

Chapter 1

Effective Dissemination of Clinical and Health Information

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The title of this chapter, "Effective Dissemination of Clinical and Health Information," as straightforward as it seems, affords concealment for any number of complexities and conundrums. Agreement on just what constitutes dissemination is limited, and the term "effective" may confuse matters. No consideration is given in the present volume to what is encompassed by the delimiting ideas of "clinical" and "health," but the boundaries represented by these terms would probably vary considerably. Finally, the term "information" is often used very loosely, so loosely that its very use conveys almost no information at all.

Vocabulary of Concepts

We begin with definitions of key terms. An initial disclaimer is necessary because the 1991 conference on which this volume is based did not adopt the definitions that we provide here, although the sense that agreement on terms would be helpful was widespread. Thus, stating definitions up front in this volume does not indicate consistent use of the terms throughout the chapters that follow; rather, the definitions should be considered as suggestions from the editors and as a starting point for further discussion, perhaps leading to standardization.

Information. We prefer a fairly strict definition of information, as proposed by Shannon and Weaver (1949) in their work on information theory. They define information as the "reduction of uncertainty." Thus, if one receives a message signed simply "Chris," an unknown person, one may be in a state of uncertainty as to whether the person is a male or a female. If one notes that the communication came from the maintenance department and one knows that nearly all maintenance employees are male, the origin of the message constitutes information with respect to the gender of Chris. Uncertainty is reduced. Had the communication come from "sales," a department in which males and females are equally represented, uncertainty would not be reduced. If it is equally likely that Chris is a male or a female, but the communication refers to "my wife, Chris," that amount of information amounts to one "bit" in Shannon and Weaver's terms, and uncertainty is reduced to zero.

The Shannon-Weaver definition of information is useful in several respects, one that is worth incorporating into our thinking even if we are unable to use it quite so precisely and technically as it is used in information theory. Information is always in relation to some uncertainty. Knowledge that does not reduce uncertainty with respect to a specific problem is not information with respect to that problem. Thus, despite the enormous number of scientific articles published each year—estimated a few years ago at 1 million (Mahoney, 1987)—the amount of information related to any one problem is likely to be very small and manageable. In fact, the total amount of information, in the technical sense of reducing uncertainty, may not be so enormous as the number of articles would suggest. The "information explosion" may not be more than a "pop."

To provide information to the public or to health care professionals, one must first determine the degree of uncertainty about the problem toward which the information is directed and the degree to which that uncertainty *should* be reduced. How much information is actually contained in the communication? If the actual reduction of uncertainty is greater than or less than the intended reduction (the legitimate reduction), then the communication has gone awry.

However, information, like entropy, can have a positive or a negative effect on the degree of uncertainty. We propose that the Shannon-Weaver definition of information be altered to suggest that information constitutes a *change* in the level of uncertainty about some issue. In some cases, we may be overly certain about an issue and accurate information would *increase* our uncertainty. An example might be the widespread and unthinking acceptance of a mode of treatment of a medical condition as "correct" when this treatment is far less effective than supposed. Wennberg's (Wennberg, Roos, Sola, and others, 1987) work on treating prostate disease seems to have altered thinking considerably toward acceptance of greater uncertainty about the best approach to treatment. We consider Wennberg's contributions as information even though they increased, rather than decreased, uncertainty. (Mark Twain once noted, in connection with a topic he was discussing, "The researches of many commentators have thrown much darkness on this subject, and it is probable, if they continue, that we shall soon know nothing at all about it.")

Dissemination. The process by which knowledge is made accessible or available to a target audience is "dissemination." Dissemination is best viewed as *active* and *intentional*; the word has its origins in the idea of sowing seed. The success of dissemination efforts can be measured by the degree to which knowledge becomes available to the target audience, without regard to what is done with the knowledge. Dissemination might be used in a narrow sense to refer simply to "broadcasting" messages. Thus, guidelines may be considered to have been disseminated if they are sent by mail to every relevant person in a specified audience. It is better, however, to incorporate into the idea of dissemination the notion that the messages will be brought to the attention of the audience. Thus, dissemination would not be regarded as successful unless the person receiving the materials gave them active attention. Mail discarded without being opened is failed dissemination; if it is opened and then discarded, dissemination can be considered successful.

