

# Promoting Science-based Approaches to Teen Pregnancy Prevention: Proactively Engaging the Three Systems of the Interactive Systems Framework

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**Abstract** In the field of teen pregnancy prevention many efficacious prevention programs are available but adoption of these programs is slow at the community level. In this article, we present a multi-site, capacity-building effort called the *Promoting Science-based Approaches to Teen Pregnancy Prevention* project (PSBA) as a case example of a proactive application of the Interactive System Framework (ISF) for dissemination and implementation. The ISF is a multi-system model leading to dissemination and implementation of science-based prevention programming through the work of three interactive systems: The “Prevention Delivery,” “Prevention Support,” and “Prevention Synthesis & Translation” Systems. This article describes the proactive use of the ISF to conceptualize and bolster the PSBA program’s goal of assisting local prevention partners in the use of science-based approaches (SBA) to prevent teen pregnancy. PSBA uses all three systems of the ISF to facilitate practice improvements and offers valuable research opportunities to investigate factors related to dissemination and implementation processes across these systems. Describing our application of this framework highlights the feasibility of actively using the ISF to build prevention infrastructure and to guide large-scale prevention promotion strategies in the area of teen pregnancy prevention. The program’s ongoing evaluation is presented as an example of early efforts to develop an evidence base around the ISF. Research implications are discussed.

**Keywords** Teen Pregnancy Prevention · Getting To Outcomes · Interactive Systems Framework · Dissemination · Implementation · Science-based Approaches

Understanding of how to better link research and practice at the community level and our strategies for doing so are limited and characterized by reactive responses rather than proactive solutions. In this article, we will use our experience in the area of teen pregnancy prevention to provide ideas about how we can proactively bridge science and practice in the field of prevention. As in many domains of prevention, the implementation of teen pregnancy prevention programs is often viewed simplistically, generally focusing on the practitioners’ knowledge, skills, and attitudes. However, the factors that influence community level prevention practices are not that simple and the outcomes of prevention practice are not solely the responsibility of the practitioner (Miller and Shinn 2005; Wandersman 2003). It is more likely that community level prevention practices are the end product of many substantial and interacting systems that may not communicate well or support one another, and might even work against each other. Funding and policies at the macro level likely have an effect on the ability, will, and motivation of teen pregnancy prevention practitioners to make improvements or changes in their work. The complexity of influences such as these can be daunting when considering efforts to create positive change in prevention practice at the local level. As the field of teen pregnancy prevention matures, the chasm between research and practice emerges more clearly than ever and bridging this chasm is perhaps the leading challenge to the field’s future success (Lesesne and Lord 2007). However, if there is hope of improving teen

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pregnancy prevention practice in the U.S., attempts must be made to understand and influence these factors.

In an effort to bridge research and practice in the prevention of teen pregnancy, this article describes the aims and experiences of the Centers for Disease Control and Prevention's (CDC) multi-site, capacity-building effort called the *Promoting Science-based Approaches to Teen Pregnancy Prevention* project (PSBA) (DHHS 2005). Specifically, we present CDC's ongoing, proactive use of the Interactive System Framework (ISF) for Dissemination and Implementation in support of the PSBA project.

## Background

Capacity building is a common approach to bridging research and practice and an emerging field of inquiry (Labonte and Laverack 2001a, b; Chinman et al. 2005; Collins et al. 2006, 2007; Livet and Wandersman 2005). Despite differences in the type of public health problem being addressed (e.g., HIV prevention, substance abuse prevention, teen pregnancy prevention) or in the venue of prevention practice (e.g., community based organizations, faith-based organizations, schools), common threads are seen across the literature regarding barriers that arise and capacities needed to overcome them. Capacity building and training have been viewed as key ingredients to overcoming many of these challenges, but much still needs to be learned to strengthen the science behind capacity building (Chinman et al. 2005; Labonte and Laverack 2001a).

Regardless of the framework used to address the research and practice gap, many researchers agree that two critical issues influence whether prevention practice has the intended public health impact: (1) that science-based prevention programs<sup>1</sup> or practices are implemented on a wide-scale and with fidelity, and (2) that these efforts be sustained over time (Botvin 2004; Collins et al. 2007; Fixsen et al. 2005). In fact, some researchers have advocated for using fidelity and sustainability as the driving forces behind capacity-building efforts, as well as to use them as primary criteria upon which to measure whether prevention capacity has been achieved (Collins et al. 2007; Elliott and Mihalic 2004). Overall, the major domains of capacity identified in the literature as those critical to the successful implementation and sustainability of prevention

programs include: (1) organizational leadership and governance; (2) adequate numbers of staff with the knowledge, skills and abilities necessary to implement programs effectively; (3) financial and technological resources to support planning, implementation, evaluation, and ongoing program activities; (4) organizational ability to adapt to or manage the external environment (e.g., changes in funding streams or cultural, social, political and legal environments); and (5) strong partnerships with stakeholders (including strengthening communication with the public, obtaining funding and technical assistance, etc.) (Botvin 2004; Collins et al. 2007; Fixsen et al. 2005). However, knowledge remains limited on how best to measure general and program-specific capacities (Chinman et al. 2005; Labonte and Laverack 2001b) and how to assess the effects of capacity-building (Collins et al. 2007). Furthermore, definitions of capacity vary, compounding the challenge of understanding the role of organizational and program-specific capacities in prevention work, and how to build capacity to improve prevention practice in communities (Labonte and Laverack 2001a, b).

## Teen Pregnancy Prevention

Fortunately, the prevention research in teen pregnancy and adolescent sexual health is strong (Kirby 1997, 2001; Kirby et al. 2006). Efforts over the last decade to develop and evaluate relevant prevention programs have resulted in the identification of over 50 teen pregnancy prevention, HIV, and STI prevention programs that have demonstrated at least some positive behavior change (Kirby et al. 2006). It is important to note that not all of these programs are publicly available or packaged for easy use by local prevention practitioners; thus, the pool of accessible, science-based programs is smaller. However, the teen pregnancy, HIV, and STI prevention research field has a well-established history and there are many prevention programs ready and available for wider use.

