

Introduction and Conceptual Model for Utilization of Prevention Research

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Introduction

The gap between research and real-world practice persists despite increasing pressure from researchers, funding agencies, practitioners, and the public for the more-effective use of knowledge derived from research.^{1,2} The decisive question of our day may be how to facilitate the utilization of research in public health and primary care practice and policy; conceptual models are playing a prominent role.³⁻⁵ This supplement to the *American Journal of Preventive Medicine* presents papers⁶⁻¹⁰ that summarize the findings of researchers examining the adoption of evidence-based interventions. Although a wide variety of conceptual models may be useful for understanding this process,³⁻¹¹ much of the work in this supplement derives from the seminal work of Everett Rogers, who in his long and productive career wrote numerous scholarly books and papers examining the concept of diffusion.¹² As a member of the research team and co-author on several of the papers in this supplement, he was the major contributor to the conceptual underpinnings of this work. Therefore, it is perhaps most appropriate to introduce this supplement by briefly reviewing Rogers's diffusion of innovations model¹² and how it was used and adapted in the present research.

Although Rogers's diffusion of innovations model¹² was selected as the most appropriate framework, it was modified using lessons learned from case study examples also included in this supplement. Constructs from other models were also adapted and incorporated into the model as evidenced in the various papers, thereby adding to the work of Rogers by creating an expanded conceptual explanation of the research utilization process (Figure 1). The stages in the research utilization model presented here are not necessarily sequential but rather articulate major phases or dimensions of

innovation use, and help in understanding barriers and facilitators by organizing them according to intuitive stages, thereby providing a useful road map for navigating the utilization process.

Stage 0: Research Development

In Stage 0, research development takes place. Although the assumption is that all research is developed to be useful, not all research is conducted with a specific application in mind. Even when the goal of research is a specific application, there is often no planned strategy for dissemination and utilization.

Stage 1: Dissemination

Stage 1 of the model acknowledges that adoption of an innovation may be influenced by factors related to dissemination, such as the choice of dissemination strategy, the vehicle for dissemination, and the appropriateness of the targeted audience. In the model presented here, dissemination is considered to be planned communication rather than passive (spontaneous) spread of an innovation from a resource system to a user system.

Activities at the dissemination stage center on making information on research-based innovations accessible. Thus, activities focus on informing target audiences of an innovation, ensuring that the "packaging" of the innovation (a program, practice, or policy) facilitates comprehension of its uses, and making information on the research accessible.

Stage 2: Intent to Adopt

In Stage 2, decisions are made within a social system to adopt and implement an innovation. Activities include setting an agenda, the process by which an issue climbs to receive priority attention in a system.¹³ More than 5200 studies of the diffusion of innovations have been completed.¹² However, few of these studies addressed (1) the diffusion of a **policy innovation**, because most investigated the spread of technologic innovations, or (2) units of adoption or rejection that are **systems** (e.g., communities) rather than the more commonly studied individuals (e.g., farmers or physicians).¹² Further, almost all of the 357 studies of the agenda-setting process focused on the **national** agenda in the United

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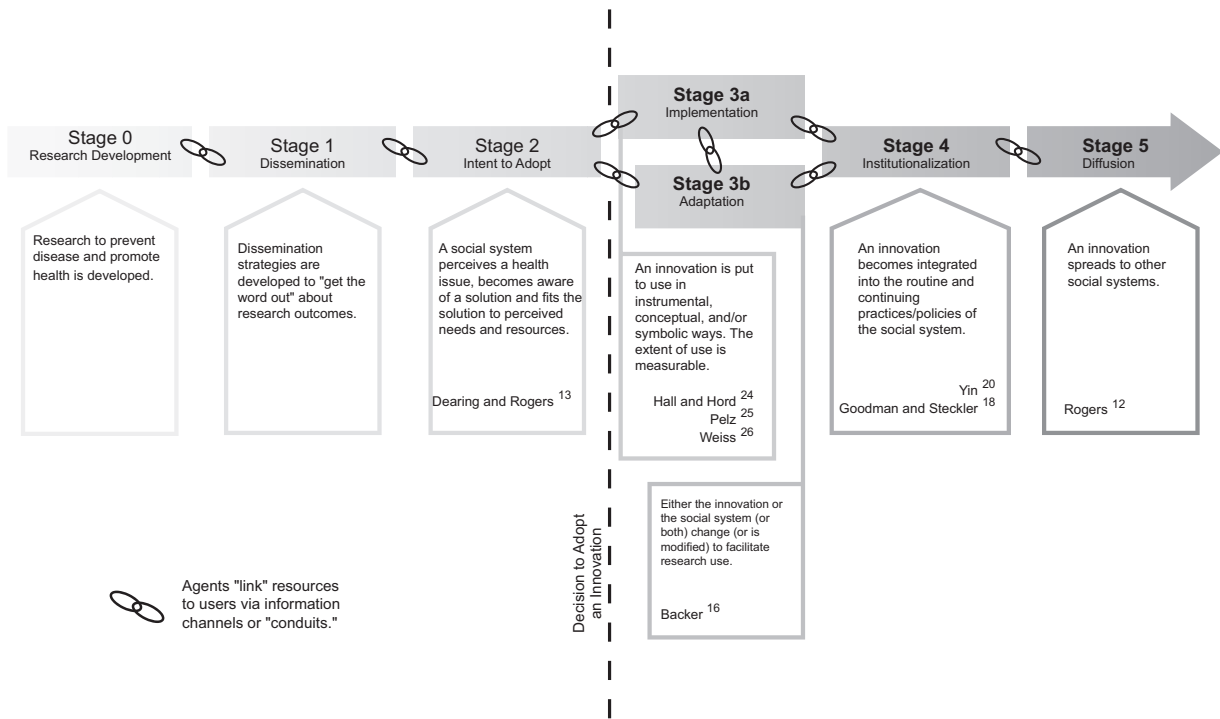