Diffusion. A term often encountered in relation to the ways in which innovations become widespread is "diffusion." In practice, "dissemination" and "diffusion" are often used interchangeably, but dissemination might better be limited to the idea of planned or directed diffusion. Diffusion is a generic term for "the process by which an innovation spreads" (Rogers, 1983, p. 13); the process may be active or passive. Innovations¹ (e.g., guidelines) may be actively disseminated, but they may also diffuse through a community without any deliberate intervention, as when innovations are diffused by word-of-mouth promotion. Diffusion may be spontaneous.

Rogers (1983) delineated the process of diffusion in terms of four crucial elements: (1) an innovation, (2) communicated by way of certain channels, (3) over time, and (4) to members of a system. In the context of this volume, diffusion refers to the process by which (1) guidelines (2) are disseminated through certain media (3) over a designated period of time (4) to an intended audience.

Utilization. The process by which knowledge is factored into decisions is "utilization," although defining the term has been a difficult problem (e.g., Stetler, 1985). If information is provided to a person and that person changes his or her behavior in the direction suggested by the information, within a reasonably short period of time, utilization of the information would seem to have occurred. Problems come about when behavior does not change, at least in an obvious way. For example, if a physician is told that a particular drug is the best available for treating hypertension, but continues to prescribe another drug instead, should one say that the information about the first drug is not utilized? If the physician responded to the information, "I don't care. I do okay with my own drug," we might conclude that the information had not been utilized. On the other hand, if the physician said, "The information is interesting, but that drug is expensive, and it is only marginally better than the cheaper drug I usually prescribe, so I am going to continue with the latter," we might conclude that the information had been factored into the decision process, even though the outcome was not reflected in any change in behavior.

Defining utilization in terms of change of behavior may be setting a too-stringent criterion for its occurrence. Most behaviors are determined by a number of factors, and it is

not always reasonable to expect one to override all others in producing change. On the other hand, defining utilization as "factoring information into the decision process" may create a criterion too broad to be measured.

Still, we prefer the looser definition. The stricter definition, in terms of behavior change, implies a superiority on the part of the agent providing the information. In some medical cases, for example, "adaptive noncompliance" with a recommended treatment regimen may be justified (Deaton and Olbrisch, 1987). In some instances, patients may know better than their doctors what is best for them. Do such persons fail to utilize medical advice? We are reminded here of the distinction made years ago in studies of leadership behavior between "successful" and "effective" leaders. Successful leaders are those who manage to get people to follow them; effective leaders are those who know the right direction in which to lead. Unfortunately, the dimensions tend to be orthogonal, so that we have cases of leaders who persuade people to follow them into disaster. Utilization of information, if the information is incorrect, will result in a bad outcome. Some years back, it was common practice to administer oxygen under pressure to prematurely born infants, a practice that produced many cases of subsequent blindness (retrolental fibroplasia). Presumably, that practice, if not exactly reflecting a guideline, was in response to promulgated doctrine (Lambert, 1978). A hospital that resisted the practice on a considered basis would not have been regarded as failing to utilize information.

Adoption. When an idea, a practice, or a method of doing something is incorporated into normal procedures, "adoption" has occurred. Many hospitals adopted the practice of administering oxygen to prematurely born infants. Some did not, whether because they thought it an unwise practice or because they lacked the resources and equipment to do so. The 55-mile-per-hour (mph) speed limit was adopted throughout the United States under the threat of loss of Federal funding for highway construction. Under pressure from the U.S. Congress, State legislatures voted for the lower speed limit, and signs announcing the 55 mph limit were erected along all interstate highways. By contrast, legislation mandating seatbelt use is more slowly being enacted by the States; that is, adoption is slow and limited.

