

Utilization of Prevention Research

Searching for Evidence

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Objective: Understanding the process of translating prevention research into practice calls for systematic efforts to assess the state of the published literature on the utilization of prevention research in public health programs and policy. This review describes the search strategy, methods, results, and challenges in identifying and reviewing literature relevant to this objective.

Methods: Systematic searches of topics related to prevention research in literature published in 1995–2002 revealed 86 empiric articles in 12 public health areas.

Results: 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 accepted articles assessed the adoption or implementation of prevention research; four examined long-term sustainability. There was approximately equal distribution of reported research set in either health services or public health settings. Few of the articles contained search terms reflecting all four concept areas (prevention, public health, research, and use) targeted by the literature search.

Conclusions: Refining terms used in prevention research and research utilization could address lack of shared and unique definitions. Expanded reporting of research utilization stages 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.

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Introduction

Calls to expand the dissemination of research efforts and to document the translation of research into practice have escalated in recent years.^{1,2} This effort has been driven partly by the documented time lag between development and application of research findings and the recognition that applied research should benefit the public.^{3–5} Efforts to build an evidence base for examining the process of translating prevention research into practice call for the systematic identification and description of the

state of the published literature on the utilization of prevention research.

In preparation for this examination of the literature, two previous reviews related to this topic were identified. Oldenburg and associates⁶ reviewed all issues of 12 journals on public health and health promotion published in 1994 “to examine the extent to which health promotion research is providing an empiric basis for the diffusion and institutionalization of effective interventions.” They identified 478 articles on health promotion research and categorized them into one of four stages: basic research and development, innovation development, diffusion research, and research into institutionalization or policy implementation. The investigators reported that most articles (89.6%) addressed basic research and development; approximately 5% described innovation development, 1.3% addressed diffusion research, and 6.3% addressed research on institutionalization or policy implementation.

Using similar methods, Bero and colleagues⁷ examined 18 systematic reviews published between 1966 and 1995 that assessed the effectiveness of clinical interventions designed to improve performance of providers or outcomes. They reported that passive dissemination of information generally was not effective in altering

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performance and that more intensive efforts to change practice generally were more successful. The researchers concluded that interventions aimed at implementation of recommendations are necessary to determine effective strategies for adoption and utilization of recommendations. The results of these two reviews are compelling and lay the foundation for further and broader analysis of the research utilization literature.

The purpose of this review is to broadly identify and examine research on the dissemination and use of the findings of prevention research. This paper describes the search strategy, methods, results, and challenges in identifying and describing the literature on prevention research utilization from 1995 to 2002. It includes an overview of what was published during this time frame, in which journal sources and addressing which areas of prevention. Applying a “stages-of-prevention research utilization model” adapted from Rogers’s Diffusion of Innovation⁸ and expanding on the work of Oldenburg et al.,⁶ this paper also summarizes the prevention research utilization literature according to its “stage”: research development, dissemination, intent to adopt, adaptation, implementation or adoption, institutionalization, and diffusion. In keeping with the transdisciplinary nature of prevention research, this literature is examined in a variety of settings, such as community, practice based, school, and work site. Recommendations are offered to guide future literature searches by researchers and practitioners concerned with application of results from prevention research.

Methods

The literature review team comprised members of the University of New Mexico and the University of North Carolina Prevention Research Centers, working with the Program Office of the Centers for Disease Control and Prevention (CDC)’s Prevention Research Centers. Prevention research focus areas of the team members include health services, community health promotion and disease prevention, health communication, community-based participatory research, and health education. The team initially discussed perceptions of prevention research utilization and shared known literature related to the topic.

Together, the members developed a glossary of common terms to ensure consistency and accuracy in the development of a conceptual framework and other elements of the project. The team agreed on the use of two major concepts. The first was the use of the CDC’s definition of prevention research. Although prevention research has been defined in multiple ways in the literature, the research team was guided by the definition provided in the Program Announcement that funded this effort.⁹ It defines prevention research as “a type of research that aims to prevent disease and promote health by developing, testing, and disseminating strategies applicable to public health programs and policies.” Although clinical prevention research is not explicitly included in the CDC’s definition of prevention research, this area of research was included in the search criteria in order to increase the utility

of the literature findings. The second concept was the adoption of a definition of utilization as the extent to which policies and programs are influenced by research findings. Research utilization requires active participation by users in the adoption process, whereas dissemination, translation, and transfer may not have this requirement.¹⁰

Conceptual Model

The conceptual model developed to describe the research utilization process was based on the model of Rogers for the innovation decision process of diffusion of innovation,⁸ the work of Oldenburg and colleagues,⁶ and findings from independent research projects described elsewhere in this supplement.^{11–13} The model for stages of prevention research utilization (Figure 1) extends this previous work by depicting five possible stages of use of a prevention research-based innovation. The stages are dissemination (Stage 1), intent to adopt (Stage 2), implementation and/or adaptation (Stages 3a and 3b, respectively), institutionalization (Stage 4), and diffusion (Stage 5). Dissemination can be understood as planned communication rather than passive spread of an innovation from the original developers to a new user system. Intent to adopt involves making one or more decisions regarding the planned adoption of a particular innovation and may include assessing the match or fit of a range of potential innovations to the needs of a social system. Implementation without major modification or adaptation of an existing research innovation in the new setting is the next stage. A further stage is institutionalization, where the innovation becomes integrated into the routine and continuing programs, practices, and policies of the social system. The final stage is diffusion, whereby the innovation is spontaneously diffused to another social system or intentionally replicated. For an in-depth description of this conceptual model, see Davis et al.¹⁴ elsewhere in this supplement.

