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Developing Effective Prevention Services for the Real World: A Prevention Service Development Model

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A Prevention Service Development Model (PSDM) is presented as an approach to develop prevention programs that are both effective and that are readily adopted for implementation in community settings. The model is an integration of concepts and methods from two fields, prevention research and marketing research as applied to new service development. Questions that are posed at each stage of the PSDM are described. Studies from the development of two preventive interventions are presented to illustrate research at several of the stages of the model.

KEY WORDS: effective prevention services.

There is a growing awareness that our current models for prevention research are not working as intended. The dominant current model (Mrazek & Haggerty, 1994) describes a progression of scientific studies in which research on the development of problems leads to the development and evaluation of interventions, which in turn lead to research on the widespread dissemination and implementation of effective interventions. However, despite considerable progress in developing scientifically validated preventive interventions (Durlak, 1997; Greenberg, Domitrovich, & Bumbarger, 1999), there is little evidence that these interventions have been widely implemented or that they have led to a significant reduction in the rates of behavioral health problems in the population (e.g., Biglan & Taylor, 2000). The purpose of this paper is to present a new research model for more rapid development and widespread implementation of effective prevention programs. The model integrates concepts and methods from business with those traditionally used in prevention research. Business models have been very successful in guiding the development of a broad range of products and services that are widely used by the public (Cooper & Edgett, 1999), but these models are not commonly used in behavioral health contexts where the primary aim is well-being of the public rather than profit. Prevention research models have been very effective in developing programs that have demonstrated a *potential* to benefit the public, but have not facilitated their wide-scale implementation. Integration of these two models is needed for rapid development and wide-scale implementation of effective prevention programs.

The paper will first present a version of the current dominant model of the Prevention Research Cycle (PRC), review sources of dissatisfaction with this model and describe proposals to increase its utility. We will then describe a model of service development in the business literature, the New Service Development Process (NSDP). A new model, the Prevention Services Development Model (PSDM), that integrates concepts from business and prevention research will then be presented. Studies from our research with children from divorced families and bereaved children will be used to illustrate activities proposed by the integrated PSDM.

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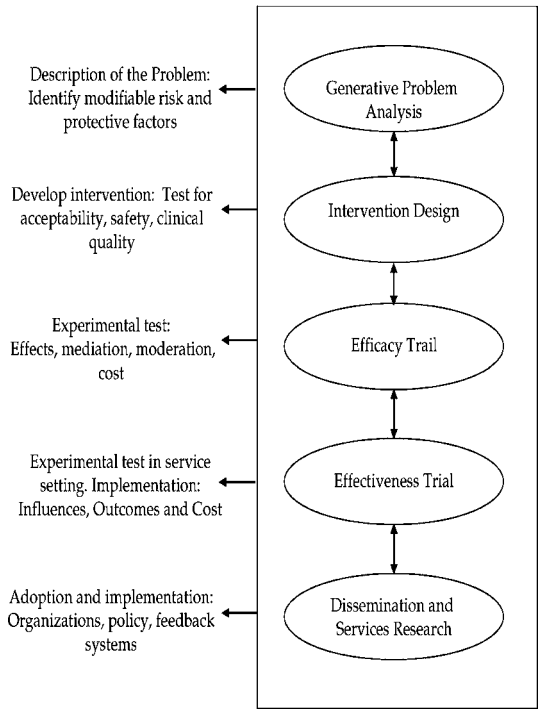

Fig. 1. Prevention research cycle.

Stakeholder Dissatisfactions With Prevention Research Cycle and Some Proposed Solutions

A five-phase version of the PRC, derived from alternative versions described previously (Greenberg & Cullen, 1984; Mrazek & Haggerty, 1994; Price, 1983; Roosa, Wolchik, & Sandler, 1997) is presented in Fig. 1. The phases describe a logical series of studies (with multiple feedback-loops) that lead from the identification of potentially modifiable risk and protective factors, design of interventions to change these factors, well-controlled trials of the efficacy of the intervention under optimal conditions, evaluation of program effectiveness when delivered under more naturalistic conditions, and finally widespread dissemination and ongoing evaluation. Multiple stakeholders have expressed concerns about the PRC model. Prevention scientists express concern that prevention programs that have been demonstrated to be efficacious in well-controlled experimental trials often do not get delivered on a large scale to the public (Rotheram-Borus & Duan, 2003). In contrast, programs that have little or no research support are sometimes widely disseminated. For example, a national survey of school-based prevention programs (Gottfredson & Gottfredson, 2001) found that DARE is the most widely disseminated substance abuse prevention program, despite the fact that evaluations of this program have failed to demonstrate positive effects (Clayton Cattarello, & Johnstone, 1996; Lynam et al., 1999). Even when evidence-based prevention programs are adopted, they are often not implemented with fidelity by community agencies, and thus are not likely to be effective (Gottfredson et al., 2002).

Community agency stakeholders express concern about the lack of fit between research-based prevention programs and their organizational capabilities as well as key stakeholders' (e.g., parents, mental health advocates, providers) preferences or values. Furthermore, there is concern about the applicability of the findings on program effectiveness to any particular community given that the clients, providers, and organizational context are likely to differ from those in the original evaluation of the program (Green, 2001; Green & Mercer, 2001).

Multiple approaches have been proposed to bridge the gap between research-based prevention programs and prevention services in the community. One approach has been to identify effective research-based programs using strong scientific criteria, to publicly certify their efficacy, and to provide funding for training and implementation of these programs in the community. A second approach involves building community or agency capability to identify and adopt programs that meet the community's needs (Hawkins, Catalano, & Associates, 1992; Morissey et al., 1997). For example Wandersman, Imm, Chinman, and Kaftarian (2000) developed a 10-step process (empowerment evaluation) in which communities identify their needs and research-based programs that meet these needs, assess how well these programs are implemented and obtain feedback to improve implementation of these programs in the local community. A third approach is to build stronger community–university collaborations to develop and evaluate prevention programs (Jensen, Hoagwood, & Trickett, 1999; Nelson, Pancer, Hayward, & Kelly, 2004).

