health-related decisions and behaviors (6 trials; insufficient SOE).
- Evidence is inconsistent for determining the benefit of reach, ability, motivation, or multicomponent strategies that target both providers and patients for health-related decisions and behaviors or clinical outcomes (1 trial in each category; insufficient SOE).

Key Question 3: Uncertainty

We found 10 articles reporting on nine unique studies that met our inclusion criteria, had low or moderate risk of bias, and examined alternative ways to communicate the precision, directness, and net benefit of evidence, and overall strength of recommendations. We found no eligible studies on overall strength of evidence, risk of bias, consistency, or applicability. Of included studies, two were RCTs, four were factorial RCTs, one was a noncontrolled trial, and two were quasi-experimental studies. One reported on the effects of alternative wordings of the overall strength of recommendations.[34] Four studies reported on various presentations of precision;[35-37] one tested alternative ways of communicating directness;[38] and four investigated different ways of communicating net benefit (with some studies making more than one comparison).[38-43] No studies reported on alternative presentations of overall strength of evidence, risk of bias, consistency, or applicability. Three studies reported the effects of alternative nonnumeric presentations of uncertainty;[34,38,40] three on alternative numeric presentations;,[35-37] one on numeric versus graphical presentations;[37] one on alternative graphical presentations;[37] and two on framing.[41,43] Only one was directed to providers; all others were directed to patients.

Interventions were tested in study populations in the United States, Canada, and Switzerland. Sample sizes ranged from 120 participants to 2,944 participants. Outcomes studied included knowledge, perceived risk, accuracy of perceived risk, appropriate choices regarding care (e.g., selecting medications, obtaining screening, guideline-concordant care), and decision satisfaction.

Key points for conveying uncertainty are as follows:

- **Communicating precision**—Studies found mixed effects of presenting numeric risks as point estimates versus 95% confidence intervals (CIs), depending on the studied outcome, width of the CI, and presence or absence of comparative information about average

population risk. Only a single small study examined the effects of changing the format in which 95% CIs were presented (numeric vs. graphical) on perceived risk of colon cancer; this precludes definitive conclusions (1 study, insufficient SOE). Further, only a single small study examined the effects of using clean versus blurry bar graphs to convey information about uncertainty (1 study; insufficient SOE).

- **Communicating directness**—Choice of a cholesterol medication with direct evidence of benefit was better for patients receiving nonnumeric advice or factual information encouraging consumers to choose the drug with direct evidence than for patients receiving usual care. However, medication choices did not differ by type of instruction (1 study; low SOE).
- **Communicating net benefit**—Choice of a heartburn medication that was more likely to have net benefit was better for consumers receiving nonnumeric advice or factual information encouraging consumers to choose the drug with greater net benefit than for patients receiving usual care, but medication choices did not differ by type of instruction (1 study; low SOE). Receiving additional nonnumeric information about benefits had little effect on refusals of cancer screening tests, but receiving more nonnumeric information on harms significantly increased test refusals and significantly decreased decision satisfaction (1 study; low SOE). Compared with usual care, giving men prostate cancer screening information alone or framed in the context of information about other, more beneficial screening services significantly increased prostate cancer knowledge (low SOE). However, giving prostate cancer screening information alone versus framed in the broader context of more beneficial services had differential effects on patient involvement and screening (2 studies; insufficient SOE).
- **Communicating strength of recommendations**—Only a single small study examined the effects of different ways of wording recommendations to convey strong or weak recommendations for care; this precludes definitive conclusions (1 study; insufficient SOE).

