

PRACTICAL ADVICE

Making Medical Research Clinically Friendly: A Communication-Based Conceptual Framework

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ABSTRACT **Context:** *It often takes a long time before the results of medical research are actually used by health care practitioners in day-to-day clinical settings. This problem, referred to as “the evidence-to-practice gap”, has significant implications for patient health care. Practitioners have difficulty keeping up with the latest information in part because it is reported in hundreds of journals that may not be easily accessed and understood.*

Approach: *This essay conceptualizes the evidence-to-practice gap as a communication problem and suggests how academic research can be translated into messages that are easier for practitioners to access, comprehend and incorporate into their medical practice. A “translation framework” shows the importance of targeting messages to specific audiences and provides a communication-based conceptual approach for summarizing research for clinicians.*

Practical Implications: *Targeting the results of academic research to practitioners will decrease the time it takes for patients to benefit from the latest medical evidence. Translation guidelines can help health researchers write more effectively for both academic and practitioner audiences. Since the evidence-to-practice gap is a systemic problem that begins with how we train our health researchers, educators should consider addressing this topic in the health professions classroom. The framework presented here can serve as the basis for an instructional unit on interpreting and reporting research findings. Finally, information technology can play a much larger role in the*

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communication process because of the enormous advantages of quick access and data organization that computers and the Internet provide. Practitioner-targeted research summaries could be made available on government or not-for-profit sponsored websites as well as by journals themselves. Funding opportunities exist for research that focuses on how technology can help improve health care, and so the time is right for health researchers to investigate ways of making their studies more accessible and quickly usable via web-based distribution. The potential of medical science should not be limited by an information delivery system that we have the knowledge, expertise and resources to improve.

KEYWORDS *Evidence-to-practice gap, published research, information access, communication, target-audience, information technology.*

Context

Given the rapid growth of medical knowledge, it is almost impossible for health care practitioners to stay up-to-date in their fields and to utilize the latest medical research findings. Even with advances in information technology and retrieval systems it sometimes takes years until published research has any impact on day-to-day clinical practice. This problem has been described as the *evidence to practice gap*, and has significant implications for optimal patient health care (Eddy, 1996; Sackett *et al.*, 1996; Grol, 1997; Haines & Donald, 1998; Silagy & Haines, 1998). If the latest medical knowledge is not accessed on a timely basis, practitioners miss opportunities to improve diagnoses, reduce recovery times and even save lives. In this essay, we conceptualize the evidence-to-practice gap as a *communication problem*, and describe how communication concepts can help translate medical research evidence into messages that are easier for practitioners to access, comprehend and incorporate into their medical practice. While medical knowledge is disseminated in a variety of ways, our interest is on the interface between academic research publications and health care practitioners. Health educators can play an important role in helping with the evidence-to-practice problem by introducing the topic to their students and by including communication and writing concepts in the health professions curriculum. Health researchers should reexamine the extent to which their own studies are written for clinical relevance and academic journals should promote the electronic distribution of targeted research summaries.

Focusing on how new information is transferred from medical publications to practitioners is important for several reasons. First, there is a lack of research on how effectively medical journals communicate medical evidence to practitioners. Most research on health communication addresses physician-to-patient communication, or the transfer of health information to consumers through mass media outlets (Sharf, 1993; Rogers, 1996). The research on clinical physicians as the target of medical education has focused on continuing

medical education and practice guidelines. Even the most basic definitions of health communication refer only obliquely to the research publication-to-physician interface (Rogers, 1996). There are, in fact, reasons to suspect that the medical journal is a poor communication channel for practitioners. Academic medical journals are written using research vernacular that includes highly sophisticated methodologies and statistical analyses. Many practitioners are not trained in research methodology and may be reluctant to wade through tomes of research articles for the bits of material relevant to their specialties. Medical breakthroughs and subsequent research specialization has spawned many new journals and has caused fragmentation that is difficult for the most avid reader to follow. New knowledge must be accessed and understood before it can be implemented, and the extent to which medical journals facilitate this process is at best unclear.