Definition of each stage was crucial in developing the literature search strategy, article abstraction, and analysis processes described here.

This model guided the development of a systematic, multiple-methods search strategy that was tested and refined. The team developed a set of conditions reflecting the study goals, which led to the establishment of criteria for initial inclusion to encompass published, peer-reviewed studies. Inclusion criteria were as follows:

- explicit investigation and description of how an intervention or other product from the research conducted (e.g., program, policy, or guideline) was disseminated or used for practice or policy;
- focus on health-related topics;
- explicit description of the effectiveness of strategies for prevention research utilization;
- publication during 1995–2002; and
- written in English.

Efficacy trials, commentaries, and editorials were excluded. A decision tree was developed to aid in determining whether a potential source met the inclusion criteria (Figure 2).

Literature Search

The National Center for Biotechnology Information’s (NCBI)’s Entrez PubMed system was selected as the search engine for the literature review because it includes literature

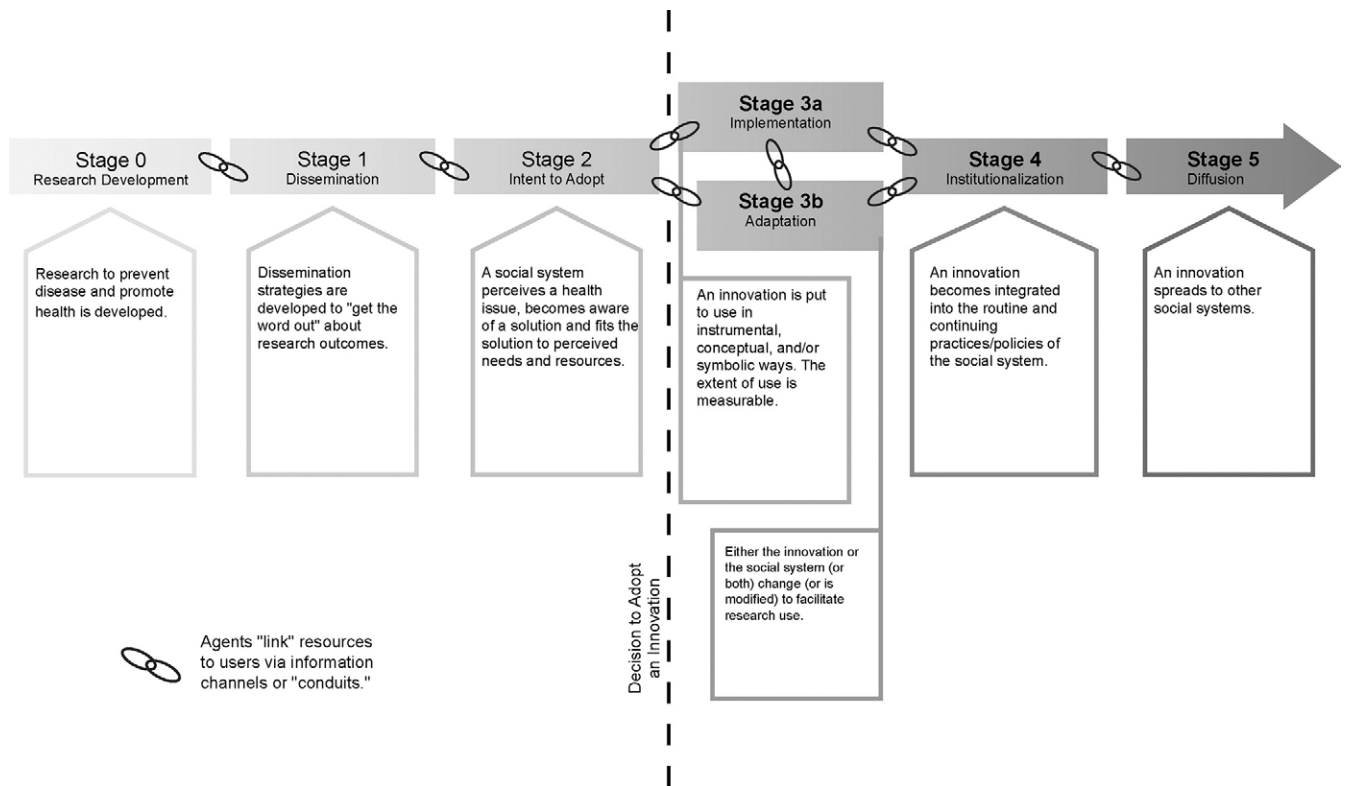


Figure 1. Stages of the research utilization model. (Modified from Rogers 2003.⁸)

covering a wide breadth of health topics relevant to this multidisciplinary topic including MEDLINE and others¹⁵ and because considerably more citations were identified by using the NCBI PubMed system when compared with two alternative search engines. For example, on a sample list of eight search phrases, PubMed identified more than three times the number of citations identified by FirstSearch and more than 13 times more than Ovid.