Recently, Rotheram-Borus and Duan (2003) recommended that concepts and methods from business be applied to prevention science, and that adoption of a market orientation would have major implications for the way prevention researchers do their work. For example, they recommend that prior to designing a prevention program, scientists conduct market research with consumers, providers, and funding agencies. Also, programs would be proactively

developed to be delivered with high quality under a wide range of community settings. The current paper builds on Rotheram-Borus and Duan's (2003) ideas by describing a service marketing perspective that is emerging in the commercial business sector (Zeithaml & Bitner, 2003), and by describing an integrated Prevention Service Development Model (PSDM) that includes complementary components of the service marketing and the prevention research perspectives.

A Services Marketing Perspective

Research, frameworks, and models in the academic field of business, particularly those that integrate customer and market input, can provide new approaches that will ultimately lead to greater success in the dissemination of preventive intervention services. Here, we draw specifically on research in the field of services marketing, a discipline within the larger field of business that focuses specifically on services as opposed to physical products. This discipline has evolved quickly over the last two decades as a prominent focus within marketing devoted to strategies and tools that are specifically applicable to services (Berry & Parasuraman, 1993; Fisk, Brown, & Bitner, 1993). Services are defined as product offerings that are intangible, experiential in nature, and that do not have physical manifestations that customers can touch or hold. Healthcare, financial services, transportation, telecommunication, and hospitality services are all major industries within the service sector. The "product" offered to customers and clients in these industries is intangible, experiential, and delivered in many cases by human providers interacting directly with the customer.

In particular, we draw on the research in new service development (e.g., Cooper & Edgett, 1999; Edvardsson Gustafsson, Johnson, & Sanden, 2002). This emerging research domain focuses on issues and methods relevant to success and failure of service introductions by organizations. Research suggests that success in introducing new services is dependent on service characteristics (e.g., service meets customer needs, advantages over alternative services, service innovativeness), strategy characteristics (e.g., synergies with the organization's technology and marketing systems, dedicated human resources to support the innovation initiative, dedicated research and development), process characteristics (e.g., following a structured approach, market orientation, customer input), and marketplace characteristics (e.g., size of the market and demand for the service, current and future availability of alternatives; Henard & Szymanski, 2001). Another consistent finding is that service organizations that follow a structured process (outlined below) for introducing new innovations are more successful than those that rely on informal processes (Cooper & Edgett, 1999; Edvardsson et al., 2002; Henard & Szymanski, 2001). A successful new service introduction is viewed as one that is valued and adopted in significant numbers by customers and provides a financial profit to the organization. Although financial profit is not the ultimate goal in community agencies that typically provide preventive services, financial viability of these organizations is critical and thus we believe much can be learned from the profit and customer-oriented models tested in business. A critical thread in the new service development process is the consideration of customer input at all stages. From the perspective of prevention scientists who are testing and developing interventions, two levels of customers need to be considered: the ultimate client who is the recipient of the program and the agency customer that adopts the program as part of its portfolio of services. Next, we describe a generic process for developing new services and later integrate it with the prevention research model to provide unique insights into more rapid dissemination of effective prevention services.

NEW SERVICE DEVELOPMENT PROCESS

Figure 2 provides a generic version of the New Service Development Process (NSDP; adapted from Cooper & Edgett, 1999; Zeithaml & Bitner, 2003, chapter 8). As shown, the sequential process begins with organizational strategy and ends with postintroduction evaluation of the service innovation after it is in the field. Throughout the process of introducing a new service, customer information is a key factor, and the fundamental foundation of "market orientation."

Although we present this process as a linear one, in reality it is possible, and even desirable, to simultaneously work on more than one stage in the process (Cooper & Edgett, 1999, chapter 6; Iansiti & MacCormack, 1997). Frequently there are several loops and iterations between the stages, and even the "last" stage of evaluation of the service in the field loops back to the generation of ideas for new services. Also, each stage is followed by questions that

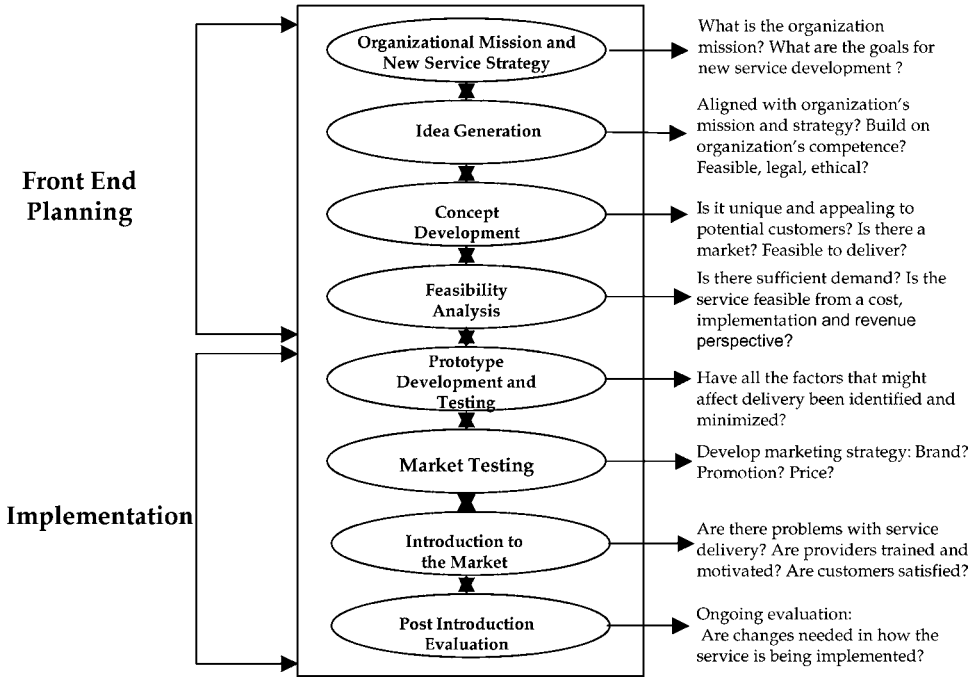

Fig. 2. New service development process (Zeithaml & Bitner, 2003).

should be answered in a positive manner before leaving that stage. As a general rule, as the new service progresses from what is initially a vague idea to a concrete reality in the marketplace, the information needed to move forward becomes more specific and detailed.

Our discussion of the new service development process is divided into two primary phases, front-end planning and implementation. Front-end planning encompasses all of the work leading up to actual implementation of the new service. Managers report the greatest weaknesses in new product and service development often occur in these early stages sometimes referred to as the "fuzzy front end" (Khurana & Rosenthal, 1997).