Second, research on health communication has traditionally focused on changing behavior, using theories of social influence, adult learning theory, and diffusion of innovation to develop persuasive, promotional, or motivational messages (Mittman *et al.*, 1992; Ratzan, Payne & Bishop, 1996; Rogers, 1996; Stross, 1999). However, while a persuasive conceptual model may be appropriate for health campaigns or for convincing patients to follow recommended medical regimens, it is probably inappropriate for the researcher-to-practitioner interface. The role of the researcher is not to *persuade*, but to *inform* the clinician by providing objective, fact-based evidence. Determining how to use medical evidence should be left to the practitioner and patient, who are familiar with the unique characteristics of the situation. Health communication researchers may need to expand their focus to include additional strategies for objective/informative communication as well as persuasive goals. This change would be consistent with approaches to the practitioner-to-patient interface that stress patient participation (Gafni *et al.*, 1998; Charles, Whelan & Gafni, 1999; Charles, Gafni & Whelan, 1999; O'Connor *et al.*, 1999; Lawrence *et al.*, 2000). Practitioner-patient communication is moving away from traditional paternalism toward shared decision-making, with the premise that patients can engage in health decisions when given understandable information with balanced framing of risks, benefits, and context (Guadagnoli & Ward, 1998; Ruland & Bakken, 2002; Ford *et al.*, 2003). The development of objective and balanced frameworks for sharing information can add to the literature in health communication that has previously focused on persuasive strategies.

Finally, information technology poses an unprecedented opportunity to develop techniques for communicating new research findings. The Internet gives rapid access to the most recent research evidence, with many journals and other information resources moving to electronic publication. Wide access, however, does not guarantee understanding. The World Wide Web has the potential to inform, misinform, and overwhelm, with information overload already a chronic problem for busy practitioners and health researchers.

Electronic publishing might even be counterproductive because its vast capacity may result in less attention to succinct, clear and cohesive language (Silberg *et al.*, 1997; Jadad & Gagliardi, 1998; Jadad *et al.*, 2000). Patients have been known to have difficulty interpreting electronically accessed medical information and practitioners may be at similar risk (McGrath, 1999). Journal Websites often use “shovelware” (i.e. text is simply moved from paper to electronic media) and some electronic tools (e.g. hypertext) in an attempt to improve communication. However, we know little about relationships between packaging techniques and knowledge acquisition. Furthermore, practitioners face the same challenges with full text, on-line articles as they do with hard copy journals. It still takes a long time to find, read and make sense of them. Now is the time to begin evaluating which electronic strategies are complementary, synergistic, or counterproductive (Jadad & Gagliardi, 1998; Jadad *et al.*, 2000).

Approach: The Translation Framework

The communication literature related to objective and effective information transfer reveals two approaches that are especially dominant: (1) a basic communication model, and (2) the six elements of logical rationale, journalism and technical writing. These two approaches have been used extensively in research and have important commonalities. We propose that a combination of the two approaches can form a framework for effectively translating published medical research to a form that is user-friendlier for practitioners. *Translation* refers to a summarization process that incorporates the dimensions of effective communication and particularly stresses the importance of tailoring messages to specific audiences. Translation guidelines (Table 1) can help educators and students evaluate research articles for clinical relevance and practice their own translations. Since research methodology indoctrination typically begins in graduate school, we recommend introducing the evidence-to-practice problem to entry-level graduate students so they may begin to recognize the importance of making health research more accessible to practitioners. The following exercise and background discussion can be used as the basis for an instructional unit on this topic.

An excellent classroom exercise is to ask health professions students to find and summarize interesting research articles published in academic journals. Student summaries should follow translation guidelines in Table 1, and then summaries and articles should be brought to class for oral presentation and discussion.