A list of search terms and search term combinations was generated through a process described by Fink.¹⁶ First, a list of relevant terms and references was developed from articles the research team identified as meeting the inclusion criteria, interviews with experts in specific areas, and a review of bibliographies of relevant published works. Next, several articles pertinent to prevention research utilization were identified. The PubMed “related articles” link was used for each, generating a set of approximately 400 citations for each. These citations were then reviewed, and those found to be relevant were scanned for key words, Medical Subject Heading (MeSH) key words, and names of relevant research programs and organizations (e.g., Cochrane Collaboration, Put Prevention Into Practice, and the *Guide to Community Preventive Services*). Four key-word categories were created to reflect the major conceptual areas of the research project, namely the utilization of prevention research in public health policy and practice: prevention, public health, research, and utilization. Commonly listed key words perceived as directly relevant to or representative of the four concept categories were so categorized, resulting in a table of 61 terms (Table 1).

Search terms were linked to construct a search phrase,¹⁷ with terms within categories linked by “or” statements and the

four categories linked by “and” statements. This strategy proved too restrictive, however, and subsequent searches were broadened by linking the categories with “or” statements. All searches were conducted from February 2001 to March 2002.

The complete PubMed citations from these searches were uploaded into EndNote to facilitate citation review. Full texts were acquired and grouped by topic areas. Articles were reviewed in their entirety to ensure that they met inclusion criteria.

Article Abstraction

Articles published in 1995–2002 that met inclusion criteria were abstracted into the study database using a standard form and abstraction protocol developed by the research team. The abstraction form comprised 14 variables, categorical and open-ended, including the four variables of focus in the current paper: (1) stage of research utilization (e.g., adoption, implementation); (2) study design and research methods; (3) topic of research utilized (e.g., AIDS/HIV, medical practice guidelines, tobacco-use prevention); and (4) setting in which research utilization took place (e.g., community, medical practice, health plan, school). Operational definitions of variables were developed. Study design and stage of utilization variables were defined a priori based on common definitions promulgated in the research literature and based on the conceptual model, respectively. Categories for the topic of research utilized and setting were defined inductively.

All eligible articles were reviewed and independently abstracted by two reviewers. Subsequently, the abstracted data

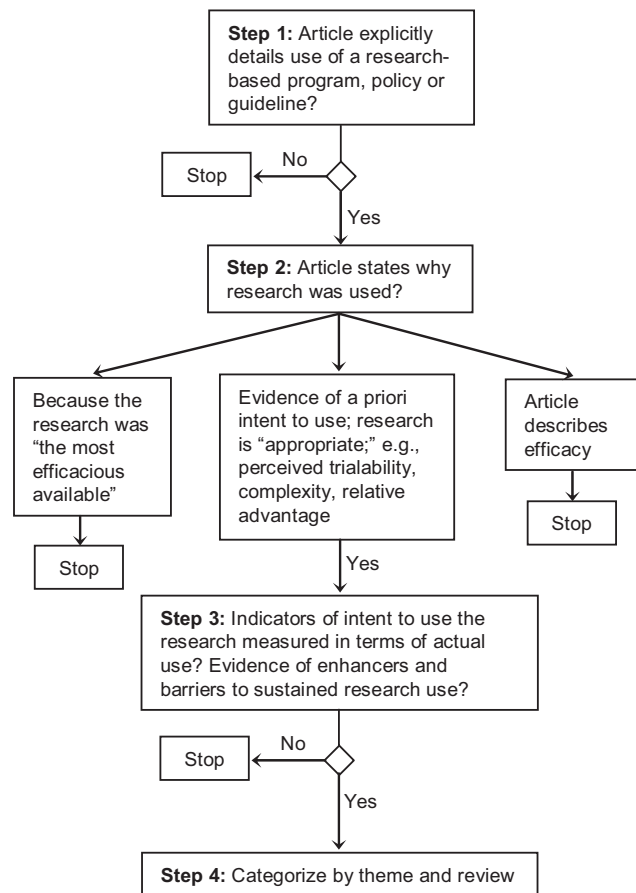


Figure 2. Decision tree for determining whether a potential source meets the inclusion criteria.

were compared by using methods similar to those of Kane et al.,¹⁸ and discrepancies were discussed and resolved by consensus before entry into a Microsoft Access database file. Quality-control functions included monitoring the abstraction progress and reviewing the accuracy of information entered into evidence tables.

