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Building capacity and sustainable prevention innovations: a sustainability planning model

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Abstract

This article presents an informed definition of sustainability and an associated planning model for sustaining innovations (pertinent to both infrastructure and interventions) within organizational, community, and state systems. The planning model stems from a systematic review of the literature and from concepts derived from a series of 'think tanks' made up of key substance abuse prevention professionals. The model assumes a five-step process (i.e. assessment, development, implementation, evaluation, and reassessment/modification) and addresses factors known to inhibit efforts to sustain an innovation. One set of factors concerns the capacity of prevention systems to support sustainable innovations. The other pertains to the extent to which a particular innovation is sustainable. A sustainability action strategy is presented that includes goals with corresponding sets of objectives, actions, and results that determine the extent of readiness to sustain an innovation. Sustainability tools to assist in implementing the planning model are illustrated, and next steps for the model are discussed. This planning model provides a conceptual and practical understanding of sustainability that can lead to further investigation.

Keywords: Sustainability; Planning; Evaluation; Innovation; Prevention

1. Introduction

Over the past three decades, considerable resources have been spent in the United States and other countries to implement and validate innovative prevention programs and strategies. For example, science-based substance abuse prevention innovations that include school-based programs (Tobler & Stratton, 1997), family-based programs (Johnson, Bryant, Collins, Noe, Strader, & Berbaum, 1998; Kumpfer, 1997), and environmental strategies (Holder, 2001; Gruenewald, Holder, & Treno, 2001) are now available for replication. Other health promotion programs have attained prominence in addressing threats concerning cancer (Kaluzny, Schenck, & Ricketts, 1986), heart disease (Bracht et al., 1994), mental health (Glaser & Backer, 1980; Murphy, 1981), and oral health issues (Silversin, Coombs, & Drolette, 1980). Also, increasingly available for implementation are growing numbers of violence prevention programs (Derzon, Wilson, & Cunningham, 1999).

Often designed as demonstrations or community trials, prevention innovations have focused primarily on successful implementation without creating as well assurances of 'life of innovations' after extramural funding has ended (Akerlund, 2000; Goodman, McLeroy, Steckler, & Hoyle, 1993; Green, 1989; Shediac-Rizkallah & Bone, 1998; Vaughn, Klingner, & Hughes, 2000). Given this problem, there is a general consensus that sustainability guidance is essential (Backer, 2000; Goodman & Steckler, 1989). In response, this article presents a planning model for sustaining prevention innovations designed for organizational, community, and state prevention systems.

The impetus for developing this sustainability planning model comes from a critical need in the substance abuse prevention field, and it was precipitated by a federal initiative, the State Incentive Grant (SIG) program funded by the Center for Substance Abuse Prevention (CSAP). From 1997 to 2002, a series of three-year grants totaling $9 million each have been given to a large majority of the states to fund these goals: (1) promote systems change in state and local prevention systems and (2) implement and evaluate science-based prevention programs and/or strategies (CSAP, 2002). Although states agreed to a variety of

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CSAP conditions, one of which was to consider sustaining effective systemic changes and prevention interventions after federal funding ended, only a limited number of planning strategies and tools are yet available for grantees to use in making sustainability decisions. The sustainability model presented here stems from a systematic literature synthesis and information that emerged from a series of 'think tanks' involving key substance abuse prevention professionals who are affiliated with CSAPs Southeast Center for the Application of Prevention Technology (CAPT). Although this model has been developed in the substance abuse prevention field, we believe it can be generalized to other prevention areas.

First, we discuss the literature about sustainability and related terms. Second, we present a prevention-focused sustainability-planning model that highlights key factors relating to sustaining innovations and how to deal with them. Third, we discuss lessons learned and future steps for the model. This planning model is being presented to provide the impetus for further empirical investigation relating to the sustainability of prevention innovations.

2. Sustainability in perspective

Decision-makers involved in implementing an innovation must face the ultimate challenge of planning for the time when the implementation phase is completed. Clearly, not all innovations need to be continued because circumstances, people, situations, and problems change (Bracht et al., 1994; Glaser, 1981). Further, an effectiveness evaluation may find that an innovation does not work outside of specific controlled conditions. Nevertheless, the continuation of an innovation must become a primary goal if evidence shows that it meets the needs of a targeted population.

In an effort to understand key differences and similarities regarding sustaining innovations after a trial or demonstration period, we conducted a systematic review of 105 articles, book chapters, and books. Sustainability literature was intentionally excluded if it did not address how to ensure continuation of innovations after a confined trial period. Although this review does not contain every sustainability-related publication, it does contain most of this literature.[1] (See Johnson, Hays, Center, and Daley (2002) for Sustainability Bibliography.)

[1] The review methodology involved the following five steps: (1) conducting a key word search (sustainability, institutionalization, capacity building, routinization, and diffusion) of selected databases (Article First, Psyc First, and Pub Med); (2) retrieving hard copy documents; (3) reviewing secondary references for additional publications; (4) conducting the review using specific criteria; and (5) constructing a summary table of review results. We examined: (a) the professions giving attention to continuation of innovations, (b) the terms used to depict continuation of innovations, (c) the differences and similarities in definitions, and (d) the stage models that included continuation of innovations in one or more stages of the change process.

We found a number of terms in the literature that address maintenance or continuation of an innovation. In total, there are eleven related terms, which include *confirmation* (Rogers, 1995), *continuation* (McLaughlin, 1990), *durability* (Glaser and Backer, 1980), *incorporation* (Bracht et al., 1994), *institutionalization* (Goodman and Steckler, 1987), *level of use* (Hall and Hord, 2001), *maintenance* (e.g. Butterfoss et al., 1998), *routinization* (Yin, 1979), *stabilization* (Brown & Flynn, 2002), *sustainability* (Shediec-Rizkallah & Bone, 1998), and *sustained use* (Klingner, Vaughn, Hughes, & Arguelles, 1999). The terms *sustainability* and *institutionalization* were the most frequently used, excluding sustainability development literature, which includes a voluminous body of literature on environmental sustainability (Farrell, 1999) and institutionalism and relates to continuation of institutions like marriage, sexism, etc. (Jepperson, 1991). Further, these two terms, which also appear most frequently in recent literature, have incorporated many of the key elements of other terms, especially routininization. The distinguishing characteristics of sustainability and institutionalization are as follows.

The definitions of both sustainability and institutionalization, although sometimes used interchangeably, have unique elements that were incorporated into our definition of sustainability, presented later. First, sustainability has been defined in a variety of ways, but continued ability of an innovation (infrastructure or program) to meet the needs of its stakeholders is central to the sustainability process (Rissel, Finnegan, & Bracht, 1995; Shediac-Rizkallah & Bone, 1998). In contrast, institutionalization refers to the long-term viability and integration of a new program within an organization (Goodman & Steckler, 1989). Thus, 'meeting the continual needs of stakeholders' vs. 'integration into business as usual' is one major distinction between the two terms.

Second, sustainability has been advanced as a global term to depict the continuation process that encompasses a diversity of forms that the process may take (Shediac-Rizkallah & Bone, 1998); but no emphasis has been placed on measuring the extent of continuation. Institutionalization developers, however, have borrowed from earlier work concerning routinization (Yin, 1977, 1979) and typology of organizational subsystems (Katz & Kahn, 1978) to develop a measure of the degree of institutionalization (Barab, Redman, & Froman, 1998; Goodman and Steckler, 1989; Goodman, et al., 1993). What they have found is that the degree of institutionalization depends on the extent to which an innovation passes through these three stages: passage, cycle, and niche saturation (i.e. spread throughout the organization). Yin (1979) recognized that passage, which occurs only once, represents a highly symbolic event such as putting into writing measurable objectives in a strategic plan. Passing through a cycle refers to repetitively reinforcing the importance of the innovation, for example, by including it in a line item budget year after year. Goodman and Steckler (1989) use the word routine to refer

to this stage. They also define niche saturation as the extent to which an innovation is integrated into all subsystems of an organization.