Adaptation. Adoption of any innovation without some adjustments or other allowances for local concerns is probably rare. "Adaptation" is the process by which an innovation is rendered more acceptable and suitable for local use.² Adaptations may be minor and of no critical consequence, or they may be extensive and fraught with consequences. In some cases adaptation may be so extensive that the character and force of the original innovation are lost. If, for example, guidelines are introduced in such a way that they can be adapted to local conditions, they might be watered down to such an extent that they could not possibly have any effect on practice. Although the 55 mph speed limit was adopted in all States, it was adapted considerably in many States, as reflected in the levels of enforcement. These levels varied so much that Federal legislation was required to ensure at least minimally satisfactory results; that is, reduced speed.

² The concept of *adaptation*, as defined here, is essentially similar to the concept of *re-invention*, the process through which the users of an innovation change the innovation as it diffuses (Rogers, 1983).

¹ An *innovation* is an idea perceived as new (Rogers, 1983).

Effective Dissemination

AHCPR's Center for Research Dissemination and Liaison has conflated the concepts of dissemination and utilization and has formulated the idea of "effective dissemination," as reflected in the name of the conference from which this volume derives. The idea of effective dissemination may not always be appropriate, as it implies that what is disseminated *should* be put into practice. Such a high level of certainty in predicting the consequences of innovations, even by experts, is not always possible. Not all innovations prove wise in the long run, and adaptations are very often necessary. If one means by "effective" only that information will be considered in the course of decisionmaking, it may be difficult to determine whether effective dissemination has occurred.

For the purposes of this volume, however, we propose that effective dissemination is exemplified by promulgation of a guideline for practice identified by the recommendations of experts or by a synthesis of research-based knowledge, followed by acceptance and change in practice in the relevant audience or community.

In the literature on dissemination, overlap exists among all these terms; for instance, Backer (1991a), glossing a variety of terms, includes both adoption and adaptation processes in his definition of "knowledge utilization."

Guidelines

Although the task of effectively disseminating health and clinical information extends far beyond the boundaries of what are termed "guidelines," it constitutes the major challenge to AHCPR at present. The term will eventually be defined by practice as guidelines gradually are written and published.

The term "guidelines" is used in quite different ways. The word has so little force in some usages that one wonders whether promulgating guidelines is worth the effort. At the other extreme, an individual guideline may be regarded as offering so little latitude in performance that its dissemination, even its formulation, may be met with great resistance and ultimate defiance. Or, if not met with overt defiance, an unacceptable guideline will be subverted and rendered ineffective. A number of years ago, investigations suggested that U.S. physicians were administering too many injections of "inferon" (iron) to elderly patients, and these injections were proscribed. Physicians simply shifted to other injectable drugs, perhaps in part to maintain their incomes but also, very likely, to satisfy their patients.

Analogies From Traffic Regulation

It may help to consider traffic guidelines as analogies and determine where, on some scale of seriousness of intent and consequences, medical guidelines might fall.

A very basic traffic guideline is that one should drive on the right side of roads and streets. That guideline usually poses no problem, and nearly everyone is in conformance with it nearly all of the time. Still, the guideline is readily ignored when people are driving on rough rural roads or streets with large potholes, or when they are in their own neighborhoods and want to check their mailboxes. The guideline is slightly more compelling if one is driving on a street or road with a clear center line marker. A medical guideline at that level would suggest something like, "This is a good

idea, but if anything comes up to suggest otherwise, don't hesitate to ignore it."

A stronger guideline is a speed limit, which suggests that one's behavior should be substantially constrained, although not without fair latitude. On the other hand, a posted speed limit may mean that one's behavior should be sharply constrained if a police vehicle is nearby. Speeding is usually a serious violation only if it is fairly flagrant. A medical counterpart to a speed limit would be a guideline that suggested some limitation on practice, but not a severe one, unless one is being watched. For example, "Don't do too many extra sonograms, and none if you think your practice might be audited."