Results

Initial search results yielded citations of 1712 publications. Review of article titles and abstracts reduced this pool to 389 potentially eligible articles. Of these, review of the full text determined that 301 of the publications addressed utilization of prevention research; yet many reported on efficacy trials and some were reviews or commentaries. Restricting consideration to articles on empiric studies yielded a final total of 86 articles in 12 research topic areas. Complete citations for the 86 articles that met inclusion criteria are included in the reference section of this article. Table 2 identifies each article's study design, journal where published, topic of the research utilized, and the setting where research utilization occurred. The table is organized by the main variable of interest: Stage of research utilization.

Study Designs and Journals

Articles that met the inclusion criteria of this search most often reported on studies using pretest/post-test evaluation (28), post-test-only evaluation (18), or cross-sectional study designs (13). Eleven reported findings from randomized controlled trials. Controlled trials were primarily conducted in clinical practice settings on interventions to promote prevention practices in primary care.

Articles were widely distributed over 59 journals, with only 3 journals accounting for more than 2 articles: the *American Journal of Preventive Medicine* (8 articles), *Health Education Research* (5), and *Preventive Medicine* (3). Fourteen journals yielded two articles each, and each of the remaining forty-two journals published only one relevant article.

Stages of Research Utilization

Nearly two thirds of the articles focused on the earliest stages of research utilization: dissemination (13 articles), intent to adopt (6), and adoption (34). Another third focused on implementation (29) or adaptation and reinvention (5). Only four articles focused on institutionalization, the long-term sustainability of research utilization. Two of these appeared in the journal *Preventive Medicine* and one in the *American Journal of Preventive Medicine*; these three were conducted in community settings.

Regarding the two journals with the most articles meeting the inclusion criteria (only eight and five), the *American Journal of Preventive Medicine* emphasized the stages of adoption, implementation, or adaptation, or reinvention of the utilization of prevention research. Articles in *Health Education Research* focused on dissemination, intent to adopt, and adoption.

There was no discernable pattern between the stage of research utilization and study design. Studies of adaptation or institutionalization of research findings were conducted more frequently in nonhealthcare settings (e.g., community [four studies], school [one], work site [one]).

Topic of Research Utilized and Setting of Research Utilization

In terms of the topic or content of the research being utilized, they appeared to fall into two broad categories of those addressing a particular disease or risk group and those addressing a particular methodology or intervention. Disease or risk group-specific topics included AIDS and HIV (11), tobacco use prevention (11), cancer (9), alcohol or drug abuse (6), cardiovascular health (4), diabetes (2), and infant mortality (2). Methodology or intervention-specific topics included medical practitioner guidelines (11), Put Prevention Into Practice or Getting Research Into Practice (11),

Table 1. Initial medical subject headings search terms

Prevention	Public health	Research	Utilization
Health promotion	Community	Clinical trials	Adapt
Health promotion/methods	Community health planning	Controlled clinical trials	Adopt
Immunization	Population surveillance	Evidence-based	Adoption
Immunization programs	Population-based	Evidence-based medicine	Apply
Immunization schedule	Population-based planning	Evidence-based medicine/methods	Application
Preventive	Public health surveillance	Evidence-based medicine/organization and administration	Choice behavior
Prevention and control	U.S. Public Health Service	Evidence-based medicine/standards	Comparative
Preventive	School-based	Evidence-based medicine/standards	Comparison
Preventive health services	School health services	Nursing research	Consensus
Preventive measures		Peer review, research	Consensus development conferences
Preventive medicine		Quality control	Data collection/methods
Preventive therapy		Quality of health care	Decision trees
Prophylaxis		Quality of health care/standards	Decision making
Vaccination		Research	Diffusion of innovation
Vaccination/history		Research design	Group processes
Vaccination/standards		Research/methods	Implement
		Research-based	Implementation
			Organizational models
			Technology transfer

screening (8), immunization (5), and nutrition (3). There were no discernable patterns between the topic of research utilized and study design or stage of research utilization.

In terms of the setting where the research was utilized, articles were approximately evenly distributed between health services settings (43) and population or community health settings (37); 6 studies covered both settings or were not possible to definitively categorize. An example of a health services setting is a trial of continuous quality improvement in managed-care practices to implement preventive services from *Healthy People 2000*.¹⁰⁵ An example of a community setting is a pretest/post-test study of the effectiveness of two dissemination strategies for a sun-protection policy in primary and secondary schools.⁶⁴ Here again, there were no discernable patterns between the setting where research was utilized and study design or stage of research utilization.

Search Terms

Few articles on empiric studies (13 of 86) had search terms reflecting all 4 study concept categories (prevention, public health, research, and utilization [data not shown]). Of the 86 articles, 40 had terms from 3 concept categories, 26 had terms from 2 categories, and 7 had terms from 1 category. The most common terms in MeSH fields were subheadings that modify or describe MeSH headings and terms; these subheadings included “organization and administration” (found 69 times) and “prevention and control” (54 times). A

substantial number of the terms used most frequently were text terms, not complete MeSH terms. For example, the text term “guideline” appeared 23 times as part of the terms “guideline adherence,” “guidelines,” and “practice guidelines.” “Education” (46 times) and “guideline” (23 times) were the most common text terms. Among MeSH headings, “program evaluation” (26 times) and “diffusion of innovation” (20 times) occurred most frequently.