The translation exercise not only encourages students to examine clinical applicability, it also produces lively discussions on research bias, source credibility, how practitioners get new information, access to new information in different cultures, specialization in medicine, and why sometimes clinicians

Table 1. Translation guidelines

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1. Clearly and concisely state the purpose of the study. If possible, use only one declarative statement. (*Goal*)
 2. Name the journal and its organizational affiliation. Name the authors and cite their credentials and affiliations. How was the study funded? (*Source credibility*)
 3. What is the journal's circulation? Does it have an on-line edition? How did you find the article? How much does a subscription cost? Is this journal widely available to clinicians? Is it widely read by clinicians? (*Channel access*)
 4. Who is the primary target audience for the study? Researchers? Clinicians? Both? What are their medical specialties? Is the audience international? What are the information needs and other special characteristics of the clinical target audience? (*Audience characteristics*)
 5. Describe the context in which the target audience works. Are there economic, political or cultural factors that may impact how the results of this study can be used? For example, will adopting a new procedure be too *costly* for a particular audience? Are there alternatives? How do the results of the study apply to populations across cultures? (*Receiver context*)
 6. Briefly describe the background, research questions, results and implications of the study. (*Comprehensible content*)
 - a. Item #4 (audience characteristics) and item #5 (receiver context) above should guide your writing.
 - b. Be concise, avoid research jargon and translate quantitative data into words and/or graphics. Whenever possible, use short sentences and simple English (if you do not understand the article's research methodology, ask your instructor).
 - c. Highlight how the results can be used in clinical practice and how the study adds to available knowledge.
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resist changing their ways even when presented with new, credible information that says they should. The translation approach is well supported by communication research, and the following sections provide good background information for instructors who wish to introduce this concept and try the exercise with their health professions students.

The basic communication model has a long history of academic study and has been described in a number of communication textbooks (Shannon & Weaver, 1949; Berlo, 1960; Barnlund, 1970; Adler & Rodman, 2002). In this model, the purpose of communication is shared meaning and understanding; it is operationalized through six elements of transmission and reception: *sender*, *message content*, *channel*, *receiver*, *purpose*, and *context*.

Message effectiveness is influenced by *sender characteristics*, such as expertise, credibility and the ability to make the purpose clear and the message comprehensible. *Message characteristics* refer to the precise content of the communication and include the degree of technical language used and visual presentations of information. *Channel formats* are the ways in which messages are sent and include face-to-face, computer-mediated or written communica-

tion. The *receiver* must have access to the channel and the ability to make sense of the message. Finally, all communication occurs in some *context*, which influences how the message is received, interpreted and understood.

Congruent with this basic communication model are the six elements of logical rationale, journalism, and technical writing: *who* (receiver), *what* (message content), *how* (channel), *when* (context), *where* (context), and *why* (purpose). In Cicero's *De inventione*, these six are the evidentiary questions for the logical components of a given situation (Hubbell, 1949); in journalism, they refer to factual elements to be quickly communicated in the first paragraph of reporting (Fedler *et al.*, 1997; Mencher, 2000); in technical writing, they are the key elements for formulating a communication product for a specific target audience (Anderson, 1984; Alred *et al.*, 1992; Barnum & Carliner, 1993). While precise definitions of each may vary, the commonality is that the components of well-planned and executed communication distill down to these six similar elements.

This summary of communication constructs can guide us toward a framework for the effective translation of medical evidence to practitioners (see Figure 1). Translation occurs when medical knowledge is reported or written in such a way that takes into consideration each communication element of the framework.