In an effort to encourage broader use of available science-based programs and approaches, CDC initiated the PSBA project in 2005 (DHHS 2005). PSBA is a five-year project that builds on earlier successes and challenges in the field by applying the ISF (Wandersman et al. 2008) to conceptualize and guide the promotion of science-based approaches in the field of teen pregnancy prevention. The ISF is described fully in Wandersman et al. 2008; in this article we focus on our application of the ISF to the PSBA. Briefly, the ISF identifies three systems, each of which carries out activities necessary for the movement of innovations (in this case SBA) into widespread prevention practice at the community level. The Prevention Synthesis & Translation System combines information about innovations from multiple sources and translates it into

<sup>1</sup> We use the phrase "science-based programs" in this article but recognize a variety of terms are used across prevention disciplines. To aid the reader, please note that the authors mean for "science-based prevention programs" to be synonymous with evidence based programs, evidence based interventions, and effective programs or interventions. The phrase "science-based approach" includes science-based programs but is more than just programs. A science-based approach as used in the PSBA project is defined in Table 1.

materials ready for end-users. The Prevention Support System facilitates the use of innovations by providing training and technical assistance (TA) to build the capacity of practitioners. According to the ISF, the Prevention Support System builds two types of capacity, general organizational and innovation-specific capacity through training and TA activities. Prevention practitioners comprise the Prevention Delivery System, and it is these individuals and organizations who actually implement prevention activities in the field. This implementation requires both general capacity and capacity specific to the innovation being implemented. Wandersman et al. (2008) provides further description of each of these systems and the ways they interact.

In this article we present the case example of the PSBA project and how we have used the ISF as a guide to the project. Specifically, we will (1) briefly describe CDC's previous attempts to improve the delivery of teen pregnancy prevention; (2) present the current PSBA project and how we have applied the ISF to date; (3) generally introduce our evaluation design for the project; and, (4) offer suggestions for future research stimulated by the PSBA project.

### **History of CDC's Efforts to Improve Teen Pregnancy Prevention Practice**

Understanding the factors associated with the adoption and implementation of science-based prevention programs is an important step in bridging research and practice, and improving the likelihood that scientifically supported prevention programs are integrated into community programs. The ISF helps refine our understanding of the processes and interactive systems that may influence the gap between research and practice. However, CDC had several earlier experiences trying to improve the linkages between research and practice in teen pregnancy prevention that were not informed by the ISF. To provide a fuller understanding of how we arrived at applying the ISF to our work, we will briefly describe this history.

The first of CDC's efforts to influence teen pregnancy prevention was the Community Coalition Partnership Program, known as the 13 Communities Project. The 13 Communities Project was conducted from 1995 to 2002 and was a demonstration project to see if building and strengthening teen pregnancy prevention coalitions would result in improved community level capacity to plan and implement effective and sustainable teen pregnancy prevention programming (Cassell et al. 2005). However, CDC learned from the 13 Communities Project that even though coalitions were important partners in prevention, the model had limited success in actually changing prevention practice at the community level (Chervin et al. 2005) and many

of the partnerships created in the project were not sustained by the end of the project (Kramer et al. 2005). Although the findings of the 13 Communities Project were somewhat discouraging to the many partners who had worked tirelessly to build community level capacity, the project offered valuable lessons about bridging research and practice. It suggested that perhaps we should focus on building the capacity of existing local coalitions or other types of community organizations that provide prevention programming directly to youth (i.e., focus more on capacity building of existing, youth serving organizations than on building new community level infrastructures such as coalitions).

Consequently, the next generation of CDC's efforts were supported by the "Coalition Capacity Building for Teen Pregnancy Prevention" (CCB) cooperative agreement (DHHS 2002). The CCB program focused on providing training and technical assistance to coalitions or organizations who directly served youth to increase their use of science-based programs rather than focusing on community level capacity building. CCB included 5 state and 3 national organizations, and was conducted from 2002 to 2005. Grantees, with support from CDC, were to increase the capacity of local coalitions and organizations to use SBA in their teen pregnancy prevention programs. Formative evaluation was conducted on the CCB project. This evaluation, completed post hoc, was limited to the activities and process outcomes reported by grantees in their periodic written reports sent to CDC and from key informant interviews with project staff (Philliber and Nolte 2008). Common barriers to and facilitators of this prevention work were identified through analysis of project records, reports, and the key informant interviews. Some of the key barriers to the adoption of SBA by local partners included: lack of awareness and/or motivation to use SBA, lack of staff resources to deliver science-based programs, and the perceived incompatibility of science-based programs with their communities' characteristics or values.

The CCB project was, in essence, a large pilot project that helped to develop strategies for capacity building with local organizations as well as surface the challenges to this approach. In doing so, CCB provided the foundation for the next phase of this work, but it also demonstrated the clear need to be more specific and strategic about what capacities were needed at the local level and to develop a framework for systematically building these capacities. Thus, the ISF was adopted for the next phase, the PSBA project.

### **PSBA Project (2005–2010): Proactively Using the ISF**

Building upon the lessons learned from the CCB, the PSBA project is the next generation of work intended to

**Table 1** Definition of a ‘Science-based Approach’ to teen pregnancy prevention*Science-based approach*

A science-based approach includes the following:

- Using demographic, epidemiological and social science research to identify populations at risk of early pregnancy and/or sexually transmitted infections, and to identify the risk and protective factors for those populations.
- Using health behavior or health education theory to guide the selection of risk and protective factors that will be addressed by the program, and to guide the selection of intervention activities.
- Using a logic model to link risk and protective factors with program strategies and outcomes.
- Selecting, adapting, if necessary, and implementing programs that are either science-based or are promising (have characteristics of science-based programs).
- Conducting process and outcome evaluation of the implemented program, and modifying approach based on results.

improve local prevention practice. Similar to CCB, grantee organizations are funded by CDC (DHHS 2005) and are expected to build their own capacity to serve as training and TA providers in SBA (defined in Table 1) in order to build the capacity of local partners who directly serve youth. The PSBA project began in 2005 and will conclude in 2010. It is a collaborative effort involving 3 national-, 9 state-, and 4 regional-level grantees as well as the CDC, Division of Reproductive Health, Applied Sciences Branch. The regional-level grantees are funded under a separate but complementary cooperative agreement (DHHS 2004) and have a slightly different project period (2004–2009). Analogous to the aim of the CCB program, the aim of the PSBA project is to improve the likelihood that local partners will use a SBA to select, implement, and evaluate their programs to prevent teen pregnancy. The project uses a tiered approach to building capacity among grantees and affiliated partners. Specifically, the national-level grantees provide training and one-on-one TA to state grantees so they are well-equipped to work with local organizations on using SBA in their teen pregnancy prevention efforts. It is the local partners who are actually delivering prevention programs in communities; however, the local organizations are not funded directly by CDC.