Discussion

After an initial search, review, and abstraction, 86 articles reporting on empiric studies met all inclusion criteria and represented 12 public health topic areas. This search yielded citations from 59 journals, reflecting a balance of population-based and health services prevention studies. The publications focused on various stages of prevention research utilization. Adoption was the stage mentioned by the most articles, followed by dissemination and implementation. However, relatively few reported on controlled, prospective studies or addressed the long-term sustainability of research utilization efforts. Few of the included articles contained search terms reflecting all four concept categories targeted by the literature search (prevention, public health, research, and utilization).

Challenges in Literature Search

Study findings suggest three general barriers to identifying articles on prevention research utilization in

Table 2. Articles identified in literature search

Reference	Journal	Year	Study design	Research topic	Setting
Dissemination					
Andreasson et al. ¹⁹	<i>Alcohol Alcohol</i>	2000	Pretest/post-test	Alcohol/drug	Practiced-based
Beaulieu et al. ²⁰	<i>Health Expect</i>	2000	Observational	MP guidelines	Community
Epps ²¹	<i>Am J Prev Med</i>	1998	Evaluation, post-test	Tobacco	Practiced-based
Gibson et al. ²²	<i>Med Care</i>	1998	Other	MP guidelines	Practiced-based
Hansen et al. ²³	<i>Fam Pract</i>	1999	RCT	Screening	Practiced-based
Lock et al. ²⁴	<i>Br J Gen Pract</i>	1999	RCT	Alcohol/screen	Practiced-based
Medder et al. ²⁵	<i>Am J Prev Med</i>	1997	Pretest/post-test	PPIP	Practiced-based
Mitchell et al. ²⁶	<i>Health Educ Res</i>	2001	Pretest/post-test	AIDS/HIV	Community
Riley et al. ²⁷	<i>Promot Educ</i>	2001	Pretest/post-test	CD: cardio	Health department
Silagy et al. ²⁸	<i>Fam Pract</i>	2002	RCT	MP guidelines	Practiced-based
Sorensen and Clark ²⁹	<i>NIDA Res Monogr</i>	1995	Observational	Alcohol/drug	Other
White et al. ³⁰	<i>Promot Educ</i>	2001	Pretest/post-test	CD: Cardio	Community
Worden et al. ³¹	<i>J Public Health Manag Pract</i>	1999	Pretest/post-test	CD: Cancer	Work site
Intent to adopt					
Brink et al. ³²	<i>Health Educ Res</i>	1995	Pretest/post-test	Tobacco	School
DiFranco et al. ³³	<i>AIDS Educ Prev</i>	1999	Cross-sectional	AIDS/HIV	Community
Frew et al. ³⁴	<i>J Health Serv Res Policy</i>	2001	Cross-sectional	CD: cancer	Practiced-based
James et al. ³⁵	<i>J Fam Pract</i>	1997	Cross-sectional	MP guidelines	Other
McCormick and Tompkins ³⁶	<i>J Sch Health</i>	1998	Evaluation, post-test	Tobacco	School
Steenhuis et al. ³⁷	<i>Health Promot Internation</i>	2001	Cross-sectional	Nutrition	Work site
Adoption					
Bloom et al. ³⁸	<i>J Public Health Manag Pract</i>	2000	Observational	Screening	Health department
Cooke et al. ³⁹	<i>Aust N Z J Public Health</i>	1999	Evaluation, post-test	Tobacco	Hospital
Daniels et al. ⁴⁰	<i>S Afr Med J</i>	2000	Evaluation, post-test	MP guidelines	Community
D'Aunno et al. ⁴¹	<i>J Health Soc Behav</i>	1999	Cross-sectional	AIDS/HIV	Practiced-based
Gemson et al. ⁴²	<i>Arch Intern Med</i>	1995	Pretest/post-test	PPIP	Hospital
Gemson et al. ⁴³	<i>Am J Prev Med</i>	1996	Pretest/post-test	PPIP	Hospital
Gilling et al. ⁴⁴	<i>J Food Prot</i>	2001	Cross-sectional	Nutrition	Work site
Goodson et al. ⁴⁵	<i>Am J Prev Med</i>	1999	Evaluation, post-test	PPIP	Community
Gulitz et al. ⁴⁶	<i>Cancer Practice</i>	1998	Observational	CD: cancer	Practiced-based
Harris-McLain et al. ⁴⁷	<i>J Occup Environ Med</i>	2000	Evaluation, post-test	MP guidelines	Practiced-based
Hislop et al. ⁴⁸	<i>Can Fam Physician</i>	1996	Observational	CD: Cancer	Practiced-based
Honkanen et al. ⁴⁹	<i>Vaccine</i>	1997	Observational	Immunization	Health department
Juma et al. ⁵⁰	<i>Methods Inf Med</i>	2000	Retrospective cohort	Immunization	Hospital
Kelly et al. ⁵¹	<i>Am J Public Health</i>	2000	Pretest/post-test	AIDS/HIV	Community
Kikano et al. ⁵²	<i>Am J Prev Med</i>	1997	Pretest/post-test	PPIP	Practiced-based
Larme and Pugh ⁵³	<i>Diabetes Care</i>	1998	Pretest/post-test	CD: diabetes	Practiced-based
Legorreta et al. ⁵⁴	<i>Diabetes Care</i>	1997	Pretest/post-test	CD: diabetes	Health plan
Lerman et al. ⁵⁵	<i>JAMA</i>	1996	Prospective cohort	Screening	Other
McCaffery et al. ⁵⁶	<i>Soc Sci Med</i>	2001	Observational	Screening	Community
McMenamin et al. ⁵⁷	<i>Cancer Pract</i>	1995	Observational	CD: cancer	Hospital
McVea et al. ⁵⁸	<i>J Fam Pract</i>	1996	Evaluation, post-test	PPIP	Practiced-based
Mesters and Meertens ⁵⁹	<i>Health Educ Behav</i>	1999	Cross-sectional	MP guidelines	Practiced-based
Miller ⁶⁰	<i>Am J Community Psychol</i>	2001	Cross-sectional	AIDS/HIV	Community
Parcel et al. ⁶¹	<i>Health Educ Res</i>	1995	Prospective case- control	Tobacco	School
Paulussen et al. ⁶²	<i>Health Educ Q</i>	1995	Cross-sectional	AIDS/HIV	School
Philpott et al. ⁶³	<i>Health Policy Plan</i>	2002	Evaluation, post-test	AIDS/HIV	Health department
Schofield et al. ⁶⁴	<i>Aust N Z J Public Health</i>	1997	Pretest/post-test	CD: Cancer	School
Solberg et al. ⁶⁵	<i>Prev Med</i>	1996	RCT	PPIP	Practiced-based
Steckler et al. ⁶⁶	<i>Health Educ Res</i>	1997	Evaluation, post-test	CD: Cancer	Health department
Taylor et al. ⁶⁷	<i>J Community Health</i>	1996	Pretest/post-test	CD: Cancer	Practiced-based