Figure 1. Stages of the research utilization model. (Modified from Rogers 2003.¹²)

States, rather than on how an issue like smoke-free environments climbs to a priority level on the agenda in a **local community**.¹³

Other activities in Stage 2 include **matching** or **fitting** a range of potential innovations with a social system's needs, resources, and perspectives. In the present model, activities in the process of adopting an innovation parallel the stages of Edwards and associates—denial, vague awareness, preplanning, and preparation.¹⁴ These stages are a modification of Prochaska's stages-of-change model of an individual process¹⁵ to a model of community readiness by Edwards et al.¹⁴ Agenda-setting and -matching activities precede the decision to adopt an innovation. Adoption occurs between Stages 2 and 3. Dissemination and intent to adopt are stages, whereas the adoption decision is a milestone **point** in the process.

Stage 3a: Implementation. In parallel with the decision to adopt an innovation, decisions are made about its implementation.¹² These decisions may center on considerations such as the type and level of use of research or research-based programs, practices, and policies. The concepts of adaptation, fidelity,¹⁶ and reinvention¹² are integral to the implementation of innovation. In the present model of research utilization, the question is not whether an innovation will be adapted but **when** and **how**. Adaptation is inevitable either in the matching stage that leads to the adoption decision or in the continued implementation of the innovation, which is sustained, institutionalized, and then potentially diffused. The balance between adaptation and

fidelity is a dynamic process in which the need for an innovation to adhere to the scientific principles of the original innovation is weighed against the need for local adaptation.¹⁶

Stage 3b: Adaptation. The potential for adaptation to the needs of the user system may be a consideration in the initial decision to adopt a research innovation and in the decision to continue use of an innovation. Over time, an innovation, the social system into which it is introduced, or both, may change or be modified to facilitate use of the innovation.¹² Thus, the perceived fit between the innovation and social system resources that led to the decision to adopt is reexamined. Goodman and Steckler^{17,18} conducted 10 case studies of the degree of prevention research utilization by local health programs in Virginia. Particularly important as a factor in research utilization was the degree to which the research-based intervention found an organizational niche by fitting with local health programs and activities. These researchers also discovered that finding a "home" for the innovation was crucial to its subsequent sustainability.¹⁸ The degree of fit is a particular type of compatibility of the innovation within a social system.¹²

Stage 4: Institutionalization

During institutionalization, an innovation becomes integrated into the routine and continuing programs, practices, and policies of the social system. Goodman and Steckler¹⁸ measured research utilization as the

degree to which the results of the prevention research were incorporated into the activities of a community, school, or other system—"institutionalization." This dimension was measured as the degree to which use of the research intervention was continued in the system studied, after completion of research. This variable has been called "sustainability" by Altman.¹⁹

According to Goodman and Steckler,¹⁸ "Institutionalization has been a neglected area of innovation research and consequently one of its weakest theoretical domains. Producing client behavioral changes is at the heart of many health promotion programs, and for such changes to occur, programs usually must have longevity." Sustained research utilization can be characterized as the continued use of programs, practices, or policies over an extended number of policy cycles.²⁰

Stage 5: Diffusion and Replication

In the final stage (Stage 5), an innovation is diffused to another social system or replicated. The ultimate measure of prevention research utilization is whether the research evidence is sufficiently useful that it becomes routine or standard practice in a broader social network. Diffusion can be spontaneous and is usually achieved through interpersonal contact, whereas replication is planned with specific aims. Both means of communication provide an opportunity to extend research beyond the original efforts.

Linking Systems

Important to the model presented here is the concept of **linking systems**. A linking system connects a **resource system** (researchers, developers, trainers, consultants, services, products, and materials), which provides the innovation, with the **user system** (individuals, organizations, agencies, groups, and networks), which adopts, implements, and maintains the innovation, often by revision and adaptation. The chief characteristic of a linking agent is its contribution to the research utilization process. This vital function is facilitated when the linking agent has sufficient knowledge about an innovation and the adopting social system to act as a bridge between resource and user systems. Linking agents are constituents of the linking system and can be representatives of the user system or the resource system or objective third parties interested in research utilization.²¹⁻²⁶

As evidenced by the model presented here, numerous factors influence research utilization. It is in some way an idealized model but one that may be useful as a road map for understanding the issues involved in research utilization and the barriers and facilitators that cluster around each stage of the research utilization process. Researchers, practitioners, and policymakers

should benefit from using the conceptual model described here. The papers included in this supplement, starting with the commentary by Green,²⁷ give the reader some background on the efforts of the Prevention Research Centers (PRCs) of the Centers for Disease Control and Prevention to illuminate the topic and contribute to the understanding of this important but challenging process. Other papers in this supplement⁶⁻¹⁰ further illustrate that the application of research is challenging and that the science is in its infancy. The systematic review further assesses the state of the published literature on utilization of prevention research in public health programs and policy.