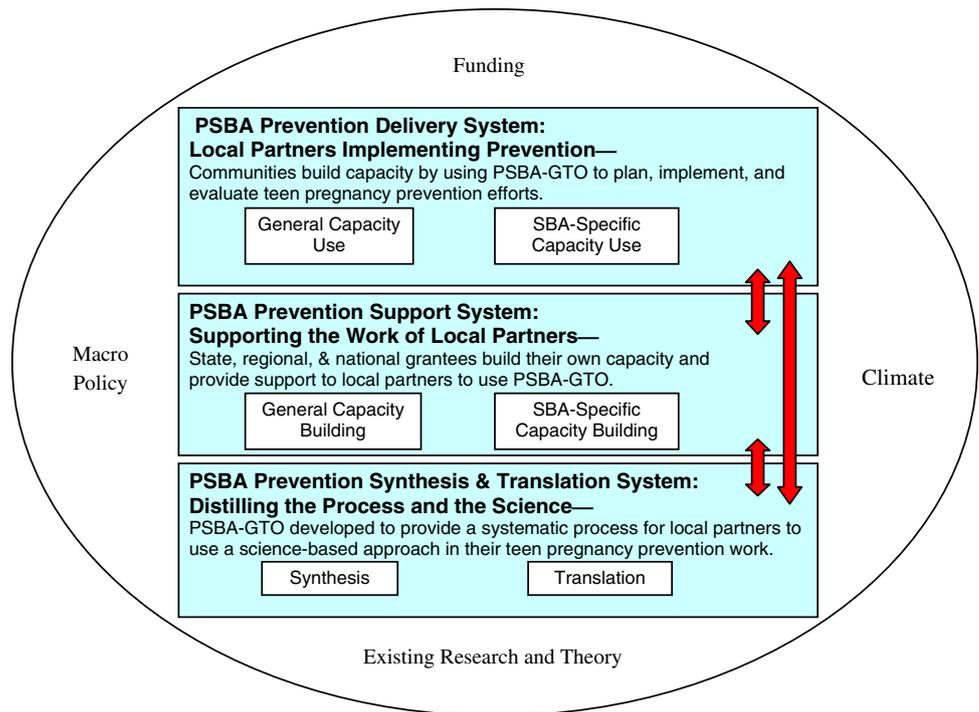
In the PSBA project, the process of promoting SBA to local partners was refined from how it looked in CCB so that it more specifically identified the tiers of influence involved in building prevention capacities (i.e., the tiers described above comprising national, regional, and state levels), and more clearly articulated the key processes needed to help local practitioners use SBAs in their work. In addition, part of further refining the project’s activities and its overall logic model was the decision to use the ISF (Wandersman et al. 2008) to guide the project. As well as complementing the tiered approaches of CCB and PSBA, the ISF highlighted the need to explicitly consider the elements within the ISF’s three component systems, and how those elements would be used in the PSBA project. This appraisal helped address some of the barriers

identified in the CCB project. For example, a barrier to using SBAs that was identified in the CCB project was the fit of science-based programs with their community values and/or target population. To overcome this type of barrier in the PSBA project, we knew a larger prevention practice process was needed to help guide local organizations to assess the fit of a proposed prevention program with the values and practices of the community as well as the characteristics and culture of the target population. Simply educating local partners on the existence and value of science-based programs or how to do an evaluation was not enough to see practice improvements.

In order to build local-level prevention capacity in the face of real world challenges, we needed to enhance the approach with a fuller process. We believed the process should be flexible, bi-directional and provide a structured sequence of actions for a local organization to really use SBA fully. To achieve this, the structured process needed to help a local organization assess the needs and resources in their community; identify potential science-based programs they could use; assess its own resources and capacity to deliver programs they consider; select a program that was compatible with their capabilities; and prepare for evaluating the program.

As we considered how this process could be created, supported, and acted on in community organizations, using the ISF was a very helpful tool to the PSBA project. We adapted the general ISF model for this project to illustrate how the actors in the PSBA project contribute to building the capacity of local partners to use SBAs to teen pregnancy prevention (see Fig. 1). The adaptation was accomplished by members of the PSBA team working collaboratively with developers of the ISF to crosswalk the elements of the ISF with the activities in the PSBA project. The process of adapting the ISF to explicitly address the elements of the PSBA project made it clear that the framework provided a useful way to think about how to carry out and evaluate the project. This is further illustrated below, as we describe each ISF level as applied in the PSBA project.

**Fig. 1** Interactive Systems Framework for PSBA project

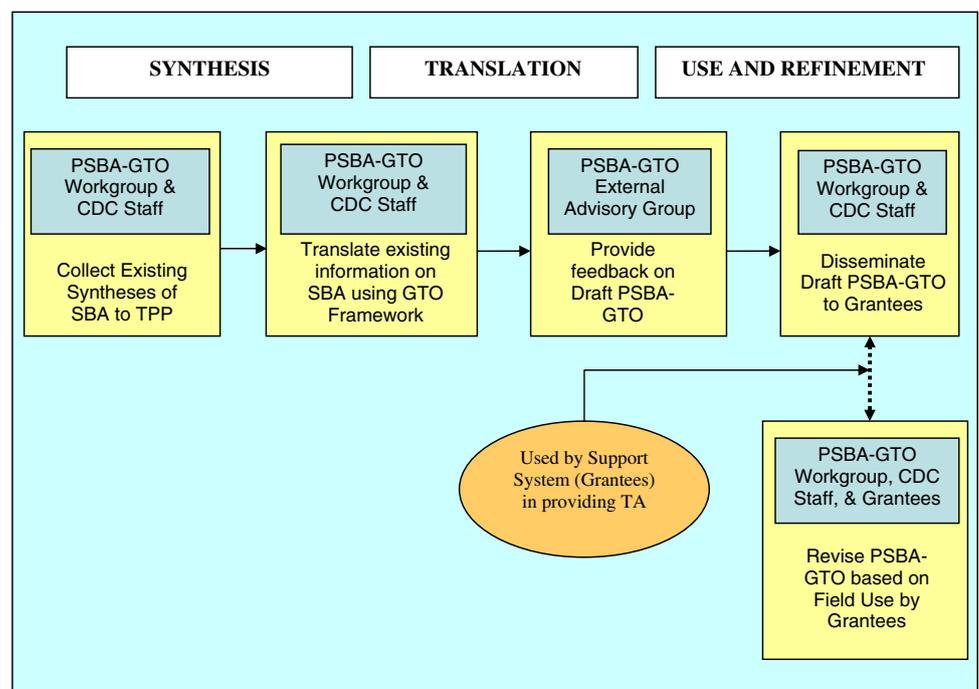


**PSBA Prevention Synthesis and Translation System**

The Prevention Synthesis and Translation System (Fig. 2) of the PSBA project existed in fragmented pieces at the conclusion of the CCB project. Much of the raw materials were there like brief, easy to read summaries of science-based programs and trainings on the importance of using