A third distinction between the uses of the two terms is setting. That is, sustainability is primarily used in the context of continuing programs in a community setting in the US or in developing projects in an international setting. Institutionalization, in comparison, refers to continuing a program primarily in an organizational setting in the US.

A final distinction worth noting is that the concept of sustainability has produced less rigorous empirical studies than has institutionalization, although there have been no seriously rigorous studies of causal modeling and randomized experiments reported in either literature. In our synthesis, we found that 37 percent of the sustainability documents ($N = 27$) were empirical, mostly including case studies, and 60% of the institutionalization documents ($N = 20$) were empirical, mostly including measurement construction and evaluation with weak designs. Hall and Hord (2001) have also constructed an instrument for measuring institutionalization in terms of the level of use of an innovation. Although there are no reports of the validity and reliability of this instrument, special training and certification are required before it can be used (Loucks, Newlove, & Hall, 1975).

In contrast to differences in definitions, the literature is fairly consistent in presenting a conceptual view of moving an innovation to practice as part of a process of progressive steps or stages of decisions and actions that are temporal and ordered, and which follow adoption of an innovation (Mayer and Davidson, 2000). Our literature review found 16 discrete stage models that included continuation of innovations beyond the implementation stage (Backer, 2001; Beyer & Trice, 1978; Bracht et al., 1994; Brown & Flynn, 2002; Edwards, Jumper-Thurman, Plested, Oetting, & Swanson, 2000; Goodman & Steckler, 1989; Green & Plsek, 2002; Hall & Hord, 2001; Huberman & Miles, 1984; McCormick, Steckler, & McLeoy, 1994; McLaughlin, 1990; Parcel et al., 1989; Rogers, 1995; Rudd, Goldberg, & Dietz, 1999; Scheirer, 1993; Wandersman, Imm, Chinman, & Kaftarian, 2000). Other than in Goodman and Steckler (1989), continuing an innovation past implementation was not the primary purpose of these stage models. While sustainability is typically placed toward the end of the change process, some suggest that sustainability activities should begin much earlier (Brown & Flynn, 2002).

In summary, our review of the literature on sustainability and related terms revealed that sustainability and institutionalization (both of which have a number of distinguishing characteristics) are the dominant terms used to characterize continuation of innovations. Sustainability and related terms also usually appear in a stage model of change; the exceptions are the concepts of institutionalization and the level of use. Finally, most observers suggest that sustainability actions be considered after adoption of an innovation, although some do advocate the development of a sustainability plan as part of the initial design process.

3. A sustainability planning model for prevention

3.1. Defining sustainability

From the list of 11 terms in the literature that defined the process of continuing an innovation beyond a trial or demonstration period, we selected sustainability as the overarching construct that is broad enough to incorporate the essential elements of the other constructs, especially institutionalization. Shediac-Rizkallah and Bone (1998) categorized existing definitions in the literature into three categories that address these issues: (a) maintaining benefits achieved through an initial program, (b) continuing the program within an organization, and (c) building the capacity of the recipient community to continue a program. Using this categorization as a starting point, we define sustainability as 'the process of ensuring an adaptive prevention system and a sustainable innovation that can be integrated into ongoing operations to benefit diverse stakeholders.'

First, we view sustainability as a change process with specific sustainability action steps to strengthen system infrastructure and innovation attributes that are necessary to sustain a particular innovation. While the literature shows the change process to be a one-time and sequential process, we assume that it is ongoing and cyclical (Hall and Hord, 2001).

Second, ensuring an adaptive prevention system is part of the sustainability process. The system must be receptive to change, thus creating an environment for innovations to adapt to the system, if necessary, to which they are introduced. Thus, one assumption is that adequate infrastructure capacity is a determinant of sustainability (Altman, 1995; Goodman et al., 1998). Depicting capacity-building as a determinant rather than an outcome departs from the literature reported by Shediac-Rizkallah and Bone (1998). Another assumption is that systems have a culture that may be resistant to change (Green, & Plsek, 2002; Hall & Hord, 2001). In these cases, capacity-building actions must be adapted to fit that reality.

Third, 'what is to be sustained' is innovation (i.e. that which is new to a prevention system). The innovations may include various things: (a) a new prevention program and strategy (e.g. school-based prevention program and policy change that targets substance abuse or violence) or (b) a new infrastructure element that provides support for a prevention program or strategy (e.g. an evaluation system, training curriculum, administrative policy, or expanded structure). We assume that ongoing innovations are essential for providing continual benefits to stakeholders (Drucker, 1990).

Fourth, a sustainable innovation is fully integrated into normal operations in that it has passed through the essential

cycles and passages (Yin, 1979; Goodman and Steckler, 1989). Further, niche saturation should occur; that is, subsystems of the prevention system(s) that are directly affected by the innovations should be empowered to assume ownership of the innovation (Bracht et al., 1994; Wong, 1997).

Fifth, a sustainable innovation should to be proven to be of benefit to the diverse stakeholders (users of the innovation) prior to adoption and after implementation in a target prevention system. That is, although it is normally not the case, an innovation should produce some scientific evidence prior to adoption that its long-term effects do benefit the targeted stakeholders. Further, there should be an evaluation during implementation of the innovation in the target prevention system to further demonstrate benefit to stakeholders. We assume that effective innovations are available through rigorous research demonstrations and trials such as substance abuse prevention (Tobler and Stratton, 1997) and violence prevention programs (Derzon et al., 1999). If not, a best practice can be substituted, and a rigorous evaluation would be essential during its implementation. The stakeholder groups are diverse, and they vary depending on the innovation. For example, with an infrastructure innovation like an administrative policy, the stakeholders would be decision-makers in specific segments of a prevention system or multiple prevention systems that are affected by the policy; for an innovative prevention program or strategy, the stakeholders would be targeted community adults or youth. Further, the groups of stakeholders will vary, depending upon whether the prevention system is at the organizational, community, state, or national level. It is assumed that these levels of a system (like a prevention system) can be interdependent and/or independent, depending on the type of innovation being sustained (Senge, 1998).

3.2. A conceptual view of the sustainability planning model

Given our definition of sustainability, Fig. 1 presents a conceptual view of a planning model for sustaining innovations. This conceptualization, which presents a prescriptive model based on a set of casual factors, is referred to in the evaluation literature as 'intervention (program) theory' (Bickman, 1987, 1990; Chen, 1990).

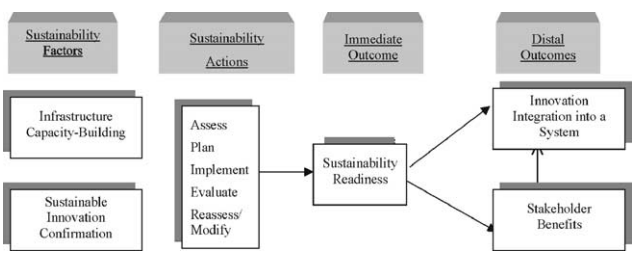

Fig. 1. A conceptual view of the sustainability planning model.

Johnson et al. (1998) and Johnson (1999) have further presented demonstrations of how an intervention theory can be tested.

Our extensive literature review found a number of capacity-building factors (i.e., type of structure and formal linkages, presence of champions for an innovation, effective leadership, resources, administrative policies and procedures, and expertise) that need to be addressed to sustain innovations. There are also known causal factors, which are attributes or characteristics of an innovation that heighten its potential to be sustained. These innovation attributes include alignment with needs, positive relationships among key implementers, successful implementation and effectiveness in the target prevention system(s), and ownership by prevention system stakeholders.

A sustainability action strategy is posited relating to infrastructure capacity-building and sustainable innovations that consist of a five-stage process: assessment, planning, implementation, evaluation, and reassessment and modification, if necessary. The degree of success of the sustainability actions produces an immediate outcome that we refer to as sustainability readiness, that is, adequate infrastructure and an innovation that has been confirmed as sustainable. Further, an adequate level of readiness will lead to achieving distal outcomes that define sustainability. These outcomes are (a) integration of an innovation (infrastructure, prevention program, or strategy) into normal operations of a given prevention system(s) at the organizational, community, state, or federal level and (b) key stakeholders' (decision-makers in the case of infrastructure innovations and citizens in the case of prevention innovations) benefits received as a result of the innovation. The relationship between innovation integration into a system and stakeholder benefits is reciprocal, noting that each outcome influences the other.

