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Models in dissemination and implementation research: useful tools in public health services and systems research

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Models in dissemination and implementation research: useful tools in public health services and systems research

ABSTRACT

Dissemination and implementation (D&I) science seeks to understand how to systematically facilitate utilization of evidence. Theories and frameworks (hereafter called models) augment D&I research by enhancing efforts to spread evidence-based interventions (EBIs). D&I models are relevant for public health services and systems research, which also explores the uses of evidence. This report: 1) develops an inventory of models; 2) synthesizes this information; and 3) provides guidance on how to select a model. The research team used snowball sampling to collect models. This article uses three author-defined variables: construct flexibility, focus on dissemination and/or implementation activities, and socio-ecological framework level to categorize models. Models that addressed policy are noted. Public health researchers and practitioners can use this inventory to identify models to guide D&I research and/or efforts.

Keywords

Dissemination and Implementation

Cover Page Footnote

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Introduction

Dissemination and implementation (D&I) science seeks to understand how to systematically facilitate utilization of evidence. Theories and frameworks (hereafter called models) augment D&I research by enhancing efforts to spread evidence-based interventions (EBIs).¹ Since public health services and systems research (PHSSR) also explores the uses of evidence (e.g., the impact of the investment of resources in public health), D&I models have high relevance for PHSSR. This report, a condensed version of a more comprehensive article,² 1) develops an inventory of models used in D&I research; 2) organizes these models according to a three-factor typology; and 3) provides guidance on how to select a model to inform study design and execution. To do this, the research team began with commonly cited models and model developers and used snowball sampling to collect models from journal articles, presentations, and books. To aid researchers in selecting a model, the authors categorize models based on three author-defined variables: construct flexibility (CF), focus on dissemination and/or implementation activities (D/I), and socio-ecological framework (SEF) level. Models that address policy activities are also noted. Public health researchers and practitioners can use this inventory to identify models to guide D&I research and/or practice.

Summary Box

- Dissemination and implementation (D&I) science aims to understand successful strategies for adoption and sustainability of evidence-based interventions and is closely linked with PHSSR. Theories and frameworks (hereafter called models) enhance D&I research. D&I research has its origins in many fields and thus models that inform D&I research also come from many fields.
- This report inventories, organizes, and synthesizes the many D&I models based on three variables:
 1. Construct flexibility
 2. Focus on dissemination and/or implementation activities
 3. Socio-ecological framework level
- This report also provides guidance on how classification of a model based on these three variables will assist in selecting a model to inform D&I science study design and execution.
- Public health researchers should consult this inventory before designing a D&I study to ensure that the study is informed by models and utilizes a model that is best suited for the study activities and context.
- Public health practitioners can consult this inventory to inform implementation of activities (interventions) to ensure the best possibility of success.

Methods

A narrative approach was used to capture and review models within the D&I field. This approach consisted of: initial snowball sampling (where one model leads to the next through citations in the reference list); consulting with experts; categorizing models; and contacting model developers to ensure valid categories. The search was not exhaustive but did attempt to identify every model. To ensure comprehensiveness, US National Institutes of Health (NIH) officials who advise researchers submitting grant proposals for D&I research were queried for additional models.

Models in this review are from many disciplines and were included if they are: designed for use by researchers, in contrast to practitioners or clinicians; applicable to local level dissemination, targeting communities and organizations; directed at more than the dissemination that occurs at the end of a research study; and written in English. Two authors reviewed all publications and convened regularly to discuss the categorization and inclusion/exclusion of models.

Three author-defined variables were used to categorize all models: CF, D/I, and SEF level (Figure 1). CF was rated on a one to five scale, where 1=broad and 5=operational. *Broad* models are those that contain more loosely defined constructs, thereby allowing greater flexibility to apply the model to a wide array of activities and contexts. This also requires more careful thought on how to operationalize, implement, and use the model. *Operational* models provide detailed, step-by-step actions clearly defined for a particular activity and context. Models between the two extremes contain constructs more detailed than broad models but not as detailed as operational models. These models are less flexible across all contexts, but more conducive to visualizing how the model assists with study design and execution.