SBA and how to conduct evaluation. However, the elements needed to promote SBA and increase the capacity of local providers were not yet synthesized or translated into a single process that clearly linked together all the elements of SBA. In an effort to do this, the PSBA project created an accessible and comprehensive manual called *Promoting Science-based Approaches to Teen Pregnancy Prevention*

**Fig. 2** Prevention Synthesis and Translation System in PSBA project. Note: CDC = Centers for Disease Control and Prevention; SBA = Science-based Approach; TPP = Teen Pregnancy Prevention; PSBA-GTO = Promoting Science-based Approaches to Teen Pregnancy Prevention using Getting To Outcomes Manual; TA = Technical assistance



using *Getting To Outcomes* (PSBA-GTO) (Lesesne et al. 2007). The manual describes a succinct and clear process for delivering teen pregnancy prevention programs using a SBA. PSBA-GTO integrates the processes and guidance offered by the 10-step *Getting To Outcomes* (GTO) results-based accountability framework (Chinman et al. 2004; Fisher et al. 2006) with content-specific elements from the field of teen pregnancy prevention such as science-based teen pregnancy prevention programs and sexual risk and protective factors.

GTO is a program planning, implementation, and evaluation framework and process (Chinman et al. 2004; Wandersman et al. 2000). Designed to assist communities in achieving outcomes with a higher level of quality, the GTO framework integrates all of the essential elements of program planning, implementation, and evaluation into a comprehensive system that provides step-by-step guidelines, worksheets, examples, and tools from the initial needs assessment through sustaining a successful program. GTO provides a structured, systematic process organized into ten accountability questions with ten corresponding steps: (1) Needs & Resource Assessment; (2) Goal & Objective Setting; (3) Identification of Best Practices; (4) Assessing Fit; (5) Assessing Capacity and Readiness; (6) Program Planning; (7) Program Implementation & Process Evaluation; (8) Outcome Evaluation; (9) Continuous Quality Improvement; and (10) Program Sustainability. A recent evaluation of GTO in the area of substance abuse prevention demonstrated that individuals in programs using the GTO process had higher levels of prevention capacity and program quality than similar comparison programs (Chinman et al. 2008).

The content-specific elements from the field of teen pregnancy were integrated with the GTO process to create PSBA-GTO. PSBA grantees and other contributors offered invaluable existing tools/resources which are highlighted and integrated into PSBA-GTO wherever possible. Some of these contributions included research syntheses from many of the grantees' organizations (such as the National Campaign to Prevent Teen Pregnancy's "Science Says" series and Advocates for Youth's "Science and Success"), how-to trainings and information on logic modeling (such as Healthy Teen Network's Behavior, Determinant, Intervention (BDI) Logic Model training and intensive TA workshops), and diverse experience on improving and sustaining prevention programs. These and other resources such as those available through the Program Archive on Sexuality, Health, and Adolescence (PASHA) (Sociometrics) and Educational Testing and Research (ETR) were included, where appropriate, in PSBA-GTO as existing resources or tools. PSBA-GTO puts all these elements into a single process intended to facilitate empowerment and assist local deliverers of prevention programs in reaching their desired

outcomes (i.e., practitioners have a state-of-the-art synthesis and translation in one place "at their fingertips"). Therefore, PSBA-GTO is the overarching prevention practice process from which to launch these resources into action.

PSBA-GTO development was led by a CDC internal workgroup and external advisory group of six representatives from PSBA grantees who reviewed and critiqued the document, and it will continue to be refined based on field use. The various partners involved in the Synthesis and Translation System are represented in Fig. 2. Consistent with the ISF, we led the PSBA-GTO development process in a way that encouraged a productive interaction with our grantees, the PSBA Prevention Support System (described in the next section), whose experiences and resources were needed in order to develop a strong synthesis and translation product (i.e., PSBA-GTO).

While our goal was to design the PSBA-GTO manual for use with local organizations/practitioners who provide teen pregnancy prevention programming to young people, we also recognized the need to build the capacity of the Prevention Support System (e.g. national, regional, and state-level grantees) to deliver tailored PSBA-GTO training and TA to their local partners. Using the ISF to think about these linkages, it became evident that the link between the Synthesis and Translation System and the Prevention Delivery System (described below) was high-quality training and TA on the PSBA-GTO process provided by the PSBA Prevention Support System and that we should create opportunities to strengthen this link in the project. The PSBA grantees were selected, in part, for their existing ability to provide training and TA around teen pregnancy prevention or adolescent reproductive health generally. However, despite being high-quality organizations in teen pregnancy prevention, there has been variability in their skills and experiences in building the general and innovation-specific capacities of other organizations. To ensure PSBA-GTO is utilized by local partners in the context of a high-quality, TA relationship, we have identified the need for SBA-specific capacity-building training and support so our grantees feel knowledgeable and confident using the manual with their local partners. In future years, a TA Provider Guide will be developed as a companion to the full manual and its contents will be based on the field experience of our grantees as they work with local partners. Thus, the Prevention Support System and the Prevention Delivery System will actually help to refine the Synthesis and Translation System products based on real-life application. In the meantime, CDC, national grantees, and contracted partners have helped to build SBA-specific capacity among state and regional grantees through training and TA supports around the PSBA-GTO manual and related tools and resources (described in the next section).