Still stronger traffic guidelines are represented by the prohibition against crossing the double yellow center line, by stop signs, and by stop lights. These traffic "guidelines" are expected to be obeyed under nearly all conditions, and, although one may get away with occasional violations, one must expect that they may be enforced at any time. Violations of these guidelines carry penalties that, while not ordinarily severe, may be reflected in quite severe penalties if the consequences of a violation are serious; if, for example, an injury or accident occurs. Medical guidelines of a similar nature would be very sharply defined and strongly prescriptive. By implication, violation might be regarded as a basis for charges of dereliction if a case ended badly.

Finally, the legal guidelines that prohibit driving under the influence of alcohol are absolute. Enforcement is not easy nor uniform, but the consequences are quite serious if one is caught. The ethical and legal proscription of sexual contact between physicians and their patients has something of the same character. Probably many, maybe most, violations are not detected, but when they are, guilty clinicians pay very strong penalties. It is not likely that guidelines for practice should ever have such an absolute standing, but if guidelines ever become involved in medical malpractice, they might achieve that status.

Background

This volume and the 1991 Tucson conference that it reports are by no means the first effort to better understand the effective dissemination of health and clinical information. Two previous conferences, one in 1972 and one in 1980, were held under Federal health agency sponsorship and were intended to bring together what was then known about the dissemination of health and medical innovations. The first conference was organized by Professor Gerald Gordon, a sociologist at Cornell University, and the edited volume from that gathering is entitled *The Diffusion of Medical Technology: Policy and Research Planning Perspectives* (Gordon and Fisher, 1972). The second meeting, held at a conference center in the Pocono Mountains, was organized by scholars in the Sloan School of Management at Massachusetts Institute of Technology. The proceedings from this 1980 conference, *Biomedical Innovation* (Roberts, Levy, Finkelstein, and others, 1981), stressed a diffusion-of-innovations perspective.

These three conferences over a 20-year period indicate the ongoing Federal Government and scholarly interest in better understanding the process through which the results of biomedical scientific advances are disseminated to practitioners in order to improve the quality of medical and health

care in the United States. Research on this dissemination process indicates that it is often complex and relatively slow, and that it is not always as effective as Federal policymakers might desire.

Knowledge Utilization and Change

As already mentioned, the word *effective* is the bridge between dissemination and utilization of health information as we have defined these terms. It may be helpful at this point to clarify the overall goal perspective to which this bridge leads and why the word *effective* is so important. In the context of health care, what does *effective* mean? What is the ultimate goal of disseminating health information to providers, policymakers, researchers, and consumers?

The answer has already been stated in several ways and perhaps is obvious, but it is an answer we often do not keep in full perspective. All too often we concentrate either on the message—the content of an exciting new technology, advances in practice, or policy directive; or on the medium—the equally exciting technologies representing delivery systems, some of which are detailed in this volume.

The titles of the chapters that follow are a reminder of the need to keep in mind both the medium and the message of effective dissemination. The goal of sending out the message (that we hope is valid) through the delivery system (that we hope will function satisfactorily) is *utilization*, the actual use of the idea, practice, or technology in some new setting.

Use, of course, may or may not mean change. Information may confirm a practice that works well and thereby mobilize support for maintaining the status quo. As George Bernard Shaw said, "If it is not necessary to change, it is necessary not to change." We may forget that essential principle in studies and interventions directed at dissemination and utilization of health information.

One of the overarching conclusions of 70 years of research on dissemination and utilization of information (which began in the 1920s with studies of farmers implementing new farming technologies and teachers adopting new educational practices) is that dissemination alone is usually not enough to bring about change (Rogers, 1983). In psychotherapy the common wisdom is that "insight does not necessarily lead to behavioral change." The Bible has an interesting view on this subject as well, in the Book of James: "What doth it profit, though a man say he hath faith, and hath not works? By works a man is justified, and not by faith only."