4. A sustainability planning model: a micro view

A micro view of our sustainability planning model is presented in Tables 1 and 2, which follows a standard planning sequence (Cooksy, Gill, & Kelly, 2001; Wholey, 1979). First, the two sets of factors (infrastructure capacity-building and sustainable innovation attributes) that are assumed to be causally associated with sustainability in our intervention theory are presented in column one of Tables 1 and 2, respectively. Second, based on our sustainability definition, two goals are formulated, each with five objectives that are associated with the respective factors presented in column two. Third, details of the action steps are displayed in column three in connection with each objective. Fourth, anticipated results from the sustainability actions that collectively define the extent of sustainability readiness are presented in column four.

Table 1
Sustainability planning model: infrastructure capacity-building

Infrastructure capacity-building			
Goal 1: continue to build, support and strengthen infrastructure capacity (organizational, community, state, or federal) to ensure an adaptive prevention system that is receptive to change.			
Capacity-building factors	Capacity-building objectives	Capacity-building actions	Results indicating readiness to sustain innovations
Structures, and formal linkages to sustain the innovation	1.1: Strengthen and/or maintain structures and formal linkages to sustain the innovation	Assess structure and formal linkages to sustain the innovation Plan strategically for building and/or maintain structures and formal linkages to support the innovation Implement, evaluate and reassess and reassess and modify, if necessary, plan for strengthening structure and formal linkages to support the innovation Create and/or maintain structures and formal linkages to support the innovation	Adequate incorporation and maintenance of structures to support the innovation Adequate formal linkages to support the innovation
Champion roles and leadership actions to sustain the innovation	1.2: Strengthen and/or maintain champion roles and leadership actions to sustain the innovation	Assess existing champion (those who have power and act as advocates for the functional area related to the innovation) roles and leadership actions that can sustain the innovation Plan strategically to strengthen and/or maintain leadership actions and champion roles to support the innovation Implement, evaluate and reassess and reassess and modify, if necessary, a plan to sustain the champion roles and leadership actions - Cultivate champions and leaders, establish linkages between leader(s) and champions and innovation stakeholders	Effective champion(s) and leader(s) who take appropriate actions to sustain the innovation Adequate linkages among leader(s) and champions and innovation stakeholders
Resources to sustain the innovation	1.3: Increase and/or maintain resources to sustain the innovation	Assess resources to sustain the innovation Develop a resource acquisition plan to sustain the innovation, to include: funding from continuous streams, staffing, computer technology (including software), workspace, information access	Adequate yet flexible resource acquisition plan that promotes ongoing resources that support the innovation Increase in resources dedicated to the innovation

(*continued on next page*)

Table 1 (*continued*)

Infrastructure capacity-building			
Goal 1: continue to build, support and strengthen infrastructure capacity (organizational, community, state, or federal) to ensure an adaptive prevention system that is receptive to change.			
Capacity-building factors	Capacity-building objectives	Capacity-building actions	Results indicating readiness to sustain innovations
		Implement, evaluate, and reassess and modify, if necessary, resource acquisition plan	
Administrative policies and procedures to sustain the innovation	1.4: Strengthen and/or maintain policies and procedures to sustain the innovation	Assess policies and procedures to sustain the innovation Develop plan to strengthen and/or maintain policies and procedures specific to the innovation; develop policies and procedures and/or revise existing policies and procedures if necessary Implement, evaluate, and reassess and modify, if necessary such policies and procedures	Adequate policies and procedures to sustain the innovation
Expertise to sustain the innovation	1.5: Build and/or maintain expertise to sustain the innovation	Assess necessary expertise to sustain the innovation Develop a plan to acquire and/or maintain adequate expertise specific to the innovation Implement, evaluate, and reassess and modify, if necessary expertise development plan	Adequate expertise to sustain the innovation

Table 2
Sustainability planning model: sustainable innovations confirmation

Sustainable innovation			
Goal 2: implement sustainable innovations that benefit diverse stakeholders for an extended period of time.			
Sustainable innovation attributes	Sustainable innovation objectives	Sustainability actions	Results indicating readiness to sustain innovation
Alignment between the innovation and the needs of innovation stakeholders	2.1: Increase and/or maintain alignment of innovation stakeholder needs with the innovation	Assess innovation stakeholders and their needs and the innovation's integrity, including: complexity, effectiveness, compatibility, and perceived benefit Develop a plan to adopt, adapt and/or maintain an innovation with integrity Implement, evaluate, and reassess and modify plan when necessary	Adequate alignment and maintenance between innovation stakeholder needs and innovation Adoption and or maintenance of innovation with integrity that adequately meets innovation stakeholder needs
Relationship among the innovation's key stakeholders	2.2: Establish and/or maintain positive relationships among the innovation's key stakeholders	Assess and enhance, where necessary, the network among key stakeholders' (i.e. developers, implementers, evaluators and decision makers): Ability to collaborate, level of trust, communication, credibility, enthusiasm, ability to create excitement Develop a plan to establish and/or maintain relationships among key stakeholders Implement, evaluate, and reassess and modify plan when necessary	Adequate long term positive relationships among key stakeholders (i.e. developers, implementers, evaluators, and decision makers)
Implementation quality and integrity of the innovation	2.3: Produce adequate process evaluation results and use appropriately to ensure implementation quality and integrity of the innovation	Assess adequacy of process evaluation strategy Develop a plan to conduct process evaluation and utilize results to ensure quality (fidelity, strength, reach) and integrity of the innovation during implementation of the innovation Implement, evaluate, and reassess and modify plan when necessary	Appropriate process evaluation methods for assessing the implementation quality and integrity of the innovation Adequate level of implementation quality and integrity of the innovation
Effectiveness of the innovation	2.4: Produce adequate outcome evaluation results to ensure effectiveness of the innovation	Assess adequacy of outcome evaluation strategy Develop a plan to conduct outcome evaluation and utilize results to ensure effectiveness of the innovation during implementation of the innovation	Appropriate outcome evaluation methods for assessing effectiveness of the innovation Adequate effectiveness of the innovation

(*continued on next page*)

Table 2 (*continued*)

Sustainable innovation			
Goal 2: implement sustainable innovations that benefit diverse stakeholders for an extended period of time.			
Sustainable innovation attributes	Sustainable innovation objectives	Sustainability actions	Results indicating readiness to sustain innovation
Ownership among innovation stakeholders	2.5: Establish and/or maintain sufficient ownership among innovation stakeholders	Implement, evaluate, and reassess and modify plan when necessary	
		Assess ownership among innovation stakeholders	Adequate and continued ownership among innovation stakeholders
		Develop a plan to establish and/or maintain ownership among key stakeholders	
		Implement, evaluate, and reassess and modify plan when necessary	

4.1. Sustainability capacity

Table 1 presents our planning framework to ensure the sustainability capacity of a prevention system. Goal 1 is to continue to build, support, and strengthen infrastructure capacity (organizational, community, state, or federal) to ensure an adaptive prevention system that is receptive to change. In connection with this goal, studies of innovation point to a number of infrastructure factors that, if addressed intentionally through strategic planning can facilitate building the infrastructure capacity needed to sustain an innovation. These factors include (1) administrative structures and formal linkages among administrative units that have purview over the innovation, (2) innovation champions and their leadership actions, (3) resources to support the innovation, (4) administrative policies and procedures, and (5) expertise sufficient to assure integration of the innovation into routine system operations. In the case of prevention systems, infrastructure capacity should be considered-whether the innovation to be sustained is an infrastructure element, such as a data collection or an evaluation system, or a prevention intervention, such as a research-based program or an environmental strategy.