PSBA Prevention Support System

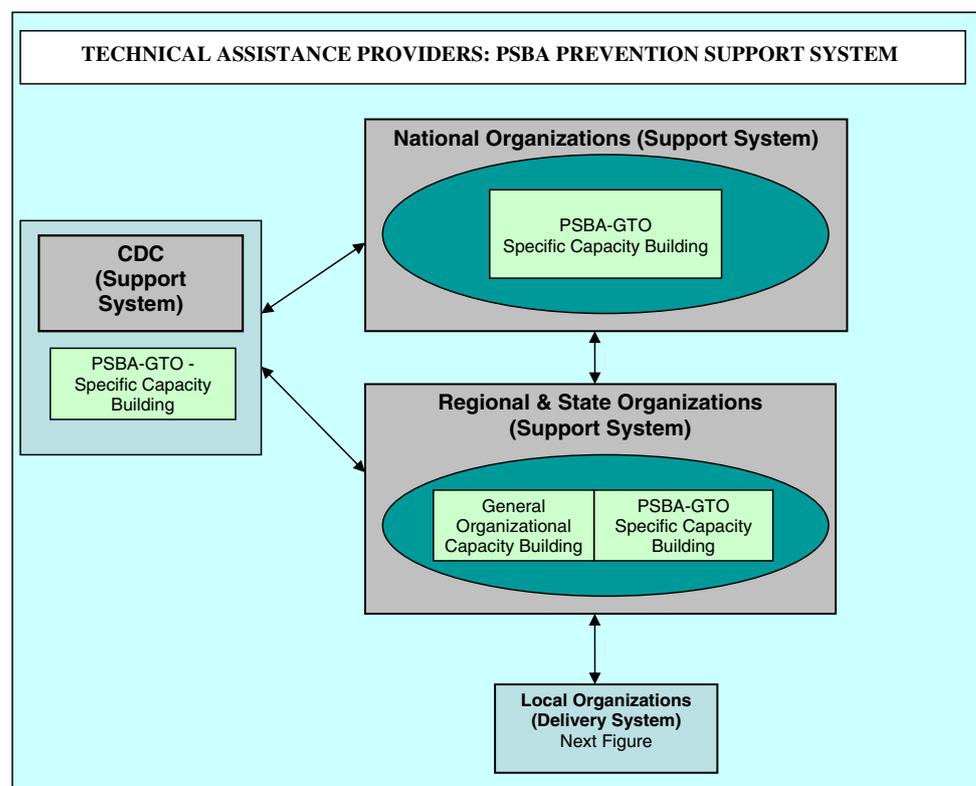
The Prevention Support System (Fig. 3) is a critical focal point for the PSBA project. In this system, CDC’s national, regional, and state partners have worked to: (1) strengthen their own general organizational capacity, (2) build SBA-specific capacity to provide training and TA using the PSBA-GTO process, and (3) through training and TA, assist local partners in applying PSBA-GTO in their work. By *general organizational capacity* we mean an organization having sufficient infrastructure (e.g., an active board in place, leadership with strong management skills, a strategic plan, financially stable, and engaged in strong partnerships). By *SBA-specific capacity* we mean an organization having the commitment, skills, and knowledge to use SBAs to prevent teen pregnancy. Some examples of SBA-specific capacity include: having the ability to use data/research to identify at-risk populations and their risk/protective factors, having an understanding of and ability to use health behavior/health education theory in prevention activities, having the ability to develop logic models linking risk and protective factors with program strategies and outcomes, having the ability to conduct process and outcome evaluations, and make program improvements based on evaluation results.

National grantees and CDC are two actors in the Prevention Support System that serve to build the general and

SBA-specific capacities of the third actor in the system, the state and regional grantees. State and regional grantees then partner with local prevention delivery groups (e.g., youth serving community-based organizations, coalitions, local/county/state health and education departments) and use PSBA-GTO to guide their training and TA with those partners. The PSBA project demonstrates the complexity of capacity building *within* the Prevention Support System of the ISF (Fig. 3). As part of the program model, training and TA *within* the Prevention Support System has served to build the capacity of system members to work effectively with Prevention Delivery System partners. If successful in building the general and SBA-specific capacities of our state and regional grantees, we believe the PSBA Prevention Support System will leverage the resources from the Synthesis and Translation System by introducing and facilitating the use of the PSBA-GTO process, tools, and worksheets with local prevention partners. The ongoing evaluation of the PSBA project will shed light on whether or not this is successful.

The ISF helped PSBA project staff think more critically about how to strengthen the interaction between our Prevention Support System and the Prevention Delivery System (discussed below) by focusing on the interconnections of these systems. In doing so, we heard from our grantees that barriers (e.g., not enough time and inadequate resources) and lack of incentives to local prevention

**Fig. 3** Prevention Support System in PSBA project (Tiered support system). Note: CDC = Centers for Disease Control and Prevention; PSBA-GTO = Promoting Science-based Approaches to Teen Pregnancy Prevention using Getting To Outcomes Manual



practitioners were going to present challenges to forging strong partnerships with local practitioners. In other words, local organizations would be more likely to engage in the PSBA-GTO process if efforts were made to reduce barriers to partnership and to increase perceived rewards of partnership with our grantees (e.g., additional resources like small grants, free training, and travel support for getting to trainings). As CDC has considered mid-course program changes, lack of incentives for local practitioners to work with our Prevention Support System was clearly an area in need of improvement. Thus, CDC has offered additional funds to our state and regional grantees specifically for reducing these barriers and providing partnership incentives. Grantees have identified site-specific incentives (e.g., purchasing curricula, scholarships to attend trainings) to offer their local organizations in order to forge new partnerships and/or retain local partners over the life of the project.

### PSBA Prevention Delivery System

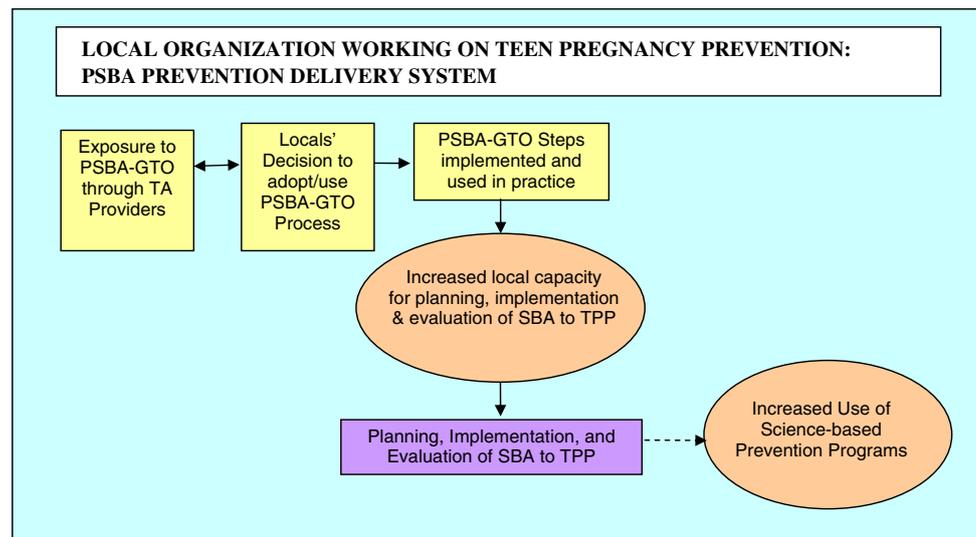
In both the ISF and in the PSBA project, the Prevention Delivery System is “where the rubber meets the road” (i.e., where teen pregnancy prevention programs are actually implemented in communities). In the PSBA project, the Prevention Delivery System includes all those local prevention partners who were invited and have agreed to receive intensive TA from the state and regional grantees. Over the life of the project, each state and regional grantee will have selected a convenience sample of 5–10 local partners and worked intensively with these partners to build their capacity to use SBA to prevent teen pregnancy. Because the PSBA project and partners are not equipped to target all possible organizations providing teen pregnancy prevention programs, a brief tool was developed to help the grantees select local partners with sufficient general organizational capacity and interest to improve their teen pregnancy prevention practice. The tool is essentially a screener for general organizational capacity and interest in improving innovation-specific capacity, using the elements in the Prevention Delivery System of the ISF. Due to limited resources, it is beyond the scope of the PSBA project to take on partners with very low general organizational capacity or little interest in critically examining their teen pregnancy prevention practice. However, the tool only aids our grantees in their selection of local partners; ultimately, each grantee organization makes final decisions about local partnerships. CDC has encouraged that they seek partnerships with local organizations that served youth directly, as opposed to other types of organizations such as coalitions and health departments. CDC does not fund local prevention practitioners as part