Sadly, the world of health care is replete with examples of information dissemination efforts that failed to lead to much utilization, either in the direct or Shavian sense. Later chapters in this volume have much to say about the many barriers to getting information used (e.g., see the McGuire chapter). And as important as it is to examine methods for dissemination, considering strategies for use may take us closer to the ultimate goal of improving the quality and cost-effectiveness of health care in the United States.

The Human Side of Change

Another challenge to effective dissemination is to apply existing knowledge of the subtle and complex human dynamics associated with change by individuals or institutions. In a consultation with a State emergency medical services

(EMS) agency (Backer, 1991), it became stunningly apparent that the two most important barriers to effective dissemination and use of new practices and programs in the State were the State EMS director, who was burned out and mildly depressed, and the most eminent EMS physician in the State, who carried a long-standing grudge against the State agency that no one wanted to talk about or try to resolve. Bringing about effective research utilization in those circumstances—and we suspect they are not uncommon—would require acumen and skill beyond what is required for constructing and delivering persuasive messages. Human concerns and problems constantly stand in the way of effective change in health care and may be just as important as monetary shortfalls or technical flaws in the innovations themselves.

In today's evolving environment of humanism and a community and family base for health care, it is ironic that group and interpersonal dynamics should constitute obstacles to change. Humanity and focused attention on human needs are as much a part of successful dissemination and utilization as they are of good medical practice. If the human aspect is ignored, medicine is reduced to the application of a cold technology, and outcomes suffer when the fears, confusions, hopes, and pride of patients and their loved ones are ignored or undervalued. The same considerations apply in health care practices or organizations, in which real, vulnerable human beings are the potential implementers of change. These human dimensions are expressed as resistance to change, paranoid anxiety about sharing information, and feelings of depression and loss when new programs replace old ones, even if all agree the new are better. This is the human side of change, and it affects large health care institutions and Federal agencies just as much as it affects the frightened elderly person contemplating hip surgery.

Keeping the human face on dissemination and utilization is a critical ingredient for success in the improvement of health care, and extensive collaboration and cooperation will be required to ensure that this happens. Jonathan Lomas, the keynote speaker at the conference, referred to "values as enzymes" that are used to digest and transform information to make it usable. Such "moderator variables" need careful study if we are to make sense of the complex processes of utilization.

Finding everyday analogies for the phenomena that we study at the meta-level also is important as a way of keeping the human face of change in view. Rogers (1983) has spent many years studying linkage agents as an important factor in promoting the diffusion of innovations. His work is well encapsulated by M. Samuels (personal communication, September, 1991), who commented that for a long time he had a translator for general news information, data that he could use better because it was selected and interpreted for him. His linkage agent was his wife, who provided this service at mealtimes, until she left that volunteer position to go to work!

An Orientation to This Volume

The following are a few suggestions of context and followthrough for absorbing the ideas in this volume.

- We must constantly remind ourselves that utilization typically requires change, and change is difficult. The effort to change results in both individual and organizational reactions of a psychological nature. If these reactions are

not attended to, they can derail a potentially fruitful change effort. No matter how complex the technology or program, the human face of change must be constantly in our view, or we are likely to fail.

- In health care, we need to continue exploring ways to connect with the multidisciplinary field of knowledge utilization. This field now includes more than 10,000 literature citations, two international professional societies with annual meetings, two scholarly journals, and many as-yet-unexplored opportunities for interface. Two recent reviews are the March 1991 Special Issue of *Knowledge: Creation, Diffusion, Utilization*, which concerns knowledge utilization activities in Federal agencies, and a small book published by the National Institute on Drug Abuse, *Drug Abuse Technology Transfer*.

The Knowledge Utilization Society is the leading professional society in this field, and a number of participants in the conference on which this volume is based are involved with the society. Tom Backer is the former president; Susan Salasin of the National Institute of Mental Health is the current president; Shirley Meehan of the Department of Veterans Affairs is treasurer; and Ev Rogers, Robert Boruch, and Jack Rothman are board members. The society held its 1992 conference in the Hall of the States in Washington, D.C., where the theme was building linkages between the academic community and public governance and service agencies.