4.1.1. Administrative structures and linkages

Objective 1.1, which is to strengthen or maintain structures and formal linkages to sustain the innovation, concerns the first capacity-building issue presented in Table 1. The administrative unit(s) responsible for the integration, use, and oversight of the innovative infrastructure element or program must have the structures and capacity necessary to carry out administrative functions related to an innovation responsively, effectively, and efficiently (Chaskin, 2001; Bossert, 1990; Beuermann & Burdick, 1997). To support the innovation, a new organizational unit that focuses on the administration of the innovation may be necessary (Beuermann & Burdick, 1997; Lefebvre, 1992).

Systems that focus on strengthening administrative capacity to support an innovation during its initial implementation are more successful at sustaining the innovation once the initial trial ends. For example, Akerlund (2000) asserts that sustainable community prevention programs have, among other characteristics, strong administrative capacity that utilizes sound administrative and fiscal management practices. Butterfoss et al. (1998) found that enhancing a coalition's administrative structures, as a part of a plan to sustain a community-based program, will empower and enable the coalition to better manage itself. Too often in the past, prevention trials and initiatives have been funded with little emphasis on funding such supportive administrative structures (Steckler and Goodman, 1989).

Linkages that facilitate cooperation among diverse agencies or organizational units responsible for the effective and ongoing implementation of the innovation also contribute to sustainability (Bauman, Stein, & Ireys, 1991; Schwartz et al., 1993; Foster-Fishman, Berkowitz,

Lounsbury, Jacobson, & Allen, 2001). Interorganizational networks among innovation stakeholders are important to ensure that those charged with sustaining the innovation have support from their peers (Goodman, 2000; Jackson et al., 1994). Further, research at both the community and state levels identifies collaboration among agencies or partners (Bauman et al., 1991; Schwartz et al., 1993; Jackson et al., 1994) as an important factor for facilitating sustainability.

4.1.2. Champion roles and leadership actions

Objective 1.2 is to strengthen and/or maintain champion roles and leadership actions to sustain the innovation. Research repeatedly points to the importance of leaders and champions (influential and proactive individuals inside or outside of a system) in the sustainability process. Inadequate leadership buy-in (Buller and McEvoy, 1989; Gersten, Chard, & Baker, 2000) or ineffectual leaders (Bossert, 1990; Chaskin, 2001; Edwards and Stern, 1998; Goodman et al., 1998; Goodman, 2000; Neville et al., 2000) can derail an innovation's sustainability. Formal and informal leaders within adopting systems, as well as champions who proactively promote an innovation from inside or outside of a system, are critical to creating an environment that supports and facilitates sustaining innovations (Akerlund, 2000; Backer, 2001; Calsyn, Tornatzky, & Dittmar, 1977; Gersten et al., 2000; Glaser & Backer, 1980; Goodman, 2000; McLaughlin, 1990; Monahan & Scheirer, 1988; Neville et al., 2000; O'Loughlin, Renaud, Richard, Gomez, & Paradis, 1998; Rogers, 1995; Schediec-Rizkallah & Bone, 1998; Scheirer, 1993; Steckler, & Goodman, 1989; Streefland, 1995).

A number of studies have found top management support for an innovation to be a primary factor in sustaining innovations (Green & Plsek, 2002; Buller & McEvoy, 1989; Gray, 1997; Huberman & Miles, 1984). In particular, Hadden and Davies (2002) and Gray (1997) found that in certain settings administrative leaders who seek to understand and foster integration of the innovation, to facilitate those who must implement the innovation to assume a leadership role in planning, implementing, and using the innovation, and to develop a partnership to resolve problems that inhibit institutionalization were essential to sustaining innovations. Akerlund (2000) suggests that communities are more likely to receive state assistance once federal funding for programs ends when key community leaders show their support.

Opinion leaders within organizations, who may wield less formal authority than top managers, can serve as champions and accelerate adoption of innovative practices through their influence with top managers and others critical to their adoption and sustained implementation (Green & Plsek, 2002; Rogers, 1995; Klingner, Vaughn, Hughes, & Arguelles, 1999). It is also important to have multiple champions of the innovations who cut across organizational disciplines and status hierarchies to ensure their successful and complete adoption (Calsyn et al., 1977). Essential skills for innovation champions include communicating their commitment to the innovation (Klingner et al., 1999), engaging others, overcoming barriers, building infrastructure, thinking and learning reflectively, summarizing and communicating, coaching for sustainability, and building further organizational capacity to spread the innovation (Green and Plsek, 2002).

State agency leaders can be important champions for sustaining prevention innovations. Further, state prevention system administrators are more likely to be able to sustain system innovations under these conditions: (1) top administrators are committed, (2) influential prevention advocates in the state actively promote the value and importance of sustaining the innovation (Hansen-Turton & Kinsey, 2001), and (3) one or more decision-makers with authority and power serve as an active champion of the innovations (Glaser & Backer, 1980). Such champions can serve as brokers on behalf of the innovation with other decision-makers (Beuermann & Burdick, 1997; Goodman & Steckler, 1987). Further, state agents, important champions for the diffusion of health promotion programs among communities (Monahan & Scheirer, 1988), must consider the role of leaders inside and outside the prevention service delivery system, as well as that of opinion leaders, in promoting diffusion and, ultimately, sustainability (Green & Plsek, 2002).

Those who work within each prevention system level, whether it be in an organization, a community, or a state, should seek to cultivate champions who can educate policymakers outside the immediate prevention system (e.g. local elected officials, state legislators, governors, other statewide elected officials, and members of Congress) about the importance of sustaining the innovation to increase their political support (Beuermann & Burdick, 1997). A mechanism must also be developed for renewal of both internal and external champions (Neville et al., 2000).

4.1.3. Resources

Objective 1.3 is to increase and/or maintain resources such as funding, staffing, and computer technology to sustain an innovation. Sustainability research clearly identifies resources as important to sustaining innovations. The sustainability literature points to the importance of adequate and stable funding (Backer, 2000; Chaskin, 2001; Goodman, Steckler, & Kegler, 1997; Goodman, 2000; Jackson et al., 1994; Scheirer, 1993) in acquisition of diverse funding schemes (Edwards & Stern, 1998; Goodman & Steckler, 1987) such as fund-raising through grants (Akerlund, 2000), taxes (Beuermann & Burdick, 1997), channeling funds to the implementing agency rather than through a brokering agency (Steckler & Goodman, 1989), federal funding (Pentz, 2000), diverse funding, (Edwards & Stern, 1998; Goodman & Steckler, 1987), and use of both local funding (Edwards & Stern, 1998) and non-local funding sources (Goodman & Steckler, 1987).

Funding is only one resource among many that are needed; other resources needed to sustain a system include human, physical, technological, and informational resources. In regard to human resources, functions required to administer the innovation must be carried out by an adequate number of qualified, committed staff (Bauman et al., 1991; Scheirer, 1993; Streefland, 1995). O'Loughlin et al. (1998) and Neville et al. (2000) found that voluntary staffing can be an important sustainability mechanism. At the community level, staff should live within or be accepted by the community (Edwards & Stern, 1998). Training of staff to provide technical assistance supporting the use of the innovation is also important for its sustained use (Gersten et al., 2000; Edwards & Stern, 1998; Calsyn et al., 1977). Further, technology and data resources are critical to generate information that informs needs assessment, and it is important to have evaluation data that provides effectiveness feedback to the system (Schwartz et al., 1993; Lee, Bonson, Yarmirr, O'Dea, & Mathew, 1995; Goodman, 2000; Neville et al., 2000).

4.1.4. Policies and procedures

Objective 1.4 is to strengthen and/or maintain policies and procedures to sustain the innovation. Failure to implement formal policies and procedures can create political obstacles to sustainability, sending mixed messages about the desirability of the innovation and expectations for sustaining it (Beuermann & Burdick, 1997). Codification of sustained integration of the innovation in an organization's operations communicates organizational commitment and sets new norms for behavior (Beuermann & Burdick, 1997). Policies and procedures should assure that the innovation remains part of the routine practice of the organization, even after the top management who advocated sustaining the innovation leaves the organization. In some cases changes in state or local laws may be required to ensure the integration of the innovation into the system.