the project, but we have increased our support to grantees so they can do so in modest ways.

Lastly, it is important to note that local partners are not *required* to implement PSBA-GTO. After their exposure to PSBA-GTO steps, concepts, tools, and resources through their TA provider, local partners will decide to adopt and implement PSBA-GTO in full, in part, or not at all. It is important to note that the PSBA project has relied on state and regional grantee TA providers to decide how best to introduce the PSBA-GTO process to local partners (e.g., giving the entire manual to local partners and then work through it with them or using the concepts, tools, and worksheets from it in a step by step sort of way starting where their partner is at in their programming). Thus, there is variability in how PSBA-GTO is introduced to local partners and we anticipate that local partners will meet with varying degrees of success in learning and utilizing the full PSBA-GTO process. As illustrated in Fig. 4, the local partners receive TA and training (from the Prevention Support System described above) to support their use of the PSBA-GTO process and tools. This TA is intended to increase their capacity to deliver quality prevention programming, and includes both general capacity building (where needed) and SBA-specific capacity building. The expectation has been that the local partners will use their increased capacity to plan, implement, and evaluate their teen pregnancy prevention programming (using the PSBA-GTO framework). The PSBA project has posited that this approach will result in increased adoption and use of science-based/effective prevention programs and substantial improvement in the quality of prevention programming at the local level.

It is clear that both the PSBA Prevention Synthesis and Translation and the Prevention Support Systems should be complementary, well-developed, and flexible since these systems are intended to support and influence the prevention practice of the partners in the Prevention Delivery System. The PSBA project has the most potential to influence the Prevention Synthesis and Translation System and the Prevention Support System in ways that encourage interaction, but it remains to be seen how well these two systems serve the Prevention Delivery System. CDC has planned and is currently conducting an overall evaluation of the PSBA project which will help assess how well the systems have interacted. The ISF was used to design the evaluation and continues to inform its execution. In the next section, the PSBA project evaluation is described in some detail to demonstrate and share our efforts to test the ISF. Although the evaluation is non-experimental in design, we believe it will shed light on the utility of the ISF as a guide for bridging research and practice.

**Fig. 4** Prevention Delivery System in PSBA project. Note: SBA = Science-based Approach; TPP = Teen Pregnancy Prevention; PSBA-GTO = Promoting Science-based Approaches to Teen Pregnancy Prevention using Getting To Outcomes Manual; TA = Technical Assistance



### PSBA Project Evaluation

A careful process and outcome evaluation of the PSBA project is underway to determine the ways in which the project was successful and/or met with challenges in the field. The major purpose of the evaluation is to document and interpret the process and outcomes achieved within the PSBA project from 2005 to 2010 with a focus on how well this ISF-inspired, capacity-building model improves prevention practice among selected local partners. The PSBA evaluation questions are detailed in Table 2.

The overall evaluation considers the three ISF systems, the multiple tiers within the Prevention Support System, and their interconnections. Given that all grantee partners came to this project with varying levels of general and SBA-specific capacity and grantees have worked intensively with local organizations with variable levels of capacity, it was determined that a multiple case-series design is the most appropriate design for this evaluation. The design has enabled us to address the evaluation questions with consideration for the dynamics within each site while examining patterns of results across sites. In this way, the evaluation tests the overarching PSBA model with appropriate consideration of the natural variability between and within the systems at each site.

We are using five common evaluation instruments to document the interaction and outcomes of these systems. The State and Regional Grantee Needs Assessment has been completed at baseline, and annually thereafter, by the Executive Directors, Project Coordinators, staff, and Boards of Directors (every other year) of all grantees. The baseline general organization capacities and baseline SBA-specific capacities of state and regional grantees have been documented with this needs assessment, and subsequent assessments will measure changes in these areas over time.

The Local Organization Selection Criteria form documents what local partners were receiving intensive TA from our state and regional grantees and some of their baseline organizational characteristics. The Local Organization Needs Assessment has documented baseline general organization capacities and SBA-specific capacities as well as described their current prevention programming in teen pregnancy. By repeating this measure at annual assessments we will measure change in these domains over time. TA Tracking forms have documented the types and amounts of TA and training being provided to local partners by the Prevention Support System. The TA tracking record is collected from our grantee partners at all levels (national organizations, regional organizations, and state organizations) on a monthly basis. Lastly, a rating of the local partners' involvement with the TA provider has served as an annual indicator of the quality and nature of the commitment, cooperation, and engagement of local partners from the viewpoint of the TA provider. Collection of these measures to date and over the life of the project will provide rich data on each ISF system and their interactions.

### Implications for Research and Evaluation in Teen Pregnancy Prevention

Using the ISF as an organizing framework has enabled the PSBA project to systematically structure its capacity building effort in teen pregnancy prevention and design an evaluation that focuses on the key capacities suggested by the ISF—as adapted for this project. To date, the ISF has also stimulated multiple ideas among the PSBA project staff for research and evaluation of components within and between these systems. In this section, we share some of these research directions for the field inspired by both the