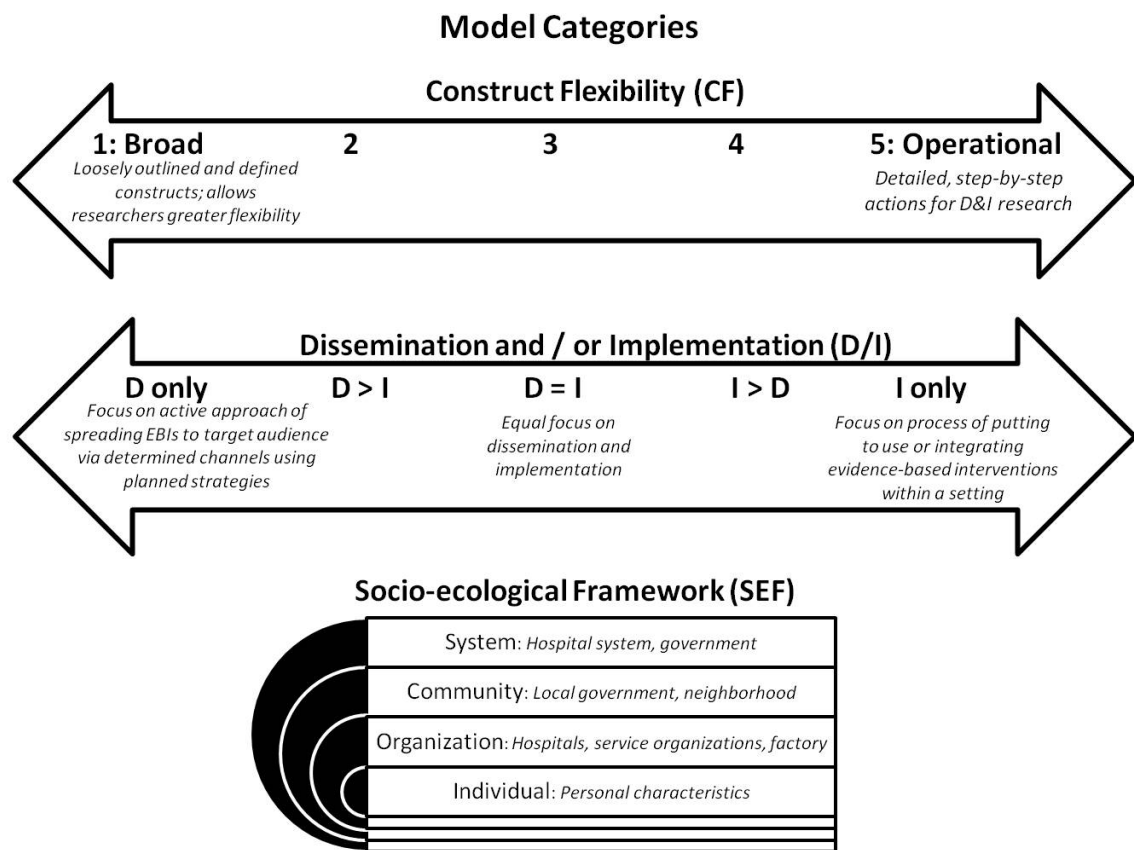
Models were also categorized on a continuum from dissemination to implementation. *Dissemination* is the active approach of spreading EBIs to target audiences via determined channels using planned strategies. *Implementation* is the process of putting to use or integrating EBIs within a setting.³ Models were split into five categories: models that focused entirely on dissemination (D only), dissemination more than implementation (D > I), both activities equally (D = I), implementation more than dissemination (I > D), and implementation only (I only).

The use of a modified SEF as the last classifying variable recognizes that D&I strategies may focus on changing behavior at a specific level or may cut across multiple levels. It is important for future use of models to identify the level at which each model operates. Models were assigned all applicable SEF level. These included individual, organization, community, and system. Models addressing policy, such as policy use and creation of policy, were also noted.

To ensure models were accurately described and that definitions were clear to experts, a sample of model developers (n=16) were contacted and

presented with the category definitions and assignment for the model they developed. All model developers (n=45) for whom contact information could be identified were contacted to assure that presented models have an accurate name and appropriate citations.

Figure 1. Three-Factor Construct Definition and Taxonomy



Additional information about the model was abstracted and is included in the full report of this work. This supplementary information includes: the original field in which the model was developed, the number of times the original publication has been cited, and a subset of studies, if any, that used the model to inform their design.²

A case study is included to provide insight into how the constructs in Figure 1 are operationalized and also how a model can be used to inform public health work (Figure 2). Based on the three-factor typology scheme presented above, this model was categorized as being D=I, CF=2 and applicable to all four

levels of the SEF; thus it would be useful to a researcher interested in a somewhat broad model to guide both dissemination and implementation activities. This case study provides background about the model; how the model was applied to the specific research setting; and information related to construct measurement. Additional case studies are also provided in the full report of this work.²

Figure 2. Case study on use of the Interactive Systems Framework (ISF)^{4,5}

ISF (Categorized as D=I, CF=2, SEF=System, Community, Organization, Individual)