While certain systems have the ability to force members to use an innovation, thereby promoting swifter adoption and greater stability of use (Lawrence, Winn, & Jennings, 2001), most social service systems, and prevention systems in particular, do not have adequate capacity to closely monitor and enforce such compliance. At most, social service systems and their member organizations have the capacity to combine incentives, rewards, and certification, or to use forms of pressure, to encourage sustained implementation of innovative practices. Such approaches can promote adoption more quickly than attempting to influence through incentives and rewards alone (Lawrence et al., 2001). Thus, policies and procedures with clear standards for performance, as well as clear penalties for non-compliance, are important, as is follow-through. Attention to the needs, attitudes, and perceptions of adopters is critical to their sustained use of an innovation.

4.1.5. Expertise

Objective 1.5 is to build and/or maintain expertise to sustain the innovation. In a critique of the community health promotion approach, Goodman et al. (1997) points to the importance of expertise in developing community and organizational support and increasing community and practitioner competence. Expertise is needed to carry out the functions associated with the innovation, as well as with the strategic planning, in order to plan for sustainability (Haws, Bakamjian, Williams, & Lassner, 1992; Bossert, 1990). State agencies, communities, and community-based organizations need a broad complement of skills to sustain the use of research-based prevention programs (Goodman, 2000). Such skills include knowledge of needs assessment, logic model construction, selection and implementation of research-based prevention interventions, fidelity assessment, and staging intervention components (Goodman, 2000). Knowledge of data collection and interpretation is critical to assure that communities identify prevention interventions to meet the needs of the target population and that organizations implement the interventions with fidelity or make appropriate adaptations (Backer, 2001). Knowledge of process and outcome evaluation methods is necessary to assess and understand the effectiveness of the innovation, and communication and data presentation skills are needed to communicate this effectiveness to other key stakeholders (Green & Plsek, 2002). Effective curriculum development and training skills are necessary in order to diffuse this knowledge within and across systems levels (Klingner et al., 1999; Buller & McEvoy, 1989). Leadership skills are critical to cultivate commitment to the innovation and the sustainability process (Neville et al., 2000), and fundraising expertise is needed to develop a flexible funding acquisition plan (Akerlund, 2000).

4.2. Sustainable innovation attributes

In addition to the necessary infrastructure capacity to sustain an innovation, the innovation itself must be sustainable. To this end, Goal 2 of the framework is to continue to effectively address the needs of innovation stakeholders (Table 2). That is, an innovation has to have specific attributes that lead to producing services to targeted stakeholders that meet specific needs. These attributes or characteristics need to be common to innovations that are infrastructure related (e.g. an evaluation system or reorganization) or specific prevention interventions (e.g. school-based prevention program or an environmental strategy).

Our literature synthesis found five attributes of sustainable innovations that need to be addressed along with infrastructure capacity factors. These attributes include: (1) alignment between the innovation and the needs of innovation stakeholders, (2) positive relationships among the innovation's key stakeholders, (3) implementation quality and integrity of the innovation, (4) effectiveness of

the innovation, and (5) ownership among innovation stakeholders.

4.2.1. Alignment

Objective 2.1 is to increase or maintain alignment of innovation stakeholder needs with the innovation's characteristics. A number of studies suggest that, regardless of the capacity of the organization to support the continued implementation of the innovation, the innovation is not likely to be sustained if it does not meet the needs of intended users (Klingner et al., 1999; Wickizer, Wagner, and Cheadle, 1998; Murray, 1986). A meta-analysis by Tornatzky and Klein (1982) of 80 studies that measured innovation attributes found that less complexity, more compatibility, and perception of benefit are associated with higher rates of adoption and implementation. The innovation cannot be too complex for users to implement; further, it must be effective (Wong, 1997) and compatible with the philosophical orientation (Wickizer et al., 1998) and internal agenda (Murray, 1986) of users, and users must perceive a benefit to the innovation beyond that of current practices (Gersten, Vaughn, Deshler, & Schiller, 1997). Personal commitment to the innovation appears to increase compliance with institutionalization processes (Colbeck, 2002). More complex, less effective, less beneficial innovations that are not compatible with the needs of stakeholders are unlikely to be sustained.

4.2.2. Positive relationships

Objective 2.2 is to establish and/or maintain positive relationships among the innovation's developers, organizational decision-makers, implementers, and evaluators. Research that focuses on sustainability of innovative educational programs and practices points to the importance of the relationship among the implementing teachers and innovation developer. Gersten et al. (1997) found that collaboration between program developers and teachers who are implementing the program appeared to increase their commitment and desire to implement the new procedures. A supportive peer network among implementers of an innovation is also important for sustaining innovations. Such peer networks provide support (Klingner et al., 1999) and prevent feelings of isolation among adopters (Green & Plsek, 2002).

4.2.3. Implementation quality and effectiveness

Objective 2.3 is to conduct process evaluation and use the results to ensure ongoing implementation quality and the integrity of the innovation, and Objective 2.4 is to increase knowledge of the innovation's effectiveness. According to Green and Plsek (2002), measurement is an important factor in the adoption equation. Because of the potential for varying degrees of commitment to a given innovation, the quality of implementation of the innovation should be monitored to ensure fidelity, strength, and reach to its intended recipients (Brekke, 1987; Zins, Elias, Greenberg, & Pruett, 2000).

Adopters are also more likely to sustain an innovation if they believe it is effective (Wong, 1997; Tornatzky & Klein, 1982). If outcome evaluation results do not indicate effectiveness, planners must look to the validity of the evaluation methods, strengthening them if necessary, as well as to the effectiveness of the innovation itself.

4.2.4. Adopter ownership

Objective 2.5 is to strengthen ownership of the innovation among adopters so that they will desire to sustain it. Individuals are more likely to comply with institutionalization processes because they are personally committed to them. A study of the institutionalization of innovative teaching practices revealed that cognitive indicators, such as personal commitment, had a stronger influence than regulative or normative indicators on increased acceptance of these practices among college instructors (Colbeck, 2002). Studies of the implementation of prevention interventions through community-based processes suggest that facilitating active citizen involvement (Abbott, Walton, Tapia, & Greenwood, 1999; Akerlund, 2000; Butterfoss et al., 1998; Chaskin, 2001; Goodman, 2000; Lee et al., 1995; Neville et al., 2000; Pentz, 2000; Schediec-Rizkallah & Bone, 1998; Streefland, 1995) and community ownership (Akerlund, 2000; Altman, 1995; Goodman & Steckler, 1987; Lee et al., 1995) are important for sustaining a given intervention or process in the community.

4.3. Sustainability actions

When planning to sustain innovations, a number of action steps need to be taken in order to achieve the objectives associated with the ten sustainability factors in the planning framework (see Tables 1 and 2). These actions are common to prevention planning in general, but they pertain specifically to sustainability in this framework. Fig. 2 presents a prescriptive set of sustainability actions that reflect a five-step cyclical process, based on an earlier assumption that sustainability is an ongoing cyclical change process rather than a one-time sequential stage process.

Step 1 entails assessing the adequacy of the infrastructure capacity to support an innovation and assessing the attributes

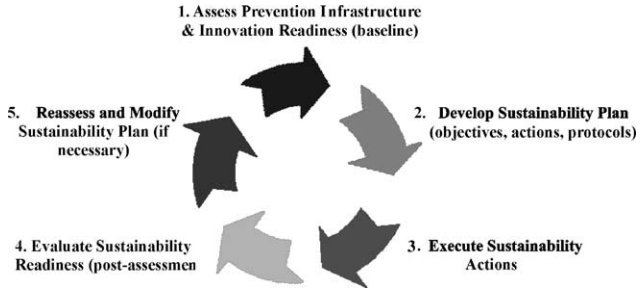

Fig. 2. The sustainability action steps.

of innovation, using the readiness measures referenced in Tables 1 and 2 for each sustainability factor. There are two purposes for conducting this assessment: (1) to determine which sustainability factors, if any, need attention in the planning and implementation steps and (2) to provide baseline data for evaluating the impact of the sustainability actions at step 4. In step 5 the sustainability plan is reassessed based on a review of the pre-post evaluation to determine whether the sustainability actions need to be modified. As additional innovations are adopted and subsequently considered for becoming a viable element of a prevention system, the five-step process is repeated.