Front-End Planning

Organizational Issues and New Service Development Strategy

The foundations for successful NSDP are the organization's overall *business strategy* in terms of its vision, mission and reason for being, combined with its more narrowly defined goals related to new service development. For example, at the Mayo Clinic the core value is "the needs of the patient come first," a value captured in a famous quote by one of the founding Mayo brothers that can be found posted within its facilities: "the best interest of the patient is the only interest to be considered." Following from this core value is Mayo's mission "to provide the best care to every patient every day through integrated clinical practice, education, and research." Any new service ideas that would be explored by Mayo would need to fit within this broad purpose and mission. An organization's *new service strategy* is a more narrowly defined portion of the overall mission. The organization's targeted growth goals, other relevant goals, and its capabilities and interests help to define specific strategies for new service development. Questions to be addressed include "What is the primary goal for new service development? Is it to grow revenue and profits, serve society, improve quality of life, or some other goal?" and "Does the organization want to achieve this goal by developing additional services for its currently served customers, identifying new customer groups, or developing services for markets not currently served?" Cross-functional discussions, supported by information on capabilities and desires, inform and shape the organization's goals with regard to the new service strategies it can pursue. It is the responsibility of the leadership of

the organization to advance these discussions and communicate a strategy that will provide focus for the rest of the NSDP.

Idea Generation

Against the backdrop of the organization's strategy and new service development goals, many approaches are used for developing more concrete ideas for new services. These ideas can come from customers, employees, competitive analysis, alliance partners, and secondary research. Specific research approaches used at this stage are focus groups, customer observation, brainstorming, employee suggestion boxes, and review of secondary research, publications, trends, and data (see, Churchill & Brown, 2004, for specific approaches used in market research). For example, in designing its first "from the ground up" hospital in Scottsdale, Arizona, Mayo relied heavily on patient, family member, and employee input for ideas on how to design the facility that were consistent with Mayo's purpose and mission and would provide an exceptional level of service and very high standard of care (Zeithaml & Bitner, 2003, chapter 10; Berry & Bendapudi, 2003). Some organizations have formal "idea gardens" where new ideas can be solicited, encouraged, and nurtured. As ideas emerge, they can be passed through the new service strategy screen to assess which ideas should be pursued to the next stage where the service concept is developed more fully. To move forward, the idea should satisfy the following basic criteria (Cooper & Edgett, 1999, p. 103): Is the proposed idea aligned with the organization's strategy and vision? Does the idea appear to fit the organization's goals for new services? Is there reasonable likelihood of technical feasibility—can we develop and deliver it? Does the project leverage or build from the organization's core competencies? Does the project meet legal and ethical requirements?

Concept Development

After it has passed through the initial idea screen, the new service concept is ready to be tested for its basic viability using input from potential end customers and with employees or other providers who will deliver the service. The goal is to get a preliminary feel for whether customers will use or purchase the proposed service.

One of the challenges at this stage is to describe the concept in enough detail to get an accurate understanding of customer reaction. With physical products, this stage is easier in that mock-ups, drawings, or even simple models of the product can be produced. For services, verbal concept statements and concept-level blueprints can be used (Zeithaml & Bitner, 2003, chapter 8). Concept blueprints show visually the basic, high-level steps in a service process together with customer actions and interactions with the system. They provide a tangible "picture" of the service that can be invaluable. Concept statements are often simply verbal paragraphs describing the purpose for the service, outcomes expected, and benefits for customers. Customers and employees can react to the concept in focus group settings, through interviews, or quick surveys such as the "quick-cept" test employed by the Royal Bank of Canada (Cooper & Edgett, 1999, p. 105). The "quick-cept" describes the service idea in a paragraph or two along with a standard five-question questionnaire to gauge interest, liking, and customer purchase intent. The questionnaire is sent to approximately 10 sales people who fill it out and e-mail this description and survey to a handful of key customers. Thus, very quickly the organization has basic feedback from about 10 employees and 30–40 key customers.

Other preliminary assessments are carried out at this stage. For example, preliminary market assessments in terms of potential users, market size, and general interest can be conducted. If others are offering similar services, a basic assessment of these competing offerings can be included. If the service will require alliance partners for its development, delivery or marketing, preliminary exploration of potential partners could take place as well. Before leaving this stage the following questions will be answered: Is the service unique and is it appealing to customers in terms of likelihood of usage or purchase? Do employees (partners) believe there is a market for the service and is it at least tentatively feasible in terms of delivery? What is the nature of the competition?

Feasibility Analysis

At this point, it is time for the more detailed feasibility analysis and building of the business case (Cooper & Edgett, 1999, chapter 5). The information already learned in the preceding steps will feed into this analysis, but the rigor and detail required are more extensive. The specific activities at this stage

may vary depending on how "new" the new service is, and the significance of the financial and organizational investment required.

If needed, further *customer research* will be carried out to assess desires and reactions to the service in more detail. Service descriptions in terms of expected customer outcomes and basic value propositions can be further developed. More detailed *market research* to assess market size and potential demand for the service will also be carried out.

At this stage *competitive analysis* will be undertaken to determine whether there is room for the new service in the marketplace and how it will be differentiated from competitive offerings. Strengths and weaknesses of competing offerings will be analyzed. Competitive analysis comprises a large subset of marketing planning activities and its discussion is beyond the scope of this paper (see, Wood, 2003, for a detailed discussing of the components and creation of marketing plans). Customer feedback, market research, and competitive analysis provide the base for determining the *positioning* of the new service and defining the target market. This information will form the basis of a concrete marketing plan for the new service that will begin to take shape at this point in the process, and evolve to its final form in the market introduction stage below (Wood, 2003).

An *operations appraisal* is part of building the case for the service. Employees or providers will be probed to determine in greater specificity the operational feasibility of the new service. The existing service system (human resources, facilities, and existing processes) will be assessed in terms of its capacity to absorb or accommodate the new service. Resource needs and potential system incompatibilities should be noted at this stage (Tax & Stuart, 1997). Delivery mechanisms and related costs will be identified. If the service is to be delivered by an alliance partner, these potential third parties should be evaluated to determine their capabilities. A detailed *financial analysis* is carried out in which projected demand for the service, pricing assumptions, and cost of service delivery are used to estimate the financial feasibility of developing the new service. Financial and other risks associated with introducing the new service are also assessed.