Table 2. (continued)

Reference	Journal	Year	Study design	Research topic	Setting
Twinn ⁶⁸	<i>J Clin Nurs</i>	1999	Retrospective case-control	Screening	Practiced-based
Twinn and Cheng ⁶⁹	<i>J Adv Nurs</i>	2000	Retrospective case-control	Screening	Practiced-based
Williams et al. ⁷⁰	<i>Arch Fam Med</i>	1998	RCT	Screening	Practiced-based
Willinger et al. ⁷¹	<i>JAMA</i>	2000	Cross-sectional	Infant mortality	Other
Implementation					
Arborelius and Bremberg ⁷²	<i>Health Promot Internation Science</i>	2001	Pretest/post-test	Tobacco	Practiced-based
Cunningham et al. ⁷³	<i>Communication</i>	2000	Evaluation, post-test	Alcohol/drug	Practiced-based
Davis et al. ⁷⁴	<i>Pediatrics</i>	2001	Cross-sectional	Immunization	Practiced-based
Elford et al. ⁷⁵	<i>AIDS</i>	2001	Pretest/post-test	AIDS	Community
Elford et al. ⁷⁶	<i>AIDS Care</i>	2002	Evaluation, post-test	AIDS/HIV	Community
Emmons et al. ⁷⁷	<i>Health Educ Behav</i>	2000	Cross-sectional	Tobacco	Work site
Gottlieb et al. ⁷⁸	<i>Am J Prev Med</i>	2001	Pretest/post-test	PPIP	Community
Grey ⁷⁹	<i>J Pediatr Health Care</i>	1998	Pretest/post-test	PPIP	Practiced-based
Gross et al. ⁸⁰	<i>Clin Perform Qual Health Care</i>	1999	Pretest/post-test	MP Guidelines	Hospital
Kalichman et al. ⁸¹	<i>J Primary Prevention</i>	1997	Observational	AIDS/HIV	Community
Kaner et al. ⁸²	<i>Alcohol Alcohol</i>	1999	Evaluation, post-test	Alcohol/drug	Practiced-based
Kaner et al. ⁸³	<i>Br J Gen Pract</i>	1999	RCT	Alcohol/screen	Practiced-based
Karuza et al. ⁸⁴	<i>Arch Intern Med</i>	1995	RCT	Immunization	Practiced-based
Lia-Hoagberg et al. ⁸⁵	<i>Public Health Nurs</i>	1999	Evaluation, post-test	MP guidelines	Community
Lock and Kaner ⁸⁶	<i>J Eval Clin Pract</i>	2000	Pretest/post-test	Alcohol/drug	Practiced-based
Martin et al. ⁸⁷	<i>Addiction</i>	1998	Evaluation, post-test	Alcohol/drug	Other
McCormick et al. ⁸⁸	<i>Am J Health Promot</i>	1995	Pretest/post-test	Tobacco	School
McDaniel ⁸⁹	<i>Clin Nurse Spec</i>	1999	Pretest/post-test	Tobacco	Hospital
Melnikow et al. ⁹⁰	<i>Am J Public Health</i>	2000	Prospective case-control	PPIP	Practiced-based
Schaffer et al. ⁹¹	<i>Arch Pediatr Adolesc Med</i>	2001	Cross-sectional	Immunization	Practiced-based
Scott et al. ⁹²	<i>Manag Care Interface</i>	1999	Pretest/post-test	CD: Cancer	Health plan
Solberg et al. ⁹³	<i>Eff Clin Pract</i>	2000	RCT	MP guidelines	Practiced-based
Taylor et al. ⁹⁴	<i>Can J Public Health</i>	1998	Evaluation, post-test	CD: Cardio	Health department
Willemsen et al. ⁹⁵	<i>Health Educ Res</i>	1999	Pretest/post-test	Tobacco	Work site
Adaptation/reinvention					
Dino et al. ⁹⁶	<i>J Public Health Manag Practice</i>	2001	Evaluation, post-test	Tobacco	School
Goodwin et al. ⁹⁷	<i>Am J Prev Med</i>	2001	RCT	MP guidelines	Practiced-based
Miller et al. ⁹⁸	<i>Am J Community Psychol</i>	1998	Pretest/post-test	AIDS/HIV	Community
Moore ⁹⁹	<i>Image J Nurs Sch</i>	1999	RCT	Infant mortality	Community
Reding et al. ¹⁰⁰	<i>Wis Med J</i>	1997	RCT	Screening	Community
Institutionalization					
Goodson et al. ¹⁰¹	<i>Am J Prev Med</i>	2001	Pretest/post-test	PPIP	Community
O'Loughlin et al. ¹⁰²	<i>Prev Med</i>	1998	Evaluation, post-test	CD: Cardio	Other
Patterson et al. ¹⁰³	<i>Prev Med</i>	1998	Pretest/post-test	Nutrition	Work site
Ruffin et al. ¹⁰⁴	<i>J Am Board Fam Pract</i>	2000	Evaluation, post-test	Cancer/screen	Practiced-based