- In reference to the adoption of innovations by health care organizations, a body of largely untapped resources could be provided by the management sciences, specifically the field of organization development and planned change. For 30 years the Human Interaction Research Institute (HIRI) has been studying how these concepts and strategies can be applied to health care. HIRI finds a tremendous potential for the adaptation of strategies that work in the corporate community to the public sector, as well as to private for-profit health care organizations.

Another way of casting the distinctions between dissemination and utilization is worth noting. Television comedian Steve Allen, never at a loss for a clever remark, once was asked by a man in his television studio audience, "Mr. Allen, do they get your program in Chicago?" Allen, without missing a beat, responded, "They see it, but they don't get it!" So the larger perspective on effective utilization can be kept in mind by simply asking ourselves periodically: Are we talking about getting it or just seeing it?

History of Knowledge Utilization

"The notion of adapting knowledge to the needs of society," according to Rich (1979, p. 18), "dates back to the Greeks and is a theme running through much of Western thought." Rogers (1983) traced the history of knowledge utilization as a specific field of inquiry back to the European beginnings of social science, with Gabriel Tarde's *Laws of Imitation* and early British and German-Austrian anthropologists known as the "diffusionists." Work in the history of philosophy and science and in applied social research also underlies the field. Knowledge utilization as a field of re-

search and scholarly activity reflects the increasing importance of knowledge in all human activities (Rich, 1979; Dunn, Holzner, and Zaltman, 1985).

Three waves of knowledge utilization activities have occurred in America (Backer, 1991a).

First Wave: 1920 to 1960

The first wave in America began in the 1920s, with studies concerning the diffusion of agricultural innovations to farmers and of new teaching ideas to school personnel. The 1943 hybrid seed-corn study by Ryan and Gross "more than any other study, influenced the methodology, theoretical framework, and interpretations of later students" (Rogers, p. 33). Most of the studies conducted during this period concentrated on innovation adoption by individuals. President Herbert Hoover's Research Committee on Social Trends, in 1929, was the first systematic effort to shape policy that would help make science more applicable to the needs of society.

After World War II, increasing attention was given to the processes of knowledge production, dissemination, and application. The period since 1945 has been characterized as the "information age," and an "information explosion" has occurred in almost all areas of human endeavor, including the health, education, and human services fields. The production of more knowledge, of course, increased the motivation to devise and test strategies for promoting its wider use.

Second Wave: 1960 to 1980

The second wave of interest and activity emphasized the dissemination and use of innovations emerging from research and demonstration activities and from innovation adoption by organizations as well as individuals. In the late 1960s and 1970s, agencies such as the National Institute of Mental Health, the Vocational Rehabilitation Administration, the Office of Education, and the Department of Labor launched programs or offices concerned with this topic. Funding became available for research on methods of utilization and for providing technical assistance to researchers and to potential adopters to increase the application of federally sponsored research by both individuals and organizations.

Federal interest in knowledge utilization during this period was motivated by (1) a desire for rapid technologic change to stimulate greater economic growth, (2) a desire to enhance the transfer of technology emerging from defense and space-related research, and (3) a desire to promote the adoption of innovations emerging from research and demonstration funding provided by Federal health, education, and human services agencies.

In particular, President Lyndon Johnson's Great Society and his War on Poverty launched new programs at substantial Federal expense. Questions raised about the effectiveness of these programs led to the development of the field of program evaluation. Federal funding also became available for research utilization activities intended to demonstrate the practical applications of research connected with these programs.

Dissemination activities proliferated, such as the creation of information clearinghouses by many Federal agencies in order to provide access for researchers, scholars, consumers, and policymakers. Targeted publications and other print dissemination mechanisms were experimented with as vehicles for "getting the word out" (U.S. Congress, Office of Technology Assessment, 1988).