The commentary by Green²⁷ lays out the rationale and explores the history of the translation of research to practice. He shares insights as to why this area is catching the attention of researchers, federal agencies, and foundations. In it, he reflects on the original mandate of the legislation creating the PRCs. He summarizes the main findings and criticisms of the Institute of Medicine (IOM) Committee on the PRC Program in the mid-1990s. He further describes the rise of the PRCs and the development and emphases of participatory research. New initiatives in the early 2000s, Special Interest Projects, and emphases on engaging their regional health departments and other practitioners and agencies have led the consortium PRCs to become a practice-based research network (PBRN). Although not called a PBRN, the PRCs share common features including the collection and sharing of data about the processes and outcomes of health interventions, and testing the uptake, adoption, and maintenance of interventions. In closing, Green²⁵ points to the papers in this supplement as examples of the PRCs' emphasis on putting research into practice.

Cunningham-Sabo et al.⁶ present a review the literature published between 1991 and 2002 using four concept areas (prevention, public health, research, and use). A lack of uniform terminology, variation in publication sources, and limited descriptions of the stages of research utilization (e.g., adoption and implementation) in the published literature posed major challenges to identifying articles that met study criteria. Most articles assessed the adoption or implementation of prevention research; four examined long-term sustainability. The majority of prevention research focused on screening and counseling. Refining terms used in prevention research and research utilization could address lack of shared and unique definitions. Expanded reporting of states of research utilization in reports of prevention research could lead to improved literature searches and contribute to more successful adoption, implementation, and further use of prevention research products.

In Peterson et al.,⁷ participation in the process of research utilization is described by using characteristics

of collaborative efforts among stakeholders. Practices, programs, or policy characterized by greater community participation generally resulted in more advanced stages of research utilization. The authors conclude that investigating the interactions among and contributions of linking agents and resource and user systems can illuminate the potential paths of prevention research utilization in community settings. Because community participation is a critical factor in research utilization, prevention researchers must take into account the context and needs of communities throughout the research process.

Efficacy studies show that interventions can enhance secondary prevention in primary care practices but provide little information on the implementation of interventions in real-life situations. Using a case study approach, Weiner et al.⁸ examine adoption and implementation of secondary prevention strategies for type 2 diabetes in everyday clinical practice of primary care. These authors explore whether adoption and implementation processes differ by type of strategy or prevalence of diabetes among patients in the practice. They conclude that adoption and implementation processes do not fit the classic innovation diffusion models, due in part to the complexity of the organizational process, structure, and culture. They suggest that alternative conceptual models are needed that take into account these complexities.

In a companion paper, Helfrich et al.⁹ discuss innovations adopted by healthcare organizations that are externally mandated. This is a common occurrence but few studies have examined the progress from adoption to sustained, effective use. These authors use Rogers's model of organizational innovation to explore community health centers' (CHCs) mandated adoption and implementation of disease registries in the federal Health Disparities Collaborative. In this case they found the data to be consistent with the four processes predicted in Rogers's model of organizational innovation. Specifically, processes included agenda setting, in which small, formal teams emerged as key forums; matching problems and opportunities with innovation, in which personal and practice experience with diabetes were important evidence sources; restructuring and redefining, driven by rapid change; and clarifying and "routinizing," in which all six sites showed strong indications of effective implementation but threats to "routinization."

Evidence-based guidelines for promoting physical activity have been promulgated and widely published, yet little information exists on the dissemination of effective interventions. In the last paper in this supplement, Brownson et al.¹⁰ look at seven specific programs and policies relating to physical activity interventions. These authors provide a dissemination framework modified from the *Diffusion of Innovations* by Rogers.¹² In this cross-sectional study,¹⁰ each program and policy

is examined as a dependent variable using five domains—organizational climate, awareness, adoption, implementation, and maintenance—as independent variables. The authors conclude that the awareness of the importance of promoting physical activity is relatively high in state and territorial health departments; however, the levels of internal support within the health department appear to outweigh any outside support from elected officials.

Research dissemination and utilization continue to be important processes for researchers, funding agencies, practitioners, and the public. The papers included in this supplement examine these processes both from the viewpoint of others, as summarized from published literature, and in real-world settings, as in the case studies conducted by the authors themselves. An adapted version of Rogers's diffusion of innovations model is used by the authors as a framework, thereby contributing to our understanding of why and how some evidence-based practices take hold and are sustained, while others languish and fade.^{26,27}

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