An example of this five-step process concerning champions and leadership actions to sustain an innovation is as follows. In Table 1 (row 2; column 3), sustainability actions to ensure adequate champions and leadership action are presented. In terms of achieving sustainability readiness, step 1 entails assessing the strength of champions and the leadership actions of those who advocate for the innovation. For example, if a state wishes to sustain an infrastructure change, such as a new evaluation system, it should first identify champions for it both inside and outside of state government. Champions should be classified by their strength and by the type of power they hold: referent, expert, legitimate, or reward. Prevention systems are best served if champions with each type of power support the innovation and use their authority to sustain it. If there are no strong champions for the innovation, a plan must be developed (step 2) and implemented (step 3) to cultivate such champions. The plan's implementation should be evaluated (step 4) and the results should be used in the reassessment (step 5). If the plan produces effective champion(s) and leader(s) who take appropriate actions to sustain the innovation and adequate linkages among innovation champions and innovation stakeholders, then the sustainability readiness is rated as adequate for this one factor. If the evaluation shows inadequacy or only marginal adequacy of champions to support the evaluation system, then the plan would need to be modified and the process repeated.

A unique feature of this sustainability planning model is that tools are being developed and piloted for each of the five action steps. Research indicates that prevention tools are effective if they have these characteristics: (1) are comprehensive; (2) are easily available; (3) provide useful, step-by-step guidance; (4) utilize a friendly and supportive tone; (5) promote networking among people with relevant experience; (6) are universally available; and (7) build capacity (Fawcett, Francisco, Schultz, Nagy, Berkowitz, & Wolff, 2000). Consistent with these principles, sustainability tools are being developed to support actions relating to each capacity-building factor and innovation attribute shown in Tables 1 and 2.

Sustainability tools are being developed for use in state, community, and organizational prevention systems. For example, one state-level substance abuse prevention system is currently developing and validating a prototype set of tools that focus on sustaining an evaluation system developed as part of a CSAP SIG initiative (Johnson et al., 2003). As part of this development process, a series of meetings was convened with key state prevention staff to conduct the assessment of the ten factors known to pose challenges to sustaining an innovation (see Tables 1 and 2). A standardized sustainability readiness score ranging from 0 to 100 (inadequate = 0–25, marginally adequate = 26–50, adequate = 51–75, very adequate = 76–100) was computed for each factor. A consensus among the five key state prevention stakeholders who assisted in the assessment reported that the quantitative readiness scores had high face validity in comparison with their individual subjective assessments, which were based on working in a variety of roles within the state prevention system. Additional tools are being developed for steps 2–5 that address the development, implementation, evaluation, and reassessment of the plan of action to strengthen factors that were found to be marginally adequate in step 1.

Because of the complexity of the sustainability process that includes infrastructure capacity-building and innovation adaptation, a Sustainability Tool Kit will be designed for use by advanced prevention specialists who have received special training in sustainability. In sequence, these trained specialists can use the tool kit to assist prevention practitioners at all levels in implementing and sustaining their prevention innovations.

5. Summary, lessons learned, and next steps

We present a prototype planning model for sustaining innovations (infrastructure and interventions) within organizational, community, and state systems that provide prevention services. This planning model stems from a systematic literature review and from a series of 'think tanks' consisting of key substance abuse prevention professionals. We define sustainability as 'the process of ensuring an adaptive prevention system and a sustainable innovation that can be integrated into ongoing operations to benefit diverse stakeholders.' This sustainability process needs to begin early after decisions have been made to adopt or experiment with an innovation.

This sustainability planning model addresses two sets of sustainability factors known to be associated with success in sustaining an innovation. One set of factors concerns the capacity of prevention systems to support sustainable innovations. The other concerns the extent to which a particular innovation is sustainable. A sustainability action strategy is presented that includes two goals and corresponding sets of objectives, actions and results that determine the extent of sustainability readiness. A five-step process of sustaining an innovation is highlighted that includes an assessment of sustainability readiness to support an innovation, development, implementation, and evaluation

of a sustainability action plan, and reassess and modifying the action plan, if necessary, to continue to strengthen infrastructure or the innovation. We posit that this model meets essential conditions to succeed in sustaining innovations.

Several lessons learned emerged from the model development process. First, we learned there is an extensive body of literature that addresses sustainability and its related terms; but this literature is sparse when it comes to conceptual or empirical documentation of a set of interrelated factors that may be procurers to the sustainability of innovations. Further, the literature is void of planning models that have practical application to professionals in prevention. Second, we learned that combining results of a systematic literature review and the experience of a 'think tank' of professionals are essential to model construction. On the one hand, the literature helped to define sustainability and to identify and document essential factors associated with sustainability. On the other hand, the think tank provided a critical eye that led us to expanding the definition of sustainability of innovations from simply a prevention intervention to also include infrastructure like an evaluation system. Further, this body of professionals insisted on the model focusing on not only attributes of a sustainable prevention innovation but also on the capacity that is needed to support an innovation continuing on after the implementation phase. Third, we learned that while developing a planning model to sustain prevention innovations is an important contribution to the field, prevention professionals need tools to help them in the sustainability process. We have provided an example of such tools, but there is much tool development work left to do.

The next step after completion of the sustainability tool kit is to test the model being presented under experimental conditions. That is, an efficacy trial in substance abuse prevention is needed (Flay, 1986). Additional trials in other prevention fields are also needed to test the effectiveness of the model across prevention fields. Once empirical evidence has found this sustainability model to be effective, dissemination and diffusion of the model are in order. Continued evaluation and model revisions are essential to remain in step with changes in prevention system over time.

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References

Abbott, M., Walton, C., Tapia, Y., & Greenwood, C. R. (1999). Research to practice: a blueprint for closing the gap to local schools. *Exceptional Children*, *65*(3), 339–351.

Akerlund, K. M. (2000). Prevention program sustainability: The state's perspective. *Journal of Community Psychology*, *28*, 353–362.

Altman, D. G. (1995). Sustaining interventions in community systems: on the relationship between researchers and communities. *Health Psychology*, *14*, 526–536.

Backer, T. E. (2000). The failure of success: challenges of disseminating effective substance abuse prevention programs. *Journal of Community Psychology*, *28*, 363–373.

Backer, T. E. (2001). *Finding the balance: Program fidelity and adaptation in substance abuse prevention. CSAP's National Center for the Advancement of Prevention (NCAP)*, Rockville, MD: Department of Health and Human Services.

Barab, S. A., Redman, B. K., & Froman, R. D. (1998). Measurement characteristics of the levels of institutionalization scales: examining reliability and validity. *Journal of Nursing Measurements*, *6*(1), 19–33.

Bauman, L. J., Stein, R. E. K., & Ireys, H. T. (1991). Reinventing fidelity: the transfer of social technology among settings. *American Journal of Community Psychology*, *19*, 619–639.

Beuermann, C., & Burdick, B. (1997). The sustainability transition in Germany: some early stage experiences. *Environmental Politics*, *6*(1), 83–107.

Beyer, J. M., & Trice, H. M. (1978). *Implementing change: alcoholism policies in work organizations*, New York: Free Press.

Bickman, L. (1987). *Advances in program theory* (*Vol. 47*). *New directions for program evaluation*, San Francisco: Jossey-Bass.

Bickman, L. (1990) (2nd ed). *Using program theory in evaluation*, San Francisco: Jossey-Bass.