Input from a variety of parties will be required for feasibility analysis. All facets and functions in the service organization will be involved at some level including marketing, human resources, service operations, and finance. To move from this stage to the implementation phases will require convincing answers to the following questions: What is the service, who will it be sold to (target markets), and why will they use or buy it (value, benefits)? What is the demand for the service based on demand projections? How will the service be positioned and differentiated from competing offerings? Is the service operationally feasible? How will the project be undertaken, when, and by whom, and how much will it cost? Why should we invest in the project? What are the costs (financial and otherwise) and benefits (financial and otherwise)?

Implementation

After the idea has successfully passed through all of the front-end planning stages, the project is ready to be implemented. At this point, development activities become very concrete and tactical, with the goal of successfully introducing the service to its target market.

Prototype Development and Testing

The prototype development and testing phase begins with the further refinement of the service concept into a more detailed service blueprint that captures every aspect of how the service will be implemented. Although similar in nature to the concept blueprint described earlier, the blueprint developed at this stage is very specific, outlining each step in the process including employee roles and responsibilities, points of contact between employees and customers, as well as needed technology and physical evidence (i.e., tangibles of the service) from the customer's point of view. The successful creation of this type of detailed blueprint requires a group effort involving all key stakeholders including individuals involved in operations, human resources, as well as customers.

Over time, the specific details of the service under development can be fleshed out via an iterative process of prototype development and testing. Although research on prototype development and testing in a services context is still in its infancy and little work has explored what methods are best to use given the characteristics of the new service under consideration, there are a variety of ways that organizations can develop and test aspects of the prototype. For example, recently, researchers specializing in operations have approached the NSDP from a service

engineering perspective. They suggest that under certain conditions, methods traditionally used for tangible product development may prove useful including structured analysis and design technique (SADT; Congram & Epelman, 1995), quality function deployment (QFD; Fitzsimmons & Fitzsimmons, 2004; see Bullinger, Fahnrich, & Meiren, 2003, for a more in-depth discussion of service engineering), and conjoint analysis. For example, Marriott used conjoint techniques to develop its Courtyard by Marriott hotel chain (Wind, Green, Shifflet, & Scarbrough, 1989).

For services that involve more customer contact, prototype testing can be particularly challenging. One option is to conduct prototype testing using methods similar to those carried out during concept development. However, at this stage, more specific information about the service and the context in which it will actually be implemented would be provided to potential customers and stakeholders. Some organizations have used technology to conduct prototype testing via virtual reality depictions of the service to which customers can react and provide feedback. Bank of America, an innovator in new service testing, recently used an experimental approach in which a set of its branches or "laboratories" experimented with new service ideas and assessed how they could be best implemented (Thomke, 2003).

The following are some key questions that are important to consider at this stage in implementation. Is the service/intervention that has been developed effective? Does the service fit the needs and wants of key customer segments? Have all aspects of the service been tested in the most realistic setting possible? Have factors that could negatively affect the delivery of the service been identified and studied sufficiently? Have steps been taken to limit their impact?

Market Testing

During the marketing testing stage, based on the marketing strategy decisions made earlier (e.g., target market and positioning of the service), plans for critical marketing activities such as branding, pricing, and promotion need to be conducted to guide the introduction of the service (see Kotler, 2001; Wood, 2003, for an in-depth discussion of marketing tactics and programs). Branding, along with tactical marketing decisions regarding elements such as pricing and promotion (which will be described in more detail below) are important because they serve to communicate the positioning of the service to consumers as well as affect consumers' perceptions of quality.

Developing a branding strategy is something that many organizations face when they introduce a new service (see Keller, 2003, for a detailed discussion of branding). Branding is the foundation for creating customer value as well as establishing a competitive advantage (Holt, 2002). Brands "serve as containers of reputations," convey that the organization can be trusted, emphasize the benefits to be delivered, as well as serve as symbols that can "express values and identities" (Holt, 2002, pp. 5–6). From a marketing perspective, all aspects of a service from pricing and promotion to delivery reflect on the brand. Thus, all of the design and marketing decisions that are made can be approached from a perspective of trying to optimize brand value.

Deciding on a pricing strategy is another important but often difficult undertaking when introducing a new service. Three common approaches include cost-based pricing where an organization determines a price based on direct and overhead costs as well as profit margin, competition-based pricing that focuses on the price charged by competitors, and demand-based pricing which involves setting a price that is in line with customers' perceptions of value (see Zeithaml & Bitner, 2003, chapter 16). Given the benefits and shortcomings in each approach, all three should be considered when making pricing decisions.

Promotion is critical to get the word out to customers and generate brand awareness. The best methods to use depend on the nature of the service and available budget. When promoting interventions, leveraging opinion leaders who are respected by the target market as well as tapping into relevant customer networks (e.g., agency associations, school systems) can help create brand awareness and facilitate adoption of the service.

Careful attention to each marketing decision is needed for a successful launch of the service. To help finalize decisions related to marketing tactics, customer testing can be conducted. Customers can be presented with a description of the service along with pricing and promotion information and asked about their perceptions and likelihood of adoption. In a similar manner, testing can also be done on the clarity of materials intended for individuals who deliver the service or for end-customers to make sure that the information is readily understood.

In many situations, the extent to which new services can be fully tested prior to launch is limited because new service offerings are often delivered via delivery systems for existing services. Sometimes, when services are provided at multiple locations, a new service will first be offered at one location as a test run. This type of testing provides a dress rehearsal in which developers can make sure that no details have been overlooked in the development of the service. Consideration should be given to the following: Has the branding strategy for the service been clearly articulated? Has careful attention been given to each marketing element such as price and promotion? Are the decisions for each element being made based on the target and positioning of the service, the effect they will have on the brand, and the financial consequences?

Introduction to the Market/Launch

When the service is launched, it is important that not only all of the details of the service process are in place but that the marketing elements have been or are in the process of being successfully executed. For services, the importance of having employees who possess the skills to deliver a high quality service experience and who are motivated to do so cannot be overstated. It is also important to have processes in place to monitor key aspects of the service. There are a number of different types of measures that are useful to collect. In regards to the service itself, it is important to gather feedback from customers such as perceptions of service quality, satisfaction with the service experience as well as loyalty (e.g., commitment, repurchase intentions or continued use intentions) via survey methodology or through qualitative research (see Zeithaml & Bitner, 2003, chapter 5, for a detailed discussion of elements of an effective marketing research program in a service context). It is also important to measure the perceptions and satisfaction of those who deliver the service to end customers.