During this period, the Brim Commission, the National Academy of Sciences Study on Social Research and Development, the Commission on Federal Paperwork, the President's Domestic Policy Review on Innovations, and other blue-ribbon commissions studied problems and opportunities associated with the proliferation of knowledge and the need to facilitate its wider use. Strategies for promoting transfer between government-sponsored activity and the private sector were emphasized in the Stevenson-Weidler legislation enacted by Congress in 1980 (and subsequently in the Technology Transfer Act of 1986).

This increased emphasis on knowledge utilization led to its further development as a field of professional and scholarly activity. In 1975, the *Journal of Technology Transfer* began publishing. In 1979, *Knowledge* was founded, followed in 1988 by *Knowledge in Society*. These are the main journals of record for scientific and scholarly activity on the subject of knowledge utilization. The two professional societies in this area are the Technology Transfer Society, founded in 1975, and the Knowledge Utilization Society (originally the Howard Davis Society), founded in 1985.

Numerous research studies concerning knowledge utilization were conducted during the second wave of activity. Dissemination and utilization strategies that were tested included print materials, films, videotapes, audiocassettes, consultation, organization development, technical assistance, network arrangements, training conferences and workshops, and participant observation. Nonprofit research institutes and university-based programs dedicated to work in this area were begun, such as the Center for Research on the Utilization of Scientific Knowledge at the University of Michigan, the Human Interaction Research Institute, and the University of Florida Rehabilitation Research Institute on Research Utilization.

Interlude: The 1980s

The Reagan administration took a different posture from that of its predecessors on the role of the Federal Government in health, education, and human services, one of very limited involvement and reduced Federal activity. Block grants became the preferred mechanism for diffusing resources to utilization activities, and the total investment was sharply reduced. Many of the programs of the 1960s and 1970s were ended.

Third Wave: 1990 to Present

The third wave of knowledge utilization activity began with the arrival of the Bush administration, with its greater emphasis on Federal partnerships with State and local entities to improve health, education, and human services. Interest in policy, research, and programmatic activity regarding knowledge utilization also increased. The 1989 hearings on dissemination and utilization, held by Congressman Owens and the Subcommittee on Select Education in the U.S. House of Representatives (Klein, 1989), and the policy discussions by several Federal agencies during the 1990 and 1991 meetings of the Knowledge Utilization Society are also part of these developments.

Many Federal agencies are currently initiating or revitalizing knowledge utilization programs, particularly agencies with substantial intramural and extramural research activities. For instance, the Human Interaction Research Institute has worked with the National Institute on Drug Abuse (NIDA)

to develop a "research technology transfer program," the first in NIDA's history. Backer (1991b) analyzes the knowledge utilization programs of 15 other Federal agencies in the search for appropriate concepts, models, and strategies that can be used by NIDA in its developing program. Agencies in health, education, and human services can be classified using a four-level scheme:

Level 1 — Dissemination (D). Programmatic activities, conducted internally or by external grantees/contractors, are limited to dissemination through vehicles such as publications and information clearinghouses. An example is the National Institute on Aging.

Level 2 — D + Utilization (U). Programmatic activities also include efforts to promote utilization through targeted funding, technical assistance, and other strategies. Examples include the Office of Maternal and Child Health, National Institute of Mental Health, National Cancer Institute, and the Department of Veterans Affairs.

Level 3 — D + U + Research on knowledge utilization processes (R). In addition to programmatic knowledge utilization activities, funding exists for extramural research on knowledge utilization. Examples include AHCPR, Bureau of Health Professions/Health Resources and Services Administration, and National Institute on Disability and Rehabilitation Research.

Level 4 — D + U + R + Integrated system for knowledge utilization (I). In addition to programmatic and research activities, at this level an integrated master plan for a knowledge utilization system exists, including a defined policy for Federal agencies. Examples include the Office of Educational Research and Improvement and NIDA.