Bossert, T. J. (1990). Can they get along without us? Sustainability donor-supported health projects in Central America and Africa. *Social Science Medicine*, *30*, 1015–1023.

Bracht, N., Finnegan, J. R., Rissel, C., Weisbrod, R., Gleason, J., Corbett, J., & Veblen-Mortenson, S. (1994). Community ownership and program continuation following a health demonstration project. *Health Education Research*, *9*, 243–255.

Brekke, J. S. (1987). The model-guided method for monitoring program implementation. *Evaluation Review*, *11*(3), 281–299.

Brown, B. S., & Flynn, P. M. (2002). The federal role in drug abuse technology transfer: a history and perspective. *Journal of Substance Abuse Treatment*, *22*, 245–257.

Buller, P. F., & McEvoy, G. M. (1989). Determinants of planned organizational change. *Group and Organization Studies*, *14*(1), 33–50.

Butterfoss, F. D., Morrow, A. L., Rosenthal, J., Dini, E., Crews, R. C., Webster, J. D., & Louis, P. (1998). CINCH: an urban coalition for empowerment and action. *Health Education and Behavior*, *25*(2), 212–225.

Calsyn, R. J., Tornatzky, L. G., & Dittmar, S. (1977). The appropriateness of adaptation in the transfer of innovations-incomplete adoption of an innovation: the case of goal attainment scaling. *Evaluation*, *4*, 127–130.

Chaskin, R. J. (2001). Building community capacity: a definitional framework and case studies from a comprehensive community initiative. *Urban Affairs Review*, *36*, 291–324.

Chen, H. T. (1990). *Theory-driven evaluations*, Thousand Oaks, CA: Sage.

Colbeck, C. (2002). Assessing institutionalization of curricular and pedagogical reforms. *Research in Higher Education*, *43*(4), 397–421.

Cooksy, L. J., Gill, P., & Kelly, P. A. (2001). The program logic model as an integrative framework for a multimethod evaluation. *Evaluation and Program Planning*, *24*, 119–128.

CSAP (2002). *Center for Substance Abuse Prevention website*.

Derzon, J. H., Wilson, S. J., & Cunningham, C. A. (1999). *The effectiveness of school-based interventions for preventing and reducing violence*,

Nashville, TN: Center for Evaluation Research and Methodology, Vanderbilt Institute for Public Policy Studies.

Drucker, P. F. (1990). *Managing the non-profit organization: Principles and practices*, New York: Harper.

Edwards, R. W., Jumper-Thurman, P., Plested, B. A., Oetting, E. R., & Swanson, L. (2000). Community readiness: Research to practice. *Journal of Community Psychology*, *28*, 298–307.

Edwards, S.L., Stern, R.F., (1998). *Building and sustaining community partnerships for teen pregnancy prevention*. Retrieved March 05, 2001, from US Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation website: http://aspe.hhs.gov/hsp/teenp/teenpreg/teenpreg.html

Farrell, A. (1999). Sustainability and decision-making: The EPA's sustainable development challenge grant program. *Policy Studies Review*, *16*(3/4), 36–70.

Fawcett, S. B., Francisco, V. T., Schultz, J. A., Nagy, G., Berkowitz, B., & Wolff, T. (2000). The community tool box: An internet-based resource for building healthier communities. *Public Health Reports*, *115*, 274–278.

Flay, B. R. (1986). Efficacy and effectiveness trials (and other phases of research) in the development of health promotion programs. *Preventive Medicine*, *15*, 451–474.

Foster-Fishman, P. G., Berkowitz, S. L., Lounsbury, D. W., Jacobson, S., & Allen, N. (2001). Building collaborative capacity in community coalitions: a review and integrative framework. *American Journal of Community Psychology*, *29*(2), 241–261.

Gersten, R., Chard, D., & Baker, S. (2000). Factors enhancing sustained use of research-based instructional practices. *Journal of Learning Disabilities*, *33*, 445–458.

Gersten, R., Vaughn, S., Deshler, D., & Schiller, E. (1997). What we know about using research findings: implications for improving special education practice. *Journal of Learning Disabilities*, *30*(5), 466–476.

Glaser, E. M. (1981). Durability of innovations in human service organizations: A case study analysis. *Knowledge: Creation, diffusion, utilization*, *3*, 167–185.

Glaser, E. M., & Backer, T. E. (1980). Durability of innovations: how goal attainment scaling programs fare over time. *Community Mental Health Journal*, *16*(2), 130–143.

Goodman, R. M. (2000). Bridging the gap in effective program implementation: from concept to application. *Journal of Community Psychology*, *28*, 309–321.

Goodman, R. M., & Steckler, A. B. (1987). The life and death of a health promotion program: an institutionalization case study. *International Quarterly of Community Health Education*, *8*, 5–21.

Goodman, R. M., & Steckler, A. (1989). A framework for assessing program institutionalization. *Knowledge in Society: The International Journal of Knowledge Transfer*, *2*, 57–71.

Goodman, R. M., McLeroy, K. R., Steckler, A. B., & Hoyle, R. H. (1993). Development of level of institutionalization scales for health promotion programs. *Health Education Quarterly*, *20*(2), 161–179.

Goodman, R. M., Speers, M. A., McLeroy, K., Fawcett, S., Kegler, M., Parker, E., Smith, S., Sterling, T. D., & Wallerstein, N. (1998). Identifying and defining the dimensions of community capacity to provide a basis for measurement. *Health Education and Behavior*, *25*(3), 256–278.

Goodman, R. M., Steckler, A., & Kegler, M. C. (1997). Mobilizing organizations for health enhancement. In K. Glanz, F. M. Lewis, & B. K. Rimer (Eds.), *Health Behavior and Health Education* (pp. 287–312). San Francisco: Jossey-Bass.

Gray, P. J. (1997). Viewing assessment as an innovation: Leadership and the change process. In P. J. Gray, & T. W. Banta (Eds.), *New Directions for Higher Education, No. 100* (pp. 5–15). San Francisco: Jossey-Bass.

Green, L. W. (1989). Is institutionalization the proper goal of grantmaking? *American Journal of Health Promotion*, *3*, 44.

Green, P. L., & Plsek, P. E. (2002). Coaching and leadership for the diffusion of innovation in health care: a different type of multi-organization improvement collaborative. *Journal on Quality Improvement*, *28*(2), 55–71.

Gruenewald, P. J., Holder, H. D., & Treno, A. J. (2001). *Environmental approaches to the prevention of alcohol, drug use, and related problems*, Berkeley, CA: Prevention Research Center, Unpublished manuscript.

Hadden, C., & Davies, T. G. (2002). From innovation to institutionalization: the role of administrative leadership in the assessment process. *Community College Journal of Research and Practice*, *26*, 243–260.

Hall, G. E., & Hord, S. M. (2001). *Implementing Change*, Boston: Allyn and Bacon.

Hansen-Turton, T., & Kinsey, K. (2001). The quest for self-sustainability: Nurse-managed health centers meeting the policy challenge. *Policy, Politics, and Nursing Practice*, *2*(4), 304–309.

Haws, J., Bakamjian, L., Williams, T., & Lassner, K. J. (1992). Impact of sustainability policies on sterilization services in Latin America. *Studies in Family Planning*, *23*, 85–96.

Holder, H. D. (2001). *The effects of substance abuse prevention: results from international research*, Berkeley, CA: Pacific Institute for Research and Evaluation.

Huberman, A. M., & Miles, M. B. (1984). *Innovation up close: how school improvement works*, New York: Plenum.

Jackson, C., Fortmann, S. P., Flora, J. A., Melton, R. J., Snider, J. P., & Littlefield, D. (1994). The capacity-building approach to intervention maintenance implemented by the Stanford Five-City project. *Health Education Research*, *9*(3), 385–396.

Jepperson, R. L. (1991). Institutions, institutional effects, and institutionalism. In W. W. Powell, & P. J. DiMaggio (Eds.), *The New Institutionalism in Organizational Sociology* (pp. 143–163). Chicago: University of Chicago Press.