Additional research might be done in regards to the marketplace to assess the success of the launch. Such research could be undertaken to measure awareness of the brand among the target segment and key stakeholders as well as the adoption rate. Over time, it might be worthwhile to do competitive brand assessments to gain an understanding of how the brand is viewed in relation to its competitors. Assessment of costs, profitability of the service, and return on investment for marketing initiatives would also be important.

Key questions that should be considered at this stage include the following: Are there any urgent problems with service delivery that require immediate attention? Is every effort being made to ensure that the individuals delivering the service are properly trained and continue to be motivated to provide outstanding service? Is information being gathered concerning their perceptions of and experience delivering the service? Are there systems in place to track every aspect of service delivery including customers' perceptions of and satisfaction with the service?

Postintroduction Evaluation

This stage involves a critical examination of the information gained through the initial introduction of the service. On the basis of these findings, changes to the service or how it is being marketed are made. The service blueprint can serve as a good basis for thinking about possible modifications to the process, staff, or physical aspects of the service. Sometimes, the data indicates that a change in the marketing tactics such as how the service is priced or promoted is needed. Given that changes in the environment or expectations and perceptions of customers or other stakeholders can affect the service over time, it is important to view the service and how it is marketed as being in a constant state of refinement. To do so effectively requires that processes are in place to continually gather data and evaluate the implications of the information for how the service is delivered and marketed.

PREVENTION SERVICE DEVELOPMENT MODEL (PSDM)

The Prevention Service Development Model (PSDM) integrates concepts and methods from the NSDP and the traditional PRC. It consists of front-end planning and implementation phases, and within each complementary activities address questions derived from each model. Although the PSDM begins at the very earliest stages of program design, it is an iterative process which can be employed at any stage of program development, dissemination, and ongoing service delivery. Although the fully specified model is new and has not systematically guided our prior work, we have utilized specific activities in the

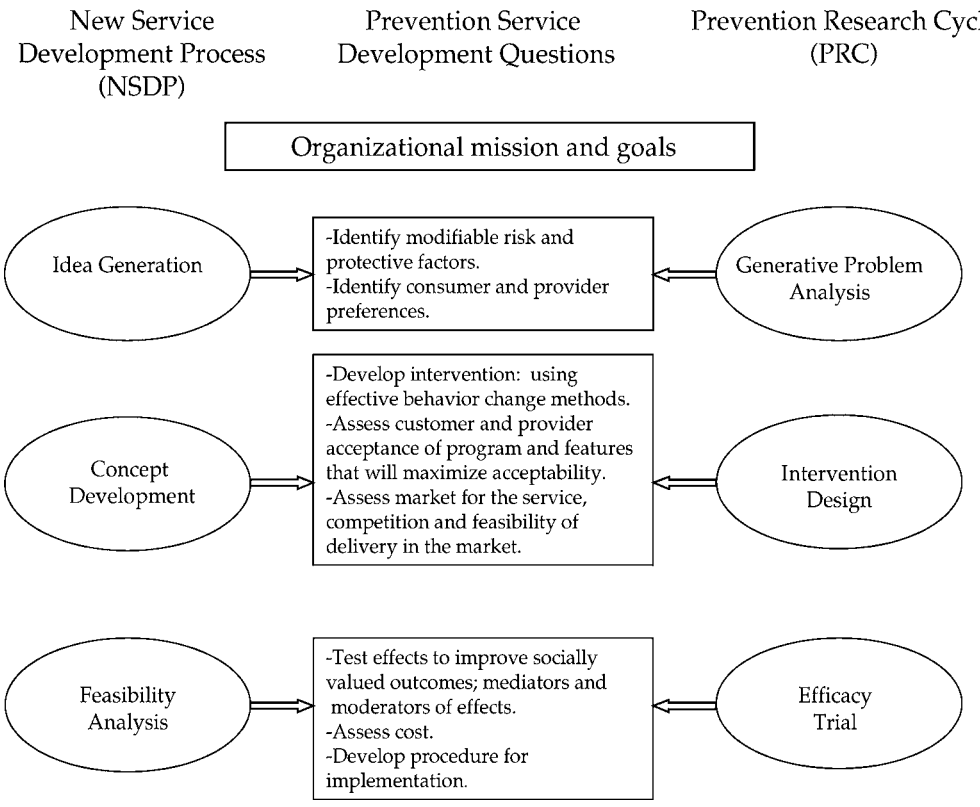

Fig. 3. Prevention service development model (PSDM): Front-end planning.

model in the development of our interventions for children from divorce families (New Beginnings Program, NBP) and bereaved children (Family Bereavement Program, FBP), and will describe these for illustrative purposes.

Front-End Planning

Front-end planning involves the generation of the idea for the new service, developing an initial design of the service or intervention and assessing its feasibility (see Fig. 3). The first step in this phase is to consider how the new service fits into the organization's mission and strategy for growth and development. Our research on divorce and bereavement was conducted by our university-based prevention research center, funded by the National Institute of Mental Health. The center's mission is to generate knowledge concerning new approaches for the prevention of mental health problems, and our organizational structure is well-designed to support this mission. The front-end planning activities proposed below are an expansion of these ongoing research activities and can be supported by this organizational structure. However, the center does not have the mission of actively promoting and managing the dissemination of its intervention. Thus, a new organizational structure is necessary to conduct these activities (Rotheram-Borus & Duan, 2003), which will be discussed in the implementation phase.

One important feature of the organizational structure that is often not included in University-based research centers is an advisory board consisting of key stakeholders in the problem being studied. Stakeholders may include representatives of consumers who may eventually participate in the intervention, potential providers of the service, organizations in which these services may be provided as well as researchers with experience in this area. The Advisory Board can be used to provide critical feedback on scientific issues, to propose questions that are generated based on consumer or provider experiences, and to anticipate issues which will later be important at the implementation phase of the research.