The specific goal, or *Why*, refers to the purpose of the research, and the mission and credentials of who is conducting it. Although it seems obvious that a research article should clearly state its purpose and describe its authors, the

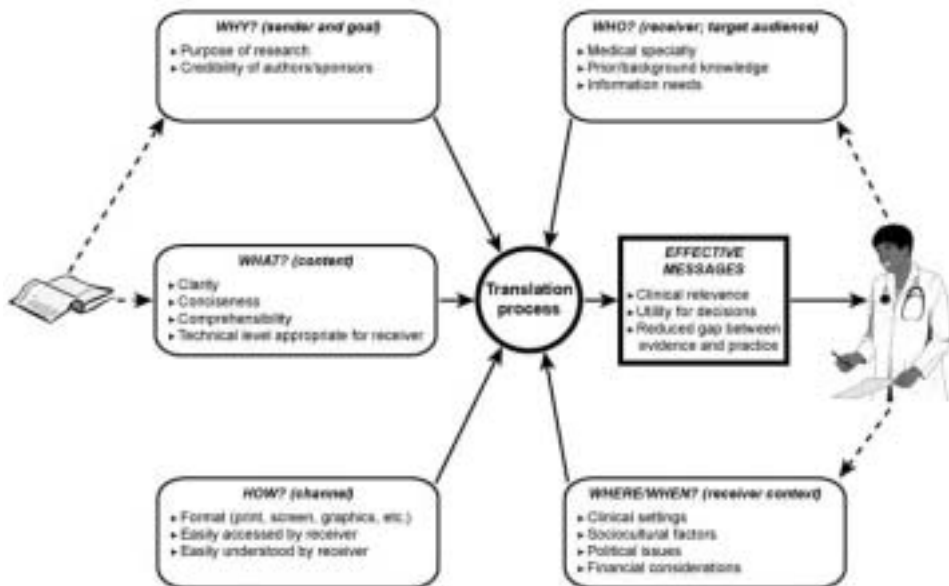


Figure 1. Translation framework.

issue of sender credibility gets thrust to center stage when one considers the proliferation of “medical evidence” on the Internet. Websites provide relatively inexpensive ways of reaching large audiences, and practitioners increasingly hear patients begin sentences with, “I read on the Internet that...”. Good and bad information exists on the Internet, and evaluating source credibility should be the first step in interpreting medical evidence. Source credibility includes the sender’s expertise and trustworthiness. In the case of the published research article, certainly practitioners would recognize prestigious, peer-reviewed medical journals as being excellent sources. But what about lesser known journals, or web pages where the source is unclear? Do these sources have the patients’ best interest at heart (or are they trying to simply sell a product or procedure)?

The *What* addresses the precise content of the message. For clinicians, the content of many medical or health related journal articles may seem to be too detailed, complex or laborious. Translated medical evidence should be clear, concise and comprehensible, with the right level of detail and scientific sophistication for the practitioner audience. For example, most quantitative data and analyses should be translated to words and graphics, using such concepts as “relative risk reduction” and “absolute risk reduction”, and “number-needed-to-benefit/harm”. Descriptions regarding numerical framing should be explicit (e.g. survival versus mortality, treatment success versus failure). Graphics can also help summarize information quickly and clarify concepts. Animated depictions of medical science and videotaped medical procedures are now common on the Internet and have enormous potential for making medical information more readily understandable. Finally, a well-done translation will also have balanced tone regarding uncertainties in available knowledge and trade-offs between benefits and risks.

How is the channel of information transfer, or messenger. For new research findings, it has traditionally been the hard copy, peer-reviewed medical journal and now, commonly, electronic journals. Evaluating the channel answers the central question: are academic journals (whether traditional or electronic) a good *way* to disseminate new knowledge to practitioners? One key issue is access, because a channel must be easily accessed in order for it to be efficient. Many practitioners do not have readily available, extensive collections of hard copy journals. The Internet can provide speedy access but not if the process involves lengthy searches through multiple websites, where the payoff is an article written in research vernacular. Practitioners need the objective information contained in peer-reviewed articles but the academic journal in its current form may not be the best way to get it. Medical research should be communicated using a channel that is easier to access and more audience-centered.