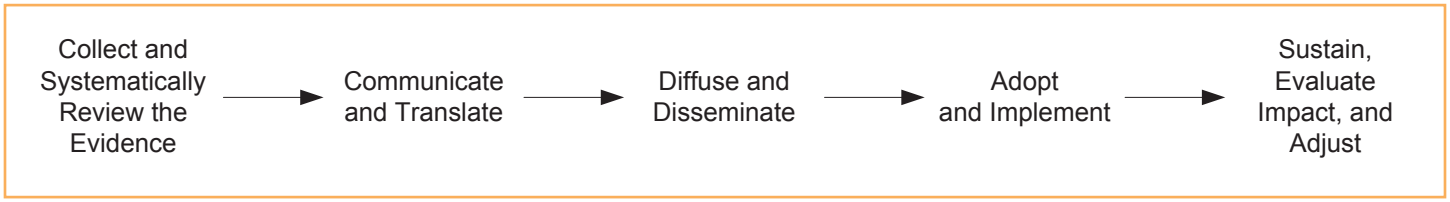
Discussion

This report presents three separate, but topically related, systematic reviews. The overarching topic involves providing health-related evidence effectively to patients and clinicians. Specifically, we were asked to examine various strategies for communicating and disseminating evidence to these target audiences. Finally, we were charged with exploring ways to explain uncertainty in evidence. Many aspects of this review cut across more than one KQ, and some across all three KQs. Below we set findings from our research into the broader context of evidence translation and highlight key cross-cutting issues that might advance the field. We also discuss limitations of our own review that should be considered in interpreting our results. Finally, we see certain commonalities in implications for future research and ramifications for patients, clinicians, and other stakeholders and end users.

Issues That Cut Across All Key Questions

- **Evidence continuum**—In the context of our review, we view the evidence as moving along a continuum, beginning with its collection and systematic review, followed by communicating and translating it for audiences as needed (Figure B). The communication and translation processes are often commingled with the diffusion (passive spread) and dissemination (active spread) of the information. Our review included only the second and third phases in the evidence continuum shown in Figure B. Some trials seemed to conflate communication and dissemination—perhaps not surprisingly, given how difficult cleanly defining these concepts can be. Several other trials also seemed to mix or merge dissemination with implementation. This conceptual overlap complicated our analysis in at least two stages: creating meaningful classifications of strategies reported in the literature and examining appropriate relevant outcomes for those strategies.

Figure B. Evidence continuum in implementation science



- **Definitions of concepts and terms**—Consensus is lacking regarding definitions of key terms pertinent to this review and the research efforts more generally. We saw this lack of consensus across studies especially for definitions of three key terms: dissemination, adoption, and implementation. Greater unity in the field in terms of concepts and terms would be beneficial. With respect to KQ 2, the lack of consistency in how dissemination strategies are referenced and classified hampered our efforts to classify a strategy into one of our domain groupings.
- **Use of theoretical frameworks and models**—Many studies (but not all) lacked any apparent theoretical or conceptual framework to inform or organize the research questions and focus interventions on essential processes of behavioral and systems change.
- **Methodological considerations**—In the included trials, there was sometimes a mismatch between study design and necessary methodology. This mismatch may partly explain why many of our included studies showed little or no effect of specific intervention strategies. Many of the studies only employed descriptive statistics and did not capitalize on more recent methodological advances (e.g., multilevel modeling) that could have improved their analytic approach. Other studies did not factor in potentially important moderating variables such as self-efficacy and health literacy.

Limitations of the Literature Specific to Key Questions

Major gaps across the KQs include (1) testing communication strategies (e.g., targeting, tailoring, or narratives) with clinicians; (2) testing dissemination strategies that are not confounded by mode of delivery, are informed by the target audience's needs, and are supported by theory; (3) testing communication studies that address uncertainty for clinicians or examine communicating risk of bias, consistency, or applicability of the evidence. Limitations for KQ 1 trials included the following:

- The evidence base for addressing comparisons of communication strategies of interest was extremely sparse (i.e., only 7 trials of direct comparisons).
- Trials focused disproportionately on screening interventions. In particular, many trials focused on screening for breast cancer, for which the evidence basis has changed in the recent past. As new evidence emerges in the media, the result can be confusion among patients and the new evidence may produce interference with the impact of interventions.
- Several trials used convenience samples, so unmeasured confounding may exist because of selection bias with the sample.
- All trials used self-reported data, which can be subject to social desirability bias.