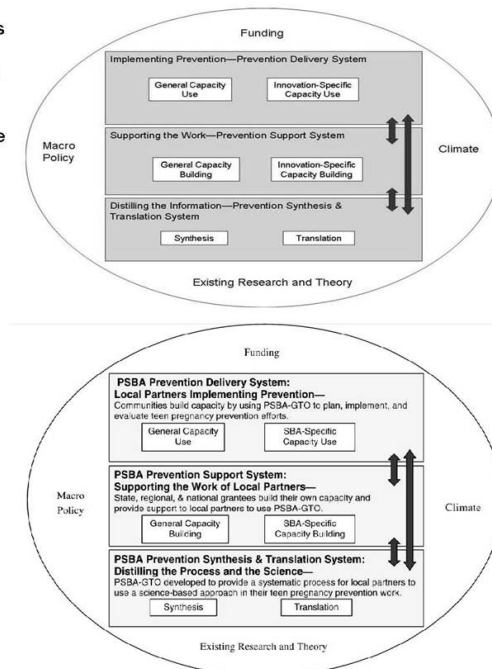
Framework Background: The Interactive System Framework (ISF) was originally developed to be used by different types of stakeholders (e.g., funders, practitioners, researchers) to better understand the needs of all stakeholders and systems. The ISF identifies three systems: the Prevention Delivery System which implements innovations; the Prevention Support System which provides training, technical assistance (TA) or other support to users; and the Prevention Synthesis and Translation System which distills information and translates it into user-friendly formats. Each of these activities is necessary for the movement of innovations into widespread prevention practice at the community level.

Study: Promoting Science-based Approaches to Teen Pregnancy Prevention project (PSBA)

Study Background: The PSBA program was a multi-site, capacity-building effort that aimed to assist local prevention partners in the use of science-based approaches (SBA) to prevent teen pregnancy. ISF was adopted to allow for specific and strategic planning about what capacities were needed at the local level and to develop a framework for systematically building these capacities.

Measures: ISF was used to inform the evaluation and its measures for this project. Evaluation questions were developed to document and evaluate the process and outcomes of the PSBA project. There was a particular focus placed on how well the ISF-inspired, capacity-building model improved prevention practice among selected local partners.

Use of ISF: PSBA used all three systems of the ISF to facilitate practice improvements. The PSBA Prevention Delivery System included all local prevention partners who agreed to receive intensive TA from the state and regional grantees. The PSBA Prevention Support System included efforts made by CDC's national, regional, and state partners to strengthen their own general organizational capacity; build SBA-specific capacity to provide training and TA; and assist local partners. The PSBA Prevention Synthesis and Translation System consisted of creating an accessible and comprehensive manual called Promoting Science-based Approaches to Teen Pregnancy Prevention using Getting to Outcomes (PSBA-GTO).



Results

A total of 61 models were included in this review. A complete list of the models is found in the full report.² Each of the five categories within the CF variable was assigned to at least four models, with the greatest number of models (25 models) categorized as three. Similarly, each of the five categories within the D/I variable was assigned to at least five models, with slight skewing towards the dissemination end of the D/I continuum. Models were distributed across all levels of the SEF, with an emphasis on the community (52 models) and organization (59 models) levels. Eight models addressed policy activities.

When the CF and D/I categories are cross-tabulated, a number of findings are apparent. Models with a greater emphasis on implementation, tend to have constructs that are more operational. In contrast, there are a greater quantity and variety of dissemination-focused models (D only, $D > I$). Of note, broad models are identified only for D only or $D = I$ activities.

Implications

Using models can enhance the effectiveness of interventions by helping to focus the work on the often-complex essential processes of change. Use of models not only makes a study more likely to be successful, but also contributes to literature on existing models and enables continued distillation and better understanding of model constructs. Model use can also enhance efforts to disseminate research findings to practice and policy audiences. The full report of this work presents 61 models to assist researchers seeking to utilize an existing model to inform their work.

In the full article, there is additional guidance on how to use this inventory of models to inform the design of a D&I study. Issues explored include: using an existing model versus developing a new model; selecting a model; using the selected model; adapting an existing model; and measuring model constructs. The case study presented in Figure 2 provides an example of a stakeholder-focused model and how these issues may manifest during implementation of a project or research study.

It is important to note that since this is not a systematic review, it is impossible to ensure all models were included. In particular, models from fields outside of health may have been missed or under-represented. Nonetheless, the organization scheme presented in this report and the full report² should assist with model selection and utilization. By using this inventory and category scheme, researchers can identify a list of models most appropriate for their study and more importantly have access to a list of additional resources that may provide guidance about how that model can be used in a research study.

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