CD, chronic disease; MP, medical practice; PPIP, Put Prevention Into Practice; RCT, randomized controlled trial.

public health practice and policy: problems with the terminology itself, the organization of terminology, and the identification of relevant articles in the wide array of journals.

The absence of uniform terminology specific to this field of study is not unique¹⁶ and presents notable barriers to the start and completion of fruitful literature searches. There is a lack of shared yet distinct broad-

concept terminology. As a result, searches necessitate a complex combination of highly specific search terms as well as a cumbersome and non-intuitive search strategy and system of organization.

This literature search revealed a lack of consensus on common terminology describing the translation of research to practice. Individuals may use the same terms differently, and the colloquial, context-specific use of a term may differ extensively from its definition in the MeSH library. Thus, a systematic search can be made impossible by lack of awareness of appropriate specific MeSH terminology, inappropriate use of specific MeSH terminology, or, conversely, reliance on a search term that is too general.

Compounding the challenge of language specificity in literature search is the organization of relevant terminology. The most common MeSH terms appearing in the final 86 articles are subheadings—terms that modify or describe the perceived “primary” concepts in each article. If the use of modifying or cross-cutting concepts best captures this literature, the premise of searching with subheadings for cross-cutting concepts rather than primary concepts may not be intuitive, and thus may prohibit successful searches. Overall, there seems to be little primary MeSH terminology describing “the utilization of public health prevention research” or the four subcomponents of the overall concept described earlier. The evidence for this assertion is that searches using colloquial terminology (text terms rather than MeSH terms) identified many of the articles in this literature review.

The final barrier relates to an initial assumption that articles meeting criteria for inclusion in a study would be clustered among a handful of the better-known prevention journals in the field of public health (e.g., the *American Journal of Preventive Medicine* and *Preventive Medicine*). In addition, because of the relatively recent interest in conducting research on utilization of prevention research, one would anticipate finding articles on a limited set of public health topics related to that issue. A striking finding was the variation in publication sources (59 different journals) and the breadth of public health topics identified (12 topics for abstracted articles and 17 for background and review). Both of these findings illustrate further potential complications in the identification of relevant articles: searching by journal name or topic (e.g., medical practitioner guidelines) would result in a severely limited and skewed set of articles.

Findings From Abstraction of Articles

Early stages of research utilization were emphasized in the abstracted articles, where 15% analyzed the dissemination of research, and 46% analyzed the adoption or intent to adopt research. Fewer still, one of twenty studies reported on institutionalization or further dif-

fusion activities. Although this reflects an increase since the review by Oldenberg and colleagues,⁶ it highlights a tremendous gap in the body of evidence available to guide practitioners in the field in achieving sustained use of prevention research.