Limitations for KQ 2 trials included the following:

- Trials often confounded the mode of distribution with other variables. Therefore, we could not tease apart the effect of mode, channel, and other variables on the outcome of interest.
- Many studies did not consistently compare strategies directly with each other, but instead compared with a usual-care or control condition, or at times made direct comparisons for only some outcomes. This limited our ability to draw conclusions about the comparative effectiveness of one approach versus another.
- The included studies were very heterogeneous with regard to the behaviors, outcomes, targeted populations, and dissemination strategies used. The resulting heterogeneity reflects a commonly encountered attribute of dissemination research. To address this heterogeneous and complicated body of work, we classified the trials in broad terms. Nonetheless, this effort still left too few studies in some categories for making meaningful conclusions about the relative impact of a particular dissemination strategy.

Limitations for KQ 3 trials included the following:

- Trials did not directly test alternative ways to communicate the uncertainty concepts that are relevant to evidence about health and health care. Few studies addressed any type of uncertainty of interest, and none examined ways to communicate risk of bias, consistency across studies, or applicability.
- When acceptable studies were present, we determined that they manipulated relatively limited comparisons. For instance, few alternative wordings were tested for communicating strength of evidence, and few graphical presentations were tested for communicating precision.
- Few studies were directed toward clinicians.

Future Research

Research teams should try to address not only the conceptual and study limitations noted for each KQ, above, but also the methodological recommendations noted below:

- Relying more on accepted theoretical constructs and models when designing interventions and studies

- Conducting some prior-needs assessments with target audiences, focusing on audience subgroups with greatest needs
- Designing robust trials or observational studies
- Using an array of proven data collection methods that can include, but might go beyond, self-reported attitudes, levels of knowledge, and behaviors
- Describing and defending choices of intermediate and ultimate outcomes
- Applying modeling or other advanced statistical and analytic techniques to account for confounders, interactions, and similar complications in data, and addressing temporal aspects of outcomes
- Thoroughly describing all aspects of study design and conduct, especially for interventions

Implications of This Report for Clinicians and Policymakers

Our findings offer some guidance for clinicians and policymakers as to the most effective strategies for communicating and disseminating evidence but leave many questions unanswered. For example, as was the case with other reviews, we found that multicomponent strategies addressing a combination of reach, ability, or motivation appear to be more effective than one strategy alone for affecting change in clinician behaviors, and particularly clinician guideline adherence (KQ 2). Our findings offered us no or insufficient evidence, however, to determine the comparative effectiveness of each dissemination strategy within a multicomponent strategy. We also found different combinations of strategies with different intended audience(s) and setting(s), and few head-to-head comparisons of single strategies, further limiting our ability to recommend a specific strategy or policy for a specific target audience and/or setting.

While clinicians and policymakers may use our findings to guide choice of a specific communication and/or dissemination strategy, they should also carefully consider other factors shown to affect awareness, adoption, and use of evidence in various settings and by individuals working in or receiving services in those settings. For example, evidence use by individual clinicians or an organization is dependent on factors such as the definition and source of evidence, the methods used to construct evidence, ways intended audience members use and retain information, characteristics and expressed needs of the intended audience(s), and organizational as well as individual constraints and enablers specific to various settings. Clinicians and policymakers should gather and use information on these and other factors relevant to their situation or setting as they consider adoption and use of specific communication and dissemination strategies to guide patient-centered care and/or develop and implement systems-level policy.

More research is needed to better understand the current barriers to translating the findings of comparative effectiveness research into community and clinical practice.[44] Further, ongoing funding for interdisciplinary communication and dissemination sciences research is needed to promote the uptake and use of evidence and ensure quality of care.

Conclusions

In closing, this was the first systematic review that attempted to compare the effectiveness of communication strategies and look at communicating uncertainty. Finding the appropriate "comparative" studies was challenging. The number of eligible studies was limited for KQ 1 and KQ 3, but more substantial for KQ 2. The review provides a helpful foundation in setting the research agenda to address key gaps in the literature.

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Full Report

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