The Generative phase of the PRC and the Idea Generation phase of the NSDP provide complementary approaches to the development of new services. In the PRC, this phase typically involves studies to document the extent of the problem and identify potentially modifiable risk and protective factors for problem development. These studies define the population to be targeted and factors to change to improve specified outcomes. Complementary information from the NSDP idea generation phase involves obtaining ideas from multiple customers (in our case, parents and children in at-risk situations) and providers of services. In the PSDM, the initial idea would have to satisfy the criteria of targeting processes that research indicates are related to outcomes and are consistent with the perceived needs and values of consumers.

We began our work with divorced families about two decades ago. At that time, despite epidemiologic studies documenting that children of divorce are at increased risk for a wide range of problems (see, Hetherington & Kelly, 2002), there were few studies demonstrating the effectiveness of program to prevent these problems (for exceptions see, Pedro-Carroll & Cowen, 1985; Stolberg & Garrison, 1985). Furthermore, despite evidence that many of the risk and protective factors for mental health outcomes of children of divorce (e.g., quality of parenting, interparental conflict) were at least partially under the control of the parent, no interventions had attempted to change these risk and protective factors specifically by working with the parent (Sandler Wolchik, Davis, Haine, & Ayers, 2003). The development and experimental evaluation of new service derived from the existing research literature was consistent with the center's prevention research mission.

The next stage, intervention design, involves complementary activities from the intervention design phase of the PRC and the concept development and feasibility phases of the NSDP. In the PRC, intervention design involves selecting the technology that has demonstrated efficacy to change the selected risk and protective processes, pilot testing the program to assess acceptability to the targeted population and safety in terms of the lack of iatrogenic effects (Greenwald & Cullen, 1984). The NSDP assesses the customers' likely acceptance of the new service, features that might maximize customer acceptance, the potential market for the new service, and factors that might influence acceptability in the market. Illustratively, a survey of a community sample of divorced families found that in the 2 years following divorce, 50.6% of parents reported receiving assistance in parenting and 45.8% reported that children received services providing assistance in coping (Sandler, Gersten, & Beals, 1987). We also conducted a survey of divorced parents to assess their program preferences. Parents indicated high levels of acceptability for programs that addressed children's emotional problems and facilitated communication with children, and preferred programs delivered in a group led by a professional that met on weekday evenings.

Program acceptability is also assessed from the perspective of the organization within which it will be delivered. Questions are addressed such as: Is the program seen as acceptable and is it feasible to deliver the service within these organizations? What factors will influence acceptability to the service delivery organization? While the service is not yet ready to be marketed these preliminary assessments should influence the original design of the intervention to maximize the likelihood that, if the intervention is found to be efficacious, it can later be successfully implemented by service delivery agencies.

From an organizational perspective there is considerable evidence that the Domestic Relations Courts are interested in offering parenting programs for children of divorce (Salem, 1996).[3] A national survey of U.S. counties found that 50% were offering parent education classes, most of which were single session mandatory classes (Blaisure & Geasler, 1996). Cookston Braver, Sandler, and Genalo (2002) in a study of a stratified random sample of courts providing parenting programs found that nearly a third of courts were either offering or were considering developing more lengthy parenting programs for either custodial or noncustodial parents. Our program concept was differentiated from services currently being offered in that it focused more on building skills for effective parenting, and none had been adequately evaluated (Braver, Salem, Pearson, & DeLuse, 1996). Furthermore, the survey of Courts identified two potential barriers to court adoption of a lengthy parenting program, funding, and parental attendance (Cookston et al., 2002). Thus, studies from the NSDP indicated there was a potential market for the new intervention, both from the

[3] Although optimally research on acceptability of the intervention to the eventual service delivery setting would be conducted as part of concept development and feasibility assessment, in our research program these activities followed the efficacy trials.

perspective of consumers and institutional providers of the service and that our concept of a skill focused program, that was well-evaluated would be distinct from what was currently being offered.

The next phase of the NSDM involves experimental efficacy trials, which are conceptualized as part of front-end planning because they test whether the program has its intended effect to improve socially valued outcomes, and thus that widespread implementation is justified (Biglan, Mrazek, Carnine, & Flay, 2003; Flay, 1986). Demonstrated efficacy to improve these outcomes also differentiates the program from nonevaluated competing services. Because different outcomes are valued by various stakeholders, it is important that prevention programs demonstrate positive impact in multiple domains. Illustratively, the 6-year follow-up of the efficacy trial of the NBP demonstrated positive effects to improve mental health, drug and alcohol use, decrease the number of sexual partners as well as improve grade point average (Dawson-McClure, Sandler, Wolchik, & Millsap, 2004; Wolchik et al., 2002). From an organizational perspective, demonstrating positive impact on factors within the court system, such as reducing use of expensive court services will make the NBP particularly attractive for later adoption by the courts. Efficacy trials also provide information concerning the mediating processes which account for program effects, and differential effects across participants. From a service development perspective, as described below, these findings help identify core program components for later community implementation of the program, and help identify specific subgroups who are most likely to benefit from the program.

Efficacy trials can also provide information on the cost of the service. Detailed cost figures for each feature of the program (e.g., training, participant recruitment, service provision, supervision) can be useful in estimating the cost of implementing the program in community agencies and identifying potential program modifications to reduce cost. For example, Foster, Porter, Ayers, Kaplan, and Sandler (2004) estimated the cost of administering each aspect of the FBP in the efficacy trial as $56 per contact hour in the efficacy trial to $37 per contact hour as delivered in a community agency. Furthermore, analyses demonstrating the economic benefit of the intervention relative to the financial cost can be very helpful in advocating for policies to fund later implementation of the intervention. Other important yields from the efficacy trial include detailed manuals describing all procedures for program implementation including participant recruitment, program content, provider training, and supervision, etc. (Price & Smith, 1985).

Implementation

Organizational Structure

Two related, yet distinct missions of the implementation phase can be identified, each of which require a different organizational structure. The organizational structure used for the study of efficacy is appropriate for the research mission of testing the preventive service under natural service delivery conditions. An important feature in the organizational structure that is often not included in university-based research is an advisory board of key stakeholders in the problem being studied. Stakeholders may include representatives of consumers, potential providers of the service, agencies that might deliver the service, and policy experts. The advisory board can provide critical feedback in the front-end planning and implementation phases in providing critical feedback proposing new scientific questions based on their unique experience. In the implementation phase, the advisory board plays an increasingly critical role by not only providing advice on all aspects of the studies but also by assisting in the enlistment of organizational sites for conducting the studies.