The importance and difficulty of sustainability has long been identified as a key challenge—perhaps the key challenge for innovative change including in health promotion efforts.^{106–109} Studying institutionalization clearly poses challenges that studying the other stages do not, notably the difficulty of identifying an endpoint that can be operationalized and that is generalizable. In addition, institutionalization, by definition, requires a long, but indeterminate time horizon, which may only be adequately addressed through prospective, longitudinal study. We think it is not a coincidence that there were few prospective study designs typical of major longitudinal research, such as prospective cohort (one) and case-control studies (two). This may be an area of research well suited to mixed-method studies, such as the study by Dino et al. of the “Not On Tobacco” teen smoking cessation program or the Goodson et al. study of how Put Prevention Into Practice activities were sustained in primary care settings.^{96,101}

In terms of studying this literature, the stage of research utilization posed a challenge to abstract because basic information about how research findings were being used was often limited. This is by no means a purely conceptual issue. The stage of utilization is fundamentally about the outcome being studied—for example, the participants’ stated intention to adopt or use a research finding for the intent-to-adopt stage and some degree of observed use in the implementation stage. Frequently, however, studies appear to conflate participants’ stated intentions, or their nominal adoption of a particular research-based program or tool, for their meaningful use of the research.

One solution is for authors to include, and for journals to accept, more detail in the written descriptions of each stage of research utilization in the report of a study. For example, it would be helpful to more clearly distinguish (1) conceptually, what the study intends to measure, such as the intent-to-adopt recommendations in research reports versus the nominal adoption of recommendations and (2) to clearly operationally define the measures used to determine the degree of success, such as survey items asking if participants intend to adopt, versus have adopted, or preferably defining some time-specific sentinel event or action that defines the stage of utilization, such as a formal policy change, a vote held, or material purchased. For maximal utility, study descriptions and findings would also include details about the factors that contributed to or posed challenges to the research utilization process. Online journal content provides an increasingly easy way for journals to accommodate

additional information without running up article lengths and costs.

Limitations

This review was limited to literature identified through PubMed and published in English between 1995 and 2002. These findings may not generalize beyond that literature, notably to more recent work. However, there are several reasons why these results have bearing for those conducting translational research today. This review covers what might be described as a formative period for the publication of research on the utilization of prevention research findings. The reviews by Oldenburg et al.⁶ and Bero et al.⁷ were published in this period, the CDC in particular expanded support for translational research, and the Institute for Healthcare Improvement launched healthcare collaboratives to facilitate the adoption and implementation of evidence-based best practices.^{110,111}

Yet the present results reveal that identifying relevant literature over this period was extremely difficult, due to the diversity and inconsistency of the key words used to catalogue it. Furthermore, literature in this period continued a trend identified by Oldenburg et al.⁶ of favoring the earlier stages of translational research (diffusion and adoption) over the latter (implementation and institutionalization). Therefore, despite the relatively large body of research produced over this time, it was quite limited in its scope in terms of stage of diffusion and its general accessibility. The descriptions of the literature search processes and the key terms used presented here are intended to help orient researchers both in searching for relevant research literature and in better labeling their own work to maximize the chances that it will be identifiable to interested colleagues. One hopes that the present results, along with the companion conceptual paper in this issue,¹⁴ advance the process of codifying the terminology related to research utilization and making this body of research more readily identifiable. These studies present a strong foundation on which future researchers may build.

Conclusion

The purpose of this literature search was to describe the state of published research on the utilization of research in public health practice and policy. In general, the search revealed a lack of shared and sufficiently specific terminology to comprehensively describe the field, which necessitated a cumbersome and complex search strategy. This analysis illustrates the challenges public health practitioners and researchers face when searching peer-reviewed literature and suggests that one reason prevention research may not be broadly and consistently utilized is the difficulty in

locating the appropriate published literature on empiric studies.

These findings suggest that today's system of terminology for "prevention and control" may have developed in a fragmented manner among independent medical specialties and public health professions. Therefore, a systematic crosscutting analysis of this field cannot be performed by using any one profession's common terminology. Conversely, the use of broad-concept search terms presents its own challenges, because of the highly specific terminology used in the search engine of the National Library of Medicine. As such, a complete review must aggregate the search results of multiple highly specific concepts and search terms, many of which are not intuitive. Otherwise, researchers and practitioners would be left with an incomplete literature review.

This analysis can serve both as a starting point for efforts to refine terminology and a resource that may be useful to practitioners and researchers interested in utilization of prevention research. The findings indicate a need for refining terms used in prevention research and research utilization to address the lack of both shared and unique definitions. Similarly, this area of investigation would also benefit from more explicit and shared descriptions of prevention research utilization stages. Expanding the reported description of each stage and the components of each research intervention investigated would greatly improve the ability to perform analysis and review of this research area. Inclusion in published reports of the analysis of factors contributing to successful adoption, implementation, and further utilization of prevention research products (e.g., policies, guidelines, and education interventions) would also move this area of investigation forward.

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