**Table 2** Process and outcome evaluation questions for PSBA project*Process evaluation questions*

1. To what extent have CDC and the 3 national organizations provided TA and training to the state organizations to strengthen their general organization capacity? Includes:
  - a. Type and amount of TA and training to build internal state organization capacity
  - b. Type and amount of TA and training to strengthen state capacity to provide TA and training to build internal local organization capacity
2. To what extent have CDC and the 3 national organizations provided TA and training to the state organizations to strengthen their capacity to provide TA and training to local organizations to enable them to promote and use SBAs? Includes:
  - a. Description of PSBA capacity needs that are identified for state organizations
  - b. Type and amount of SBA-specific TA and training to build state capacity to provide TA and training to local organizations
  - c. Satisfaction of state organizations with TA and training
  - d. Satisfaction of state organizations with the content and utility of the PSBA-GTO manual and related tools
  - e. Quality improvements, based on feedback from national, state and local partners, made over the life of the cooperative agreement to enhance the PSBA/GTO manual, training, and related tools
  - f. Quality improvements made over the life of the cooperative agreement to enhance the provision of TA and training from CDC and the national organizations
3. To what extent have the state organizations provided TA and training to local organizations to build their capacity to promote and use SBA? Includes:
  - a. Description of local partners and how were they selected
  - b. Description of PSBA capacity needs that are identified for local organizations
  - c. Type and amount of TA and training to build general organization capacity of local organizations
  - d. Type and amount of TA and training to build local organizations' capacity to select, implement and evaluate SBA
  - e. The description of the PSBA-GTO steps that are being addressed with local organizations
  - f. TA providers' rating of local partners' receptivity to and involvement with the project
  - g. Quality improvements made over the life of the cooperative agreement to enhance the provision of TA and training from state organizations

*Outcome evaluation questions*

4. Has general organization capacity improved? Includes:
  - a. General organization capacity among state grantees
  - b. General organization capacity among local partners
5. Has SBA-specific capacity improved? Includes:
  - a. Capacity of state organizations to provide TA and training to local organizations regarding promoting and using SBA
  - b. Capacity of local organizations to select, implement and evaluate SBA
  - c. Knowledge and skills of local partners in using the steps of PSBA-GTO
6. Have local organizations improved the delivery of prevention programs by using a science-based approach? Includes:
  - a. Selection and implementation of a science-based or promising program
  - b. Improvement of a pre-existing program using a science-based approach
  - c. Implementation of a science-based or promising program with fidelity and for a sustained period of time

PSBA project and by the more general need to understand the ISF systems and how to influence them as we move research to practice (and practice to research). In general, we believe it is important to better assess the state of prevention practice and the frequency of use of science-based programs for teen pregnancy prevention in local communities. Without this basic understanding of whether and how prevention science is being used, by whom, and with what target populations, we basically do not know the nature of the Prevention Delivery System for teen pregnancy prevention. However, with this knowledge it would be possible to refine and target synthesis and translation efforts with an eye for specific groups of prevention practitioners and investigate their needs for prevention

supports. It is imperative that the teen pregnancy prevention field focuses on how to support prevention practitioners in the most effective ways. This means we must contribute to the measurement of and evidence base for effective TA and capacity building strategies. In the following sections, we present specific research opportunities in each ISF system.

#### Research in the Prevention Synthesis and Translation System

Sharing the latest research on risk and protective factors, high-risk populations, and efficacious preventive interventions is intuitively appealing and necessary. The work

of carefully synthesizing this information into accessible resources for teen pregnancy prevention is critical, but it is only a first step toward moving these resources and the latest science into action. Our knowledge is limited about whether and how prevention delivery practitioners understand and use this information in their work, or how useful it is to them. This is an area in need of focused evaluation and exploratory research. It is likely that the recipients of these resources will differ in their perception and ability to use the information effectively. A further question is, what additional tools and support do practitioners need to act on this information? Research in this area would benefit from clear articulation of the audiences for this information and intensive study of what trainers and TA providers (Support System) and practitioners (Delivery System) need, understand, and can use in prevention practice. In addition, a focus on adult learning theory (Merriam and Leahy 2005) and health marketing approaches (Maibach et al. 2006) in synthesis and translation research is sorely needed and will enable us to optimize action as a consequence of exposure to resources/information or new evidence based programs. Research questions include: Who are our main audiences for synthesis and translation materials? What is the best format and content? How can we effectively disseminate these resources to ensure that important audiences learn about what research is telling us?

#### Research in the Prevention Support System

The Prevention Support System has a critical role in bridging the gap between research and practice. Research, although limited, suggests that prevention support including training, TA, coaching, manuals, and other methods are needed for capacity building, and have demonstrated some success in changing the knowledge, attitude, and skills of prevention delivery practitioners (Chinman et al. 2008; Hunter et al. 2008; Mitchell et al. 2004; Stevenson et al. 2002; Wilson et al. 2005). However, even with evidence of its need and potential utility, TA support to prevention delivery practitioners is not yet a well-developed science (e.g., Chinman et al. 2005). In order to strengthen this system there are several research needs in the capacity-building and TA field in general, and, more specifically, in the area of teen pregnancy prevention.

We suggest that research in the Prevention Support System should focus on evaluation, perhaps even experimental research, of the types and format of capacity-building supports that are most effective. As resources become more limited, it will be important to determine which types of prevention practitioners should be targeted for the largest impact on prevention programming. In general, the more we understand how to effectively increase general and SBA specific capacity among training

and TA providers, the more likely those providers will be successful in their efforts to support local-level prevention practitioners. This type of research could aid in optimizing the capacity of a large network of TA providers in the field of teen pregnancy prevention.

Lastly, longitudinal research should be conducted to examine the dynamic relationship between well-functioning Prevention Support and Delivery Systems over time. For example, are the supports provided by TA and training meeting the needs of practitioners on the ground? How can practitioners influence the way prevention support is delivered? What are appropriate criteria to judge the effectiveness of the Prevention Support System? What factors relate to success of the Prevention Support System? In other words, what TA and training supports predict capacity building success, capacity use, and improved prevention programming for youth? Longitudinal research might also shed light on what maintenance supports are needed once high-level general and innovation-specific capacity is achieved.

#### Research in the Prevention Delivery System

The Prevention Delivery System, which carries out the implementation activities for effective prevention programming, also needs considerable research attention because it is the system most directly engaged in prevention work. A basic recommendation for research in this system is to better assess the current state of prevention practice in the area of teen pregnancy. Without a clear understanding of the main settings where prevention programming is delivered, the types of prevention programming being utilized across settings, and the interest and willingness of prevention delivery practitioners to learn about or adopt science-based prevention programs, it will be very difficult to systematically influence the delivery of prevention programming. Anecdotal reports from those providing support to local programs suggest that the use of effective prevention programs with fidelity is the exception rather than the rule. If this is true, then what are prevention practitioners implementing and why have they chosen these approaches? In this era of accountability, are they using good prevention practice processes to do their work? Regardless of their intervention programming choices, are they evaluating their programs and reaching outcomes? Systematically describing the program priorities and prevention capacity of practitioners in key delivery contexts, such as schools, community-based organizations, and faith-based institutions, would help to elucidate the current practices and potential needs by program delivery setting. Similarly, we need a better understanding of the extent of TA required for the different steps in taking research to practice (such as those in the PSBA-GTO

process) in specific settings. For instance, are local prevention practitioners' needs primarily about knowledge of science-based/evidence based prevention programs, other elements in program delivery (such as needs assessments, planning, implementation with quality, evaluation, continuous quality improvement, sustainability), or are general organizational capacity concerns an overriding priority?