The second mission involves marketing the program for widespread adoption. The organizational structure for this mission supports functions such as marketing, branding, pricing, ongoing training and support for implementation and ongoing service quality maintenance and improvement. These functions need to be provided by an organization with an appropriate mission and strategic plan. This organization needs to retain close partnership with the researchers who developed the program and should have as part of its mission the maintenance of high levels of quality of implementation of the program. Examples of organizational structures devoted to promoting the dissemination of evidence-based prevention programs are emerging (Gordon & Stanar, 2003; Olds, Hill, O'Brien, Racine, & Moritz, 2003; Rotheram, 2004). For example, the National Center for Children, Families and Communities was developed with the mission of assisting state and local health organizations to adopt and implement

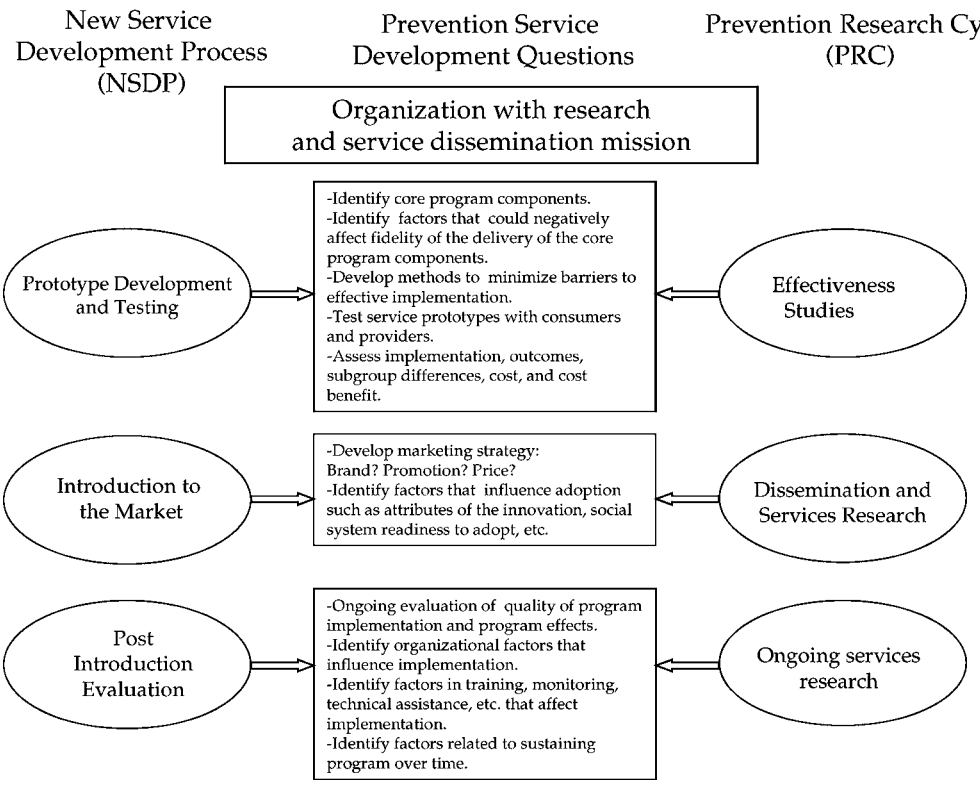

Fig. 4. Prevention service development model (PSDM): Implementation.

the Nurse–Family Partnership, a prevention program which was developed using the prevention research cycle.

Implementation Research and Service Agenda

Three types of complementary activities are included in the implementation process: effectiveness studies that evaluate the service as delivered in community settings, marketing to disseminate the service widely, and ongoing evaluation and quality improvement. As shown in Fig. 4, the PSDM uses methods and concepts from both the PRC and the NSDP in each of these activities.

Effectiveness studies evaluate the effects of the intervention as delivered in the natural environment; how these effects differ as a function of levels of implementation, use of the service by the consumer (e.g., compliance), and how these factors differ across characteristics of consumers, providers, or organizational settings (Flay, 1986; Schoenwald & Hoagwood, 2001). From the perspective of the NSDP, the effectiveness trial is a "dress rehearsal" for widespread implementation in the community. One of the major issues in preparing for an effectiveness trial concerns the adaptability versus fidelity of delivery of the service: to what extent the program can be adapted in order to fit differences in consumers, providers or service delivery settings while still effecting positive change on socially valued outcomes (Center for Substance Abuse Prevention, 2002). One perspective is that there are core program components (i.e., those that are responsible for program effects) that need to be delivered with fidelity while other components are adaptable. Mediational analysis from prior efficacy trials provides one set of clues to identify core program components (MacKinnon & Dwyer, 1993), and expert knowledge of the program developers can be used to identify the components that are most likely to affect these mediators. In addition, experimental designs can be used to identify the effects of specific program components (West & Aiken, 1997). For example, improved parental warmth and discipline were found to partially account for the effects of the NBP to improve mental health and academic outcomes 6 years later for children from divorced families (Sandler, Millsap, Zhou, & Wolchik, 2004). In addition, an experimental test indicated little additive

effect of a child-coping component over and above the impact of the parenting program (Wolchik et al., 2002). On the basis of these findings, we decided that the components of the NBP that focused on improving parenting were responsible for many program effects, and that these "core" components need to be implemented with high fidelity in community agencies.

Techniques and concepts from NSDP provide important tools to maximize successful program implementation in community agencies by identifying potential barriers to fidelity and pretesting prototypes of modifications to enhance fidelity. For example, service blueprinting provides a very detailed description of the process of delivering the service from the perspective of all stakeholders, consumers, providers, and support personnel (Zeithaml & Bitner, 2003, chapter 8). Implementing an intervention in a community agency in a way comparable to the efficacy trial may be difficult due to differences in required customer actions (e.g., parking, finding caregiving for children), a decrease in time allocated to backstage employee actions (e.g., training or ongoing supervision), or a lack of support processes (e.g., copying of forms). Planning for replication of the intervention in the service agency may begin by all relevant stakeholders participating in developing the service blueprint based on the blueprint in the efficacy trial and problem solving how to deal with potential incompatibilities.