Johnson, K. W. (1999). Structural equation modeling in practice: testing a theory for research use. *Journal of Social Service Research*, *24*(3/4), 131–171.

Johnson, K., Collins, D., Carrico, L., Center, H., Daley, C., Hays, C., Mawn, D., Shuntich, D., & Stewart, B. (2003). *Sustainability readiness assessment tool*, Kentucky, Louisville: Pacific Institute for Research and Evaluation, Inc.

Johnson, K., Bryant, D., Collins, D., Noe, T. D., Strader, T., & Berbaum, M. (1998). Preventing and reducing alcohol and other drug use among high risk youths by increasing family resiliency. *Social Work*, *43*, 297–308.

Johnson, K., Hays, C., Center, H., & Daley, C. (2002). *Sustainability bibliography. Center for Substance Abuse Prevention's Southeast CAPT*, Louisville, KY: Pacific Institute for Research and Evaluation.

Kaluzny, A. D., Schenck, A. P., & Ricketts, T. C. (1986). Cancer prevention in the workplace: an organizational innovation. *Health Promotion*, *1*, 293–299.

Katz, D., & Kahn, R. L. (1978) (2nd ed). *The social psychology of organizations*, New York: Wiley.

Klingner, J. K., Vaughn, S., Hughes, M. T., & Arguelles, M. E. (1999). Sustaining research-based practices in reading: A 3-year follow-up. *Remedial and Special Education*, *20*(5), 263–274. also see p. 287.

Kumpfer, K. L. (1997). *Literature review: Identification of drug abuse prevention programs [7/11/97 part I only]*, Unpublished report.

Lawrence, T. B., Winn, M. I., & Jennings, P. D. (2001). The temporal dynamics of institutionalization. *Academy of Management Review*, *26*(4), 624–644.

Lee, A. J., Bonson, A. P. V., Yarmirr, D., O'Dea, K., & Mathew, J. D. (1995). Sustainability of a successful health and nutrition program in a remote aboriginal community. *The Medical Journal of Australia*, *162*, 632–635.

Lefebvre, R. C. (1992). Sustainability of health promotion programmes. *Health Promotion International*, *7*, 239–240.

Loucks, S. F., Newlove, B. W., & Hall, G. E. (1975). *Measuring levels of use of the innovation: a manual for trainers, interviewers, and raters*, Austin: The University of Texas at Austin, Research and Development Center for Teacher.

Mayer, J. P., & Davidson, W. S. (2000). Dissemination of innovation as social change. In J. Rappaport, & E. Seidman (Eds.), *Handbook of community psychology* (pp. 421–438). New York: Kluwer Academic/ Plenum.

McCormick, L. K., Steckler, A. B., & McLeroy, K. R. (1994). Diffusion of innovation in schools: a study of adoption and implementation of school-based tobacco prevention curricula. *American Journal of Health Promotion*, *9*(3), 210–219.

McLaughlin, M. W. (1990). The Rand change agent study revisited: macro perspectives and micro realities. *Educational Researcher*, *19*(9), 11–16.

Monahan, J., & Scheirer, M. A. (1988). The role of linking agents in the diffusion of health promotion programs. *Health Education Quarterly*, *15*(4), 417–433.

Murphy, M. M. (1981). Stress management classes, a health promotion tool. *Canadian Nurse*, *77*(6), 29–31.

Murray, D. M. (1986). Dissemination of community health promotion programs: the Fargo-Morehead heart health program. *Journal of School Health*, *56*(9), 375–381.

Neville, D., Potvin, L., MacDonald, M., Williams, W., Pluye, P., Blair, L., & Green, L. (2000). *What are the key factors and processes associated with sustained environmental change supportive of health promotion? (NHRDP Grant #6601-1216-94)*, St. John's, Newfoundland: Newfoundland and Labrador Center for Health Information.

O'Loughlin, J., Renaud, L., Richard, L., Gomez, L., & Paradis, G. (1998). Correlates of the sustainability of community-based heart health promotion interventions. *Preventive Medicine*, *27*, 702–712.

Parcel, G. S., Taylor, W. C., Brink, S. G., Gottlieb, N., Engquist, K., O'Hara, N. M., & Eriksen, M. P. (1989). Translating practice into theory: intervention strategies for the diffusion of a health promotion innovation. *Family and Community Health*, *12*(3), 1–13.

Pentz, M. A. (2000). Institutionalizing community-based prevention through policy change. *Journal of Community Psychology*, *28*, 257–270.

Rissel, C., Finnegan, J., & Bracht, N. (1995). Evaluating quality and sustainability: issues and insights from the Minnesota Heart Health Program. *Health Promotion International*, *10*(3), 199–207.

Rogers, E. (1995). *Diffusion of innovations*, New York: The Free Press.

Rudd, R. E., Goldberg, J., & Dietz, W. (1999). A five-stage model for sustaining a community campaign. *Journal of Health Communication*, *4*, 37–48.

Scheirer, M. A. (1993). The life cycle of innovation: adoption versus discontinuation of the fluoride mouth rinse program in schools. *Journal of Health and Social Behavior*, *31*, 203–215.

Schwartz, R., Smith, C., Speers, M. A., Dusenbury, L. J., Bright, F., Hedlund, S., Wheeler, F., & Schmid, T. L. (1993). Capacity building and resource needs of state health agencies to implement community-based cardiovascular disease programs. *Journal of Public Health Policy*, 480–493.

Senge, P. M. (1998). *Rethinking leadership in the learning organization. In The New workplace: Transforming the character and culture of our organizations*, Waltham, MA: Pegasus Communications.

Shediec-Rizkallah, M. C., & Bone, L. R. (1998). Planning for the sustainability of community-based health programs: Conceptual framework and future directions for research, practice, and policy. *Health Education Research*, *13*(1), 87–108.

Silversin, J. B., Coombs, J. A., & Drolette, M. E. (1980). Achievements of the seventies: self-applied fluorides. *Journal of Public Health Dentistry*, *40*, 248–257.

Steckler, A., & Goodman, R. M. (1989). How to institutionalize health promotion programs. *American Journal of Health Promotion*, *3*(4), 34–44.

Streefland, P. H. (1995). Enhancing coverage and sustainability of vaccination programs: an explanatory framework with special reference to India. *Social Science Medicine*, *41*, 647–656.

Tobler, N. S., & Stratton, H. H. (1997). Effectiveness of school-based drug prevention programs: a meta-analysis of the research. *Journal of Primary Prevention*, *18*(1), 71–128.

Tornatzky, L. G., & Klein, K. J. (1982). Innovation characteristics and innovation adoption implementation: a meta-analysis of findings. *IEEE Transactions on Engineering Management*, *29*(1), 28–44.

Vaughn, S., Klingner, J., & Hughes, M. (2000). Sustainability of research-based practices. *Exceptional Children*, *66*(2), 163–171.

Wandersman, A., Imm, P., Chinman, M., & Kraftarian, S. (2000). Getting to outcomes: a result based approach to accountability. *Evaluation and Program Planning*, *23*, 389–395.

Wholey, J. S. (1979). *Evaluation: Promise and performance*, Washington, DC: The Urban Institute.

Wickizer, T. M., Wagner, E., & Cheadle, A. (1998). Implementation of the Henry J. Kaiser family foundation's community health promotion grant program: A process evaluation. *The Milbank Quarterly*, *76*(1), 121–147.

Wong, B. (1997). Clearing hurdles in teacher adoption and sustained use of research-based instruction. *Journal of Learning Disabilities*, *30*(5), 482–485.

Yin, R. K. (1977). Production efficiency versus bureaucratic self-interest: two innovative processes. *Policy Sciences*, *8*, 381–389.

Yin, R. K. (1979). *Changing urban bureaucracies: How new practices become routinized*, Lexington: Lexington Books.

Zins, J. E., Elias, M. J., Greenberg, M. T., & Pruett, M. K. (2000). Promoting quality implementation in prevention programs. *Journal of Educational and Psychological Consultation*, *11*(2), 173–174.