Federal agencies outside of the health, education, and human services areas, such as the Federal Extension Service of the Department of Agriculture, Department of Defense/National Aeronautics and Space Administration, and Department of Transportation, also have vigorous dissemination and utilization programs.

Some Federal agency programs have started moving up this four-level scale during the past 2 years. For instance, the director of the National Institute on Disability and Rehabilitation Research, Dr. William Graves, in his April 1990 invitational address to the Society for Knowledge Utilization and Planned Change, declared that knowledge utilization is the "number one priority" of his agency. A long-range planning process that will likely result in the development of a level-4 integrated system for this agency is already under way.

Top-level policy support for knowledge utilization is becoming more common within Federal agencies. Assistant Secretary of Education Christopher Cross signed and implemented an agencywide "policy on knowledge utilization" for the Office of Educational Research and Improvement, which is now being carried out through a number of new activities.

The policy relevance of knowledge utilization also is being acknowledged at higher levels. For example, a 1988 Institute of Medicine (IOM) study on the future of public health identified utilization of knowledge as a main priority, calling for "an institutional home in each State and at the Federal level for development and dissemination of knowledge, including research, and the provision of technical assistance to lower government and to academic institutions and voluntary organizations" (Institute of Medicine, 1988, pp. 153-154). Former Assistant Secretary for Health James Mason is

a co-author of the IOM report, and near the mid-1990s, broad new support for knowledge utilization activities appears to be in the offing.

References

- Backer, T.E. (1991a). Knowledge utilization: The third wave. *Knowledge: Creation, Diffusion, Utilization*, 12, 225-240.
- Backer, T.E. (1991b). *Drug abuse technology transfer*. Rockville, MD: National Institute on Drug Abuse.
- Deaton, A.V. and Olbrisch, M.E. (1987). Adaptive noncompliance: Parents as experts and decision makers in the treatment of pediatric asthma patients. In Wolraich, M. and Routh, D.K. (Eds.), *Advances in developmental and behavioral pediatrics* (pp. 205-234). Greenwich, CT: JAI Press.
- Dunn, W.N., Holzner, B., and Zaltman, G. (1985). Knowledge utilization. In *International Encyclopedia of Education* (pp. 2831-2839). New York: Pergamon Press.
- Institute of Medicine (1988). *The future of public health*. Washington, DC: National Academy Press.
- Gordon, G. and Fisher, G.L. (Eds.) (1972). *The diffusion of medical technology: Policy and research planning perspectives*. Cambridge, MA: Ballinger.
- Klein, S.S. (1989). Federal programs in educational dissemination: Learning from the past and looking to the future. *Knowledge: Creation, Diffusion, Utilization*, 11, 3-9.
- Lambert, E.C. (1978). *Modern medical mistakes*. Bloomington, IN: Indiana University Press.
- Mahoney, M.J. (1987). Scientific publication and knowledge politics. *Journal of Social Behavior and Personality*, 2, No. 2, Part 1.
- Rich, R.F. (1979). The pursuit of knowledge. *Knowledge: Creation, Diffusion, Utilization*, 1, 6-30.
- Roberts, E.B., Levy, R.I., and Finkelstein, S.N., and others (Eds.) (1981). *Biomedical innovation*. Cambridge, MA: MIT Press.
- Rogers, E.M. (1983). *Diffusion of innovations*. New York: Free Press.
- Shannon, C.E. and Weaver, W. (1949). *A mathematical theory of communication*. Urbana, IL: University of Illinois Press.
- Stetler, C.B. (1985). Research utilization: defining the concept. *Image: Journal of Nursing Scholarship*, 17, 40-44.
- U.S. Congress, Office of Technology Assessment (1988). *Informing the Nation: Federal information dissemination in an electronic age*. Washington, DC: U.S. Government Printing Office.
- Wennberg, J.E., Roos, N., Sola, L., and others (1987). Use of claims data systems to evaluate health care outcomes: Mortality and reoperation following prostatectomy. *Journal of the American Medical Association*, 257, 933-936.