As another example Quality Function Deployment (QFD) uses input from key stakeholders (organizational experts, providers, consumers, and cultural experts) to identify potential sources of variability in implementing the core components of the intervention in service agencies. Sources of variability might include features of the program (e.g., session length), aspects of the manual (e.g., amount of material to present), characteristics of participants (e.g., cultural differences), or constraints of the organizational environment (e.g., time allocated to supervision). These sources of variability are potential barriers to consistent high fidelity implementation in the service delivery setting. Multiple methods can be used to obtain this information, including in-depth interviews with providers who pilot test delivering the service in their setting, and obtaining reactions to vignette prototypes of specific parts of the program from a panel of potential providers. Once sources of variability are identified, methods to minimize their effects can be developed through making surface structure changes (e.g., user-friendly manuals, teaching aids, video demonstrations), developing comprehensive and standardized training and technical assistance materials (e.g., web-based feedback to providers) and by adapting the program for culturally diverse audiences (Sue & Arredondo, 1992). Although QFD methods have been used successfully as a way of embedding the "voice of the consumer" in manufacturing and service development in the design of products (Curtis & Ellis, 1998) and health care systems (Shaffer & Pfeiffer, 1995), they have rarely been applied to prevention programs (see Kegeles et al., 2000, for an interesting exception). Illustratively, the Advisory Board for the NBP consisting of knowledgeable stakeholders with different positions in the Domestic Relations Courts (e.g., judges, court administrators, and human service professionals) identified 17 types of factors that would affect quality of implementation of this program in the court setting. The three highest ranked categories of factors were on-site administration and coordination, ongoing feedback from consumers and stakeholders, and training of providers. Preparation for implementation in the courts will need to design strategies that address each of these factors, as well as those identified by other key stakeholders (e.g., providers), to optimize fidelity of implementation of core NBP program components in the courts.

Introduction to the Market and Postintroduction Evaluation

If the effectiveness trial demonstrates positive effects of the program when delivered in the natural setting, the service is ready for marketing to the community. The NSDP identifies the strategies of branding, pricing, and promotion as critical for marketing of a program. Although there are multiple examples of successfully marketed prevention programs, many of these lack any evidence of effectiveness (Gottfredson & Gottfredson, 2002). Rogers (1995) discussed how the rapid diffusion of DARE as a drug abuse prevention program was driven largely by the high priority of the drug issue on the national agenda, and the ability of DARE to show that the schools were "doing something" about the perceived drug problem. The fact that DARE is a collaboration between the police and the schools, and thus is compatible with dominant societal values likely also played a role in its rapid adoption despite the paucity of evidence concerning its efficacy. The case study of the marketing of DARE and the dissemination of

other nonresearch based programs (Gottfredson & Gottfredson, 2002) is a graphic reminder that marketing requires strategic planning and that adoption decisions are based on factors other than empirical evidence of program effectiveness. For example, Rogers (1995) identified five factors as determining the rate of adoption of innovations, perceived attributes of the innovation, types of innovation decision, communication channels, nature of the social system (e.g., network interconnectedness), and extent of change agent promotion efforts.

The Advisory Board for the NBP identified six categories of factors that they believed would influence adoption by the court. They rank ordered these factors in order of importance as (1) court funding and resource investment (e.g., cost to the court), (2) program perceived efficacy (e.g., broad support from professionals and citizens), (3) perceived program credibility (e.g., other court experiences with the program), (4) program structure and content (e.g., number of sessions), (5) program delivery quality (e.g., program material), and (6) program accessibility (e.g., multicultural access). These factors can be addressed both in the design of the effectiveness trial and in communication of findings from the trial. For example, the effectiveness trial can develop data on the cost of implementing the NBP, and on benefits to reduce court costs (e.g., by reducing use of other court services) and use of health and mental health services. Findings concerning program impact to improve outcomes for children will be helpful by generating broad support for the program from parents, professionals, and other stakeholders. Such results are most likely to affect adoption if they are communicated directly to opinion leaders and decision makers in the field. To gain visibility for the NBP and reinforce its identity as a research-based program we have consistently presented findings from our research at conferences of court professionals, the decision makers for our targeted market. Optimally each of the factors relevant to adoption, as well as other marketing activities (e.g., branding, pricing, promotion) would be captured in a marketing plan developed in parallel with the effectiveness trial.

Ongoing Evaluation and Quality Improvement

After programs have been adopted by community agencies, it is a challenging task to maintain their positive effects and sustain them as institutionalized practice over time. The task can be viewed from two perspectives, the adopting community organization and the disseminating organization (Mayer & Davidson, 2000). Wandersman (2003) proposes that successful implementation of prevention programs requires building the organizational capacity of the agencies to select, implement, evaluate, and sustain the preventive intervention. He and his colleagues have developed tools and a training framework to assist organizations to adopt programs that are targeted to meeting their needs, implement them with quality, evaluate how they work in meeting local needs, and address the issue of maintaining the program over time. These strategies complement the program developers' activities for ongoing evaluation and monitoring of program implementation. A growing number of prevention organizations have developed models to successfully disseminate their programs to large numbers of community agencies (e.g., Kumpfer & Alvarado, 2003; Sanders, Turner, & Markie-Dadds, 2002; McDonald and Sandler, FAST). For example, Olds et al. (2003) describe three conditions for effective replication of their Nurse Home Visitor Program: preparing the site to have the capacity to deliver the program, providing training and technical assistance to support implementation, and developing methods of ongoing evaluation and quality improvement. Although there is considerable research on factors that influence adoption of new programs, relatively little research has been done on factors that contribute to quality of implementation and effectiveness after the prevention program has been adopted, and factors that affect sustainability of the intervention in community agencies (for notable exceptions see Goodman & Steckler, 1989; Mayer, Blakely, & Davidson, 1986).

SUMMARY

Prevention researchers have had considerable success in the past two decades in demonstrating the efficacy of a wide variety of preventive interventions. However, the impact of prevention research on the public health has been limited due to the low rate of implementation of effective preventive interventions in community agencies. This paper has proposed a Preventive Services Development Model as an approach in which preventive interventions are developed from the very beginning with the twin goals of being effective and readily implementable in the community. To accomplish these twin goals the model integrates complementary strengths of

concepts and methods from marketing and from prevention research

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