The ISF clearly articulates the Prevention Delivery System as the system *using* its general and innovation-specific capacities to deliver programs. Future research needs to explore prevention practice in the field of teen pregnancy and really understand what practitioners are doing in local communities. Such research would ideally inform the activities and approaches of the other ISF systems. However, it is no longer enough to view changes in knowledge, willingness, skills and ability as the primary outcome of capacity building work. The authors feel strongly that we must now look at whether and how capacity is actually used and with what results. In other words, evaluation efforts guided by the ISF really need to push toward outcome orientations. Many capacity building projects stop at achieving capacities or implementing a program. The ISF does not currently address the issue of prevention outcomes, though it is the implied ultimate outcome of the interactive systems approach. Evaluation efforts should include outcomes within the Prevention Delivery System, not just capacity built or programs implemented.

Research that answers these questions should directly influence the future activities of the other ISF systems. Thus, the interactive nature can be realized and refined to optimize our chances for closing the research-practice gap.

### **Conclusions: Using and Validating the Interactive Systems Framework**

It is important to acknowledge the complexity of the issues we presented here. In many ways, closing the research-practice gap may seem improbable. However, if we do not confront the size of the gap and challenge our thinking about how to do this, we will continue to build prevention programs that do not see large-scale use or we will continue to see large-scale use of programs that are not empirically validated, and therefore, may not help our youth. The ISF offers one way to approach this challenge and it has significantly improved the PSBA project's capacity-building approach by anchoring it in theory and practice. It has also contributed to mid-course corrections in terms of training, support, and deciding where to place scarce resources in order to strengthen the linkages between systems. Lastly, using the ISF proactively has increased our critical thinking about how the PSBA project

can achieve its aims and continues to guide the evaluation of the project.

The ISF is, of course, not a panacea to the challenges of prevention practice in teen pregnancy prevention or other fields for that matter. While noting the influences in the surrounding context (forces surrounding the three systems), the ISF does not offer any directives for influencing what can be powerful financial and political forces that affect the nature of local prevention practice, especially in the area of adolescent sexual health. Additionally, the ISF relies heavily on capacity building as integral to the framework. As many researchers have noted, capacity building is one of many avenues to chip away at the research-practice gap in prevention fields and one fraught with measurement issues and a limited empirical base (Labonte and Laverack 2001b). Partly because of these limitations, some have argued that prevention science should look toward communities of practice for solutions. Specifically, some have argued that we need to reduce the bias favoring researcher-developed, new prevention programs and against community-developed, existing prevention programs (Miller and Shinn 2005).

We are aware that the PSBA project example, although interactive and engaging all the ISF systems, is primarily focused on the movement of SBA from the Prevention Synthesis and Translation System through the Prevention Support System and then to the Prevention Delivery System. In other words, this project emphasizes the arrows connecting the systems in Fig. 1 going from bottom to top, rather than the arrows that go from top to bottom. However, the ISF depicts bi-directional influences where the driving force could actually emanate from the Prevention Delivery System, thus supporting community-centered approaches (Miller and Shinn 2005; Wandersman 2003). By viewing the ISF from this direction, the flows of influence could start with the community of practice and move toward synthesis and translation through community-researcher partnerships. It is entirely possible that indigenously developed teen pregnancy prevention programs might be found effective if rigorously evaluated and thereby add to the effective programs available for use in other communities. Although the PSBA project is not directly positing this flow of influence over the research-practice gap, it is certainly positioned to value and allow for it. For instance, in the PSBA project, local organizations are encouraged to implement one of the existing science-based programs. However, the project is deliberately designed to respect the two-way interaction between the Prevention Support System and the Prevention Delivery System, and is flexible enough to allow a partner to work with a locally-developed program by helping them determine ways to evaluate and improve its effectiveness. The project is also addressing the demand from the Prevention Delivery System for guidance

on making adaptations to science-based curricula by working on a new synthesis and translation product focused on adaptation. A future project could focus more specifically on reframing the flow of influence by initially selecting local organizations with community-developed interventions that meet certain criteria, assessing the science-basis and effectiveness of those interventions (i.e., within the Synthesis and Translation System), and then perhaps determining the elements of support needed to scale up the intervention with local partners (i.e., the Prevention Support System).

Whether the ISF can fully capture the “practice-based evidence” (Green and Glasgow 2006) or community-centered models of prevention and health promotion is yet to be seen and is an underdeveloped area in the current ISF. Nonetheless, viewing the ISF through a different lens—where the direction of influence originates with the community Prevention Delivery System rather than the Prevention Synthesis and Translation System—is an area for future inquiry and could bolster local efforts to address their own teen pregnancy issues. However, thinking about the ISF operating as it does in the PSBA project, if the “systems” approach were applied on a large scale in networks or other public health infrastructures it may assist with the scaling up of science-based prevention practice and getting science into practice more readily. Without more research, this is speculative but plausible if well-coordinated.

Given our experience using the ISF, clearly we believe a systems approach to improving research and practice is necessarily and purposefully interactive and dynamic. Thus, future research should focus on the interplay among the systems rather than only focusing on one system or another in isolation. Although targeted research within systems will shed light on key components of these systems individually, the systems coexist and mutually influence each other. If we aim to understand how research influences practice (and vice versa) and how we can strengthen teen pregnancy prevention efforts, the linkages between systems may be just as, if not more, important than the individual systems. Therefore, it is important to capture the essence of the ‘interactive’ framework in future program and research efforts. We believe researchers should develop and evaluate approaches to improving teen pregnancy prevention programming that target all ISF systems simultaneously and employ study designs that are sensitive to system interactions over time. To some degree, the PSBA project is a beginning effort to do this kind of research, but we need further opportunities to develop more refined, ISF-inspired system interventions and test them empirically. This type of applied research will help the field focus on and tailor the work of each of the ISF systems and provide evidence for the continued investment in

stakeholders in all systems. It will also enable the field to evaluate and refine the ISF as a model for translating, supporting, and delivering science-based prevention in the area of teen pregnancy and have important implications for other domains of public health.

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