The model also considers the relevant wider contexts of *Where* and *When*. These deal with how time and place influence a practitioner’s ability to understand and use new information. For example, an environment that is

relaxed and free of distractions might be an ideal context for reading journal articles. Unfortunately, the opposite tends to be true in clinical settings. Practitioners typically work at a hectic pace and constantly get interrupted. Context also reflects how the sender may need to adapt the information to local situations in different sociocultural, clinical (e.g. health maintenance organization, fee for service, academic), political or economic environments. From an international perspective, cultural differences in medical practices and the economic resources available to practitioners may influence how and when new research is accessed, understood and implemented. Particularly in developing countries, subscriptions to many medical and health care journals may be too costly and alternative channels for new information are necessary.

Finally, the *Who* element deals with tailoring the message to the audience. We argue that many academic journals are written for academic audiences (including clinician researchers) who are inclined to access the journals and are equipped to make sense out of complicated data. Academic journals may in fact speak well to academic audiences, but not so well to practitioners who spend most or all of their time in a clinical setting. Certainly most practitioners *can* figure out or decode research language to understand its implications for their practices. But the time and effort it takes to do so may dissuade some from trying. Even if they do try, deciphering takes time and therefore still represents a hurdle for reducing the evidence-to-practice gap. Communication is more efficient and effective when one tailors the message to the audience. Efforts can also be made to adapt messages to specialty practitioners when medical findings are particularly relevant to sub-categories.

Practical Implications

The translation framework suggests several ways that we can do a better job of communicating the latest research to health care practitioners. First, the framework reminds health researchers that they are communicating both to the research community *and* to practitioners. If the goal is to reduce the gap between evidence and practice, an appreciation for the second audience in terms of the elements of the framework may be helpful in writing in a more user friendly way. Therefore, we advise health researchers to use the translation guidelines and framework as touchstones or important reminders about how to best communicate to practitioner audiences. To attack the evidence-to-practice problem at its roots, we recommend translation education to begin in medical schools or other health care schools that train academic researchers. Teachers of health professions should talk about this important issue in class and consider trying the instructional unit and class exercise that are outlined above.

Taking the framework one step further may suggest a role for “translation editors” in editorial offices for health publications to focus additional expertise

on the interface between the investigator-writer and clinicians' information needs. Editors could use the framework for giving feedback to authors who may need to clarify points in their papers for their various intended audiences or to assist journals in producing their own research summaries. Authors could submit practitioner-targeted summaries along with their manuscripts, or editors could call upon other health researchers to summarize (for clinical relevance) one or more articles at a time and then publish those summaries on the web or in a section of the journal itself.

Ultimately, information technology should play a key role in the translation process because of the enormous advantages of quick access and data organization that computers and the Internet provide. Effective technological execution can overcome problems related to information overload and bewildering Internet searches. As mentioned, standardized, practitioner-targeted summaries could be made available on websites for journals, governments or not-for-profit organizations (to avoid industry conflicts of interest). Summaries could be targeted to various international audiences where additional language translations may be appropriate. The creation of subcategories according to medical specialty, medical condition and treatment options would further enhance access. Imagine an OB/GYN physician knowing that she is one click away from credible, meaningful summaries of the latest research on hormone replacement therapy. She could no doubt find that information elsewhere, but how long would it take and would it be effectively summarized for clinical relevance?

We know that considerable investment would be required to develop such a resource, but a growing body of social science evidence suggests the value of doing so. For example, recent research has shown that computer-based decision support systems can improve clinician performance and patient health care outcomes (Bates & Gawande, 2003). In fact, the US Senate is considering legislation that would provide nearly \$1 billion over a period of 10 years to support hospitals and nursing homes that implement technology that improves medical safety (Medication Errors, 2001). The time is right for health researchers to apply for grants that focus on how information technology can enhance the accessibility of medical information. The incredible potential of medical science should not be limited by a poor information delivery system that we have the expertise and resources to improve. Electronically accessed translated information can help reduce the evidence to practice gap and create opportunities for patients to benefit from the latest medical research.

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