CHAPTER 1
OVERVIEW OF INTERVENTION MAPPING

Competency

- Choose and use a systematic approach to planning health promotion programs.

In this chapter we present the perspectives underlying Intervention Mapping and a preview of the program-planning framework. The purpose of Intervention Mapping is to provide health promotion program planners with a framework for effective decision making at each step in intervention planning, implementation, and evaluation. Health promotion has been defined as combinations of educational, political, regulatory, and organizational supports for behavior and environmental changes that are conducive to health (Green & Kreuter, 2005), and health education is a subset of health promotion applications that are primarily based on education. This book uses the terms health educator, health promoter, and program planner interchangeably to mean someone who is planning an intervention meant to produce health outcomes. One difficulty which planners may encounter is that of knowing exactly how to create health promotion or education programs that are based on theory, empirical findings from the literature, and data collected from a population. Existing literature, appropriate theories, and additional research data are basic tools for any health educator, but often it is unclear how and where these tools should be used in program planning. In Intervention Mapping, these tools are systematically applied in each step of program development.
Imagine a health promoter in a city health department. The city’s mayor, who has recently received strong criticism for inattention to a number of critical health issues, has now announced that a local foundation has agreed to work with the city to provide funding to address health issues. Youth violence, childhood obesity, adolescent smoking, and other substance abuse as well as the high incidence of HIV/AIDS are among the many issues competing for the mayor’s attention. Not only does the allocated sum of money represent a gross underestimation of what is needed to address these issues, but also the city council is strongly divided on which health issue should receive priority. Council members do agree, however, that to dilute effort among the different issues would be a questionable decision, likely resulting in little or no impact on any single issue. As a response to increasing pressures, the mayor makes a bold political move and invites stakeholders who have advocated for these health issues and others to work with the health department to decide on the issue that should be chosen and to build and implement an intervention. The mayor agrees to help secure yearly funds, contingent on the project’s effectiveness in producing significant, measurable improvements in the chosen issue at the end of each fiscal year.

The health promoter is to be the project lead from the city health department. Although she is apprehensive about the professional challenge as well as the complications inherent in facilitating a highly visible, political project, the health promoter feels encouraged by the prospect of working with community and public health leaders and is energized by the possibilities in the new project.

The first step the health promoter takes is to put together the planning group for the project. She considers the stakeholders concerned with health in the city. These are individuals, groups, or other entities that can affect or be affected by whatever project is chosen. She develops a list of community, health services, and public health leaders and invites these individuals to an initial meeting where they will discuss the project and make plans to expand this core group. She uses a “snowball” approach whereby each attendee suggests other community members who may be interested in this project. The superintendent of schools begins the process by suggesting interested parents, teachers, and administrators. After the first meeting, the health educator has a list of 25 people to invite to join the planning group.

Twenty-five people is a lot for one group, and the project lead knows that this multifaceted group will have to develop a common vocabulary and understanding, work toward consensus to make decisions, maintain respect during conflicts, and involve additional people throughout the community in the process. Members must be engaged, create working groups, believe that the effort is a partnership and not an involuntary mandate, and work toward sustainability of the project (Becker, Israel, & Allen, 2005; Cavanaugh & Cheney, 2002; Economos & Irish-Hauser, 2007; Faridi, Grunbaum, Gray, Franks, & Simoes, 2007).

The composition of the city’s planning group is diverse, and group members are spurred by the mayor’s challenge and enthusiastic to contribute their expertise. With this early momentum, the group devotes several weeks to a needs assessment, guided by the PRECEDE model (Green
& Kreuter, 1999). The members consider the various quality-of-life issues relevant to each of the health problems, the segments of the population affected by each issue, associated environmental and behavioral risk factors for each health problem, and determinants of the risk factors.

Planning group members recognize the importance of all of the health issues discussed by the group, and they want to work with community members to ascertain what problem might be most relevant to the community and most feasible to address. Even though the planning group comprises many segments of the city’s leadership, health sector, and neighborhoods, the members realize that they do not have a deep enough understanding of what health problems might be of most relevance in their community. A subgroup takes on the role of community liaison to meet with members of various communities within the city to discuss health problems. The community liaison group wants to understand community members’ perceptions of their needs, but it is equally concerned with understanding the strengths of the communities and their unique potential contributions to a partnership to tackle a health problem. The subgroup invites members of each interested neighborhood to join the planning group. Jointly, the planning group, the communities, and the funders agree to select a problem as the focus of an intervention. The health promoter knows that with a group this large she will have to strategize about using smaller work groups for different tasks. However, knowing the history of the city and the feeling of some stakeholder groups that they are often excluded from initiatives, she welcomes all interested participants.

The group’s initial work on the needs assessment identifies childhood obesity as an important problem, one that the community members could agree to work on, and one that disproportionately affects lower-income and minority children. This initial work facilitates group cohesion and cultivates even greater enthusiasm about generating a solution for the health problem; however, despite the considerable needs assessment work that remains to be done (see Mayor’s Project, Chapter 4), several members of the group even begin to imagine the victory that would be had if the group were to produce a change in half the allotted time because so much of the needed background information has already been gathered. The project lead knows that there remains a lot of work to be done but is comfortable with the group’s enthusiasm as well as their pace and productivity. Once the group decides which issue to address, it faces the challenge of moving to the program-planning phase. In her previous work the health promoter used Intervention Mapping to develop programs and felt fairly confident about scheduling the first planning meeting devoted specifically to intervention.

What the health promoter hasn’t anticipated is that in the course of conducting the initial part of the needs assessment, each group member independently began to conceive of the next step in the planning process as well as to visualize the kind of intervention that would be most suitable to address the problem. The day of the meeting arrives, and on the agenda is a discussion of how the group should begin program planning. What follows is a snapshot of dialogue from the planning group that illustrates several differing perspectives.
School Board Member: As we see from the work of our community liaison group, parents are concerned about obesity in children. According to community development techniques, we have to start where the people are. I think we should begin by conducting a series of focus groups with parents and have them tell us what to do.

City Council Representative: But we also heard a lot about the barriers to eating good food and exercising. Some of these barriers are environmental. I think we ought to develop a program for the Department of Parks and Recreation.

Community Member Parent: Well, I think a school-based program is most important. Our children need to learn what to eat.

Community Member/Teacher: Yes, children do have a role. Helping children make nutritious choices is important, but what about the quality of food they are served at home and in the schools?

Community Agency Participant: I think the program should focus on excess television watching and sedentary behavior. All community members just need to get up and move!

Parks and Recreation Representative: We are talking about one dimension of the problem at a time. This is a very big, very complicated problem. How will we ever address everything? Maybe it is just too big. Maybe we need to take on a simpler problem.

Religious Leader: Well, it is big. Maybe we will need an agency coordinator. I say we find a nonprofit group to serve as a community coordinating center from which various interventions and services can be implemented. That way, programs are sustainable and a variety of activities can be offered.

Youth Club Board Member: One of the national obesity programs has great brochures and videos—in three languages. We have numerous testimonials from kids, teachers, and parents about how motivated they were by these interventions. This approach is quick and easy; it’s low cost; and I’ve already made sure we can get the materials. Plus, if the materials come from a national center, they must be effective.

Community Member: But, are those materials really powerful enough? It seems like a problem as complex as obesity would have to be addressed in many different ways. For example, what about the food service providers in schools? I think we have to think more carefully about how to address the many factors that may be causing this problem and making it hard to solve.

Health Care Provider: We know it takes more than learning information to change behavior. We have to address factors such as attitudes and self-efficacy. But how do we measure a change in attitudes? I think we should measure behavior directly.
**Educator:** Well, clearly we have to begin by designing a curriculum. What are our learning objectives?

The health promoter is worried but undeterred by the cacophony of comments about program development. She is prepared to lead group members through a series of systematic steps to construct the intervention and realizes that the group could work through their differences in the process. She is pleased to have a group with so much cumulative experience. The planning group decides to complete the needs assessment by organizing the information about obesity using an effective model that has been applied to many health issues (Green & Kreuter, 2005). (See Intervention Mapping [IM] Step 1, Chapter 4.) The members agree to take an ecological perspective, that is, the belief that most health problems are multidetermined and that one must intervene at individual, organizational, community, and societal levels to resolve a problem (Kok, Gottlieb, Commers, & Smercenik, 2008). But, as the group dialogue indicates, each group member brought a different set of experiences and training to the meeting. This is a common experience in group activities. Each member makes an important and relevant contribution worthy of consideration in the creation of the intervention. To help the group move to solutions to the problem that they describe in the needs assessment, they will specify behavior and environmental conditions that should change and also the determinants of the desired change (IM Step 2, Chapter 5); design an intervention, including theory- and evidence-based change methods and applications (IM Step 3, Chapter 6); produce a deliverable program (IM Step 4, Chapter 7) and specify how it will be implemented (IM Step 5, Chapter 8); and make plans for program evaluation (IM Step 6, Chapter 9).

**Perspectives**

Intervention Mapping is a planning approach that is based on using theory and evidence as foundations for taking an ecological approach to assessing and intervening in health problems and engendering community participation.

**Theory and Evidence**

We agree with Kurt Lewin’s adage that nothing is as useful as a good theory (Hochbaum, Sorenson, & Lorig, 1992). The use of theory is necessary in evidence-informed health promotion to ensure that we can describe and address the factors that cause health problems and the methods to achieve change. Teachers of health promotion and education suggest that the field would be well served with better guidance in how to use theory to understand health and social problems (DiClemente, Salazar, & Crosby, 2011; Glanz & Bishop, 2010; Glanz, Rimer, & Viswanath, 2015; Jones &
Donovan, 2004). In the text, we address this need by providing guidance on the how-to of theory selection and use (Brug, Oenema, & Ferreira, 2005).

In Intervention Mapping we use theory from a problem-driven perspective. Program planners, even those who are primarily researchers, often approach theory in a way that is fundamentally different from either theory generation or single theory-testing. A person who wants to find a solution to a public health problem has a different task from one who wants to create or test a theory. In practice, problem-driven, applied behavioral or social science may use one theory or multiple theories, empirical evidence, and new research to assess a problem and to solve or prevent a problem. In this approach, the main focus is on problem solving, and the criteria for success are formulated as outcomes related to the problem. Contributions to theory development may be quite useful, but they are peripheral to the problem-solving process.

Choices have to be made when developing an intervention, and theories are one tool to enable planners to make better choices. Health promotion planners are likely to bring multiple theoretical and experiential perspectives to a problem rather than to define a practice or research agenda around a specific theoretical approach. To understand a problem, the planning team begins with a question about a specific health or social problem (Buunk & Van Vugt, 2013; Ruiter, Massar, Van Vugt, & Kok, 2012). The team then accesses social and behavioral science theories and research evidence of causation of the health problem and its behavioral and environmental contributors. Causal theories help describe the health problem and its causes. Change theories suggest approaches to problem solutions. The planner then proceeds to gather evidence for the factors theory suggests. By the term evidence, we mean not only data from research studies as represented in the scientific literature but also the opinion and experience of community members and planners. In this way, theoretical and empirical evidence is brought to bear on meeting a health or social need. Intervention Mapping provides a detailed framework for this process.

### Ecological Models and Systems Thinking

The social ecological model, an underpinning for Intervention Mapping, has been used extensively in health promotion and is consonant with and encompassed by systems thinking (Kok et al., 2008; *American Journal of Community Psychology*, 2007; McLeroy, 2006; National Cancer Institute, 2007; Trochim, Cabrera, Milstein, Gallagher, & Leischow, 2006). In the social ecological model, health is a function of individuals and of the environments in which individuals live, including family, social networks, organizations, communities, and societies (Berkman, Kawachi, & Glymour, 2014; Crosby, Salazar, & DiClemente, 2011; Marmot, 2000; Richard, Gauvin, & Raine, 2011; Stokols, 1996).
A system is activities, actors, and settings that are affected by or affect a certain problem situation (Foster-Fishman, Nowell, & Yang, 2007). Using a systems perspective to assess the needs and strengths of the population; to understand a health problem and its causes; to form a group of stakeholders to plan, conduct, and disseminate an intervention; and to select the most effective leverage points to address a health-related problem can increase the effectiveness of planning. In particular, planners should understand that interventions are events in systems and that other factors within a system can reinforce or dampen the influence of an intervention on the specific behavior or environmental change being targeted (Hawe, Shiell, & Riley, 2009). See Chapter 3.

The social ecological paradigm focuses on the interrelationships between individuals (biological, psychological, and behavioral characteristics) and their environments. These environments include physical, social, and cultural aspects that exist across the individual’s life domains and social settings. A nested structure of environments allows for multiple influences both within levels and across levels. Throughout the book, we have adopted the approach of D. G. Simons-Morton, B. G. Simons-Morton, Parcel, and Bunker (1988) of looking at agents (decision makers or role actors) at each ecological level: interpersonal (e.g., parents), organizational (e.g., managers of school food services), community (e.g., newspaper editors), or societal (e.g., legislators). Interventions at the various levels focus on agents (individuals or groups, such as boards or committees) in positions to exercise control over aspects of the environment. For example, adolescent uptake of smoking might be influenced by peers and parents at the interpersonal level of environment and by regulations and access at the social and community levels of environment. The picture that emerges is a complex web or system of causation as well as a rich context for intervention.

We present, as a beginning point, a template for simple, linear logic models focusing on the presumed cause-effect pathways related to health problems and their solutions articulated from theory and empirical research (Bartholomew & Mullen, 2011). See Chapter 4. However, we encourage the reader to adapt the logic model template to the complexity of the problem being analyzed, and we assume that the intervention, the system activity being targeted, and the proposed outcome are part of a complex multilevel system. An intervention at one environmental level can influence causal factors at multiple levels. For example, a program to conduct health-related lobbying may influence a legislative behavior (passing laws) that may influence individual health behavior. In illustration, one of our colleagues worked with a coalition in a large metropolitan area to use media and social advocacy to influence the police department and the U.S. Department of Labor to crack down on the use of young Hispanic children as dancers in bars and nightclubs (an activity that can lead to such health risk
behaviors as substance abuse and prostitution). Once policy-level change occurred, parents expressed more resolve to manage their children.

**Participation in Health Promotion Planning**

All health promotion program development, implementation, and evaluation should be based on broad participation of community members (Israel et al., 2008; Krieger et al., 2002; Minkler, 2004, 2005; Minkler, Thompson, Bell, Rose, & Redman, 2002; Wallerstein & Duran, 2006; Yoo et al., 2004). Inclusive community participation helps ensure that program focus reflects concerns for the local community. Broad participation can bring a greater breadth of skills, knowledge, and expertise to a project and can improve external validity of interventions and evaluation by recognition of the local knowledge of community members and practitioners (Israel, Schulz, Parker, & Becker, 1998; Israel et al., 2008). Green and Mercer (2001) also suggested that evidence-based health promotion interventions may be more acceptable to communities and potential participants when the research that has produced the evidence does not originate under special circumstances in distant places. In a discussion of environmental health promotion, Kreuter, De Rosa, Howze, and Baldwin (2004) described community participation as particularly important for

“wicked problems” wherein stakeholders may have conflicting interpretations of the problem and the science behind it, as well as different values, goals and life experiences. Accordingly, policy makers, public health professionals, and other stakeholders who grapple with these problems cannot expect to effectively resolve them by relying solely on expert-driven approaches to problem solving. (p. 441)

Planners can benefit greatly by applying principles for facilitating participatory action and partnerships suggested by Israel and colleagues (1998, 2008) and used by others to evaluate community-based participatory program efforts (Belansky, Cutforth, Chavez, Waters, & Bartlett-Horch, 2011; Horn, McCracken, Dino, & Brayboy, 2008; Israel et al., 2005 (see Chapter 4). Their principles are to:

- Recognize a partner community as a unit of identity
- Build upon community strengths and resources
- Facilitate collaborative, equitable decision making in which partners negotiate desired roles in all project phases and attend to social inequalities
- Foster colearning among partners
- Balance knowledge generation with community benefit
• Focus on ecological perspectives, local problems, and multiple determinants of health
• Develop systems using an iterative process
• Disseminate information, results, and benefits to all partners
• Develop a commitment and long-term process

Ethical Practice of Health Promotion

A systematic, thoughtful planning process can provide part of the roadmap required to establish ethical health promotion practice. Kass (2001) has presented a framework for evaluation of public health programs against standards of ethical integrity as have the American Association of Public Health (Thomas, Sage, Dillenberg, & Guillory, 2002) and the World Health Organization (World Health Organization, 2011). The Society for Public Health Education (SOPHE) has developed specific ethical and professional guidelines for public health educators (Society for Public Health Education, n.d.). Combined, these sources suggest the following guidelines for intervention:

• Program goals should always be related to the health of the public. Furthermore, health educators should be proactive in confronting issues that can adversely affect health of persons and communities and should provide services equitably. Intervention Mapping supports this principle by directing planners to focus on health issues and to begin planning with a full appraisal of the health problem and its causes.

• Interventions should be based on thorough evidence to increase the chance of effectiveness. Intervention Mapping supports this principle by basing programs on clear evidence of effectiveness. The Intervention Mapping steps help planners systematically consider the following types of evidence: importance, causes (including behavior and environment), and consequences of the health problem; effective approaches to behavioral and environmental change; and useful approaches to implementation. Kass (2001) suggested that when our programs are based only on the most intuitively “obvious” assumptions, we are at the most risk of developing programs that do not work.

• Development of interventions should include diverse participation. As the SOPHE suggested, Intervention Mapping directs planners to involve communities in program development and implementation, consider and accommodate diverse perspectives and values in program development, encourage informed decision making among individuals, and be transparent in disclosure of all program aspects, including benefits, other outcomes, unexpected consequences, and burdens.
• Intervention planners should consider the rights of persons and take action to protect them. Furthermore, public health practitioners are expected to support the worth, dignity, and uniqueness of all people and ground their practice in the ethical principles of respect for autonomy, promotion of social justice, promotion of good, and avoidance of harm. They must address the known and potential burdens of the program, including risks to privacy and confidentiality, liberty, self-determination, and justice.

Intervention Mapping suggests that planners consider burdens to participants and minimize them by adopting alternate approaches.

The emphasis on participation helps ensure that communities have input into judgments about tolerable levels of intervention and evaluation burden as well as an acceptable balance of burden-to-risk based on community values. Members of communities will not necessarily agree on risks and benefits, and a participatory planning process enables disclosure, discussion, consensus, and plans for moving forward through disagreement. Another way that the Intervention Mapping approach helps protect against inequitable burden is the focus on an ecological approach to both problem analysis and intervention. Most problems have contributions from the at-risk group or persons with the problem and from factors and agents in the environment. All significant contributors to the problem should comprise the focus for interventions, and planners should avoid the temptation to blame the victim by burdening the persons with the problem with full responsibility for its solution.

**Intervention Mapping Steps**

Each step of Intervention Mapping comprises several tasks (Figure 1.1). The completion of the tasks included in a step creates a product that is the guide for the subsequent step. Completion of all steps creates a blueprint for designing, implementing, and evaluating an intervention based on a foundation of theoretical, empirical, and practical information. Even though Intervention Mapping describes six steps, the process is iterative rather than completely linear. Program developers move back and forth between tasks and steps as they gain new information and perspective. However, the process is also cumulative; planners base each step on the previous steps, and inattention to a step can jeopardize the potential effectiveness of the intervention by compromising the validity of the foundation on which later steps are conducted. Sometimes planners can get carried away by momentum in the process of the planning group and forget a step, or they may perform a step with less-than-optimal rigor. Fortunately, most of the time planners can backtrack and include, repeat, or elaborate on a neglected step.
### Intervention Mapping Steps

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| **Step 1** | • Establish and work with a planning group  
• Conduct a needs assessment to create a logic model of the problem  
• Describe the context for the intervention including the population, setting, and community  
• State program goals |
| **Step 2** | • State expected outcomes for behavior and environment  
• Specify performance objectives for behavioral and environmental outcomes  
• Select determinants for behavioral and environmental outcomes  
• Construct matrices of change objectives  
• Create a logic model of change |
| **Step 3** | • Generate program themes, components, scope, and sequence  
• Choose theory- and evidence-based change methods  
• Select or design practical applications to deliver change methods |
| **Step 4** | • Refine program structure and organization  
• Prepare plans for program materials  
• Draft messages, materials, and protocols  
• Pretest, refine, and produce materials |
| **Step 5** | • Identify potential program users (adopters, implementers, and maintainers)  
• State outcomes and performance objectives for program use  
• Construct matrices of change objectives for program use  
• Design implementation interventions |
| **Step 6** | • Write effect and process evaluation questions  
• Develop indicators and measures for assessment  
• Specify the evaluation design  
• Complete the evaluation plan |

*Figure 1.1 Intervention Mapping Steps*
The six steps of the Intervention Mapping process are the following:

1. Develop a logic model of the problem based on a needs assessment
2. State program outcomes and objectives—a logic model for change
3. Develop the program plan, including scope, sequence, change methods, and practical applications
4. Produce the intervention, including program materials and messages
5. Plan program use, including adoption, implementation, and maintenance
6. Develop an evaluation plan

**Step 1: Logic Model of the Problem**

In Step 1 (Chapter 4), the planning team will:

1. Establish and work with a planning group
2. Conduct a needs assessment to create a logic model of the problem
3. Describe the context for the intervention, including the population, setting, and community
4. State program goals

Before beginning to actually plan an intervention, the planner puts together a team to assess the health problem, behavioral and environmental causes of the problem, and determinants of behavioral and environmental causes. We strongly recommend depicting these relations on a logic model diagram, also called theory of the problem and theory of change (Chen, 2014; Connell & Kubisch, 1996; Frechtling, 2007; Kirby, 2004; Rossi, Lipsey, & Freeman, 2004; Weiss & Coyne, 1997). Intervention Mapping introduces a logic model (theory) of the problem in Step 1 and a logic model (theory) of change in Step 2. Logic models are indispensable guides for program development and evaluation, are an increasingly common requirement in applications to funding agencies, and are taught and supported by the Centers for Disease Control and Prevention as the fundamental framework for program evaluation (ActKnowledge & Aspen Institute Roundtable on Community Change, 2003; Centers for Disease Control and Prevention, 1999; Centers for Disease Control and Prevention, 2011; W. K. Kellogg Foundation, 2006, 2010).

We suggest the PRECEDE model as a framework for creating a logic model (theory) of the problem—graphic representations of the causal relations between health problems and their causes (whether demonstrated or hypothesized) (Glanz et al., 2015; Green & Kreuter, 2005). See Figure 1.2. To develop this model beginning with a health problem, the planning team addresses the questions of What is the problem and who has it? How many people have it or will get it? Moving to the right, in the model, the
planner addresses what quality-of-life effects occur because of this health problem. Moving to the left of the health problem, the questions are about causes. What behaviors among the priority population may cause the health problem or make it worse? What environmental factors contribute to the health problem either directly or through behavior? Finally, we address the why questions. Why do people in the priority population do the behavior (risk behavior)? Why do people in the environment create the conditions that contribute to the health problem directly or through behavior of the priority population?

In addition to developing the logic model of the problem, an equally important continuous effort is to understand the character of the community, its members, its strengths, and its knowledge of the health problem and potential solutions. Finally in this step, the planning team sets goals for intervention, including behavioral and environmental change, as well as health and quality-of-life outcomes.

**Step 2: Program Outcomes and Objectives and Logic Model of Change**

In Step 2, the planner completes the following tasks:

1. State expected outcomes for behavior and environment
2. Specify performance objectives for behavioral and environmental outcomes
3. Select determinants for behavioral and environmental outcomes
4. Construct matrices of change objectives
5. Create a logic model of change
Step 2 (Chapter 5) specifies who and what will change because of the intervention. A logic model (theory) of change shows what change is needed to prevent, reduce, or manage the health problem, and it depicts the proposed mechanisms of change. It depicts the proposed causal relations between theory- and evidence-based change methods, the determinants they are expected to influence, and behavioral and environmental outcomes that will address the health problem (Figure 1.3). The planner begins this step using the logic model of the problem (Step 1) as a guide. The questions to ask are: What needs to change in the behavior of the priority population (behavioral outcome) or in the environment (environmental outcome)? Then, moving to the right: What impact will these changes have on the health problem? Moving toward the left, the why questions become: Why would the priority population make these changes? Why would agents in the environment make these changes? In Step 2, the tasks focus on what needs to change by specifying the program outcomes and objectives. In Step 3, the logic model of change is completed with the how of change by identifying the theoretical methods for change and the practical applications of selected change methods.

Once the planning team has identified the health-promoting behaviors, environmental conditions, and their determinants, the next task in Step 2 is to develop matrices of change objectives. Performance objectives are the description of the specific behaviors that the at-risk group or the environmental agents have to perform to achieve the desired change. The change objectives combine determinants and performance objectives and are the basis for choosing theory- and evidence-based change methods and other

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**Figure 1.3 Logic Model of Change**

- **At-Risk Group**
  - Change Objectives: (Personal Determinants × Performance Objectives) What theory- and evidence-based changes are expected to affect the behavioral outcome(s)?
  - Behavioral Outcome: What is intended to change in order to produce the desired health outcomes?
  - Health Problems: What changes should the intervention produce in the health problem(s)?

- **Environmental Agent**
  - Change Objectives: (Personal Determinants × Performance Objectives) What theory- and evidence-based changes are expected to affect the environmental outcome(s)?
  - Environmental Outcomes: What is intended to change in order to produce the desired health outcomes?
  - Quality of Life: What changes should the intervention produce in the quality-of-life issues related to the health problem(s)?
program content. The matrices represent detailed change at relevant ecological levels (individual, interpersonal, organizational, community, or societal) and are the most immediate target of an intervention. When Step 2 is completed, planners can think explicitly about the intervention in Step 3.

To develop performance objectives for environmental outcomes, planners identify roles of environmental agents at each relevant ecological level. For example, superintendents, principals, and teachers may have roles for school environmental change. Statements of what must change at each ecological level and who must make the change are more specific intervention foci than are traditional program goals and objectives. For example, in a program to increase fruit and vegetable consumption by children in elementary school, matrices would be created for both the child and the food service personnel. The food service matrix might contain more than one role: for example, the manager’s purchasing practices; the dietitian’s menu development, and the cooks’ food preparation.

**Step 3: Program Design**

In Step 3 (Chapter 6), the planner completes the following tasks:

1. Generate program themes, components, scope, and sequence
2. Choose theory- and evidence-based change methods
3. Select or design practical applications to deliver change methods

In this step, the planning team works from the logic model of change and matrices (Step 2) to design a coherent, deliverable intervention. Designing the intervention means first matching theory- and evidence-based methods to the change objectives they are meant to influence and selecting or devising practical applications to deliver the methods to the various priority populations. An intervention change method is a defined process by which theories postulate and empirical research provides evidence for how change may occur. Whereas a method is a theory-based technique to influence determinants, an application is a way of organizing, operationalizing, and delivering the intervention methods. Examples include a meeting with community members (application) to encourage community participation (change method), role model stories (application) for modeling (change method), and signing a public pledge (application) for commitment (change method). The planning team will strategize practical applications that will reach the priority population and that the population will find acceptable. For example, a planning group might want an intervention that influences parents’ outcome expectations regarding human papillomavirus (HPV) vaccination so that they get the vaccination for their children. Change methods might include cultural similarity, modeling, verbal persuasion, and anticipated regret. One application for all of these methods
could be a videotaped testimonial by parents who have made the decision to have their children vaccinated for HPV and can model positive aspects of their decision.

Once the planning group has a basic plan of methods and applications, it will be able to describe intervention themes, components, scope, and sequence. All of these tasks are done with the full planning group, but perhaps it is particularly important to listen carefully to practical program ideas from community members who may implement the intervention or participate in it. Also, throughout these tasks reference to the matrices is important to ensure that the final applications will address the change objectives adequately.

Step 4: Program Production

In Step 4 (Chapter 7), the planner completes the following tasks:

1. Refine program structure and organization
2. Prepare plans for program materials
3. Draft messages, materials, and protocols
4. Pretest, refine, and produce materials

The products in this step are all of the support materials needed in an intervention. This step gives specific guidance for designing communications that convey the intent and form of the intervention as planned in Step 3. It also describes pretesting and pilot testing of applications, activities, materials, and messages before they are finally produced. The most common scenario for producing a new intervention is that most of the needed materials will have to be developed de novo. Nevertheless some materials may be available and can be adapted to address change objectives, methods, and applications. Only after completing Intervention Mapping Steps 1–4 can a planner adequately evaluate whether existing materials fit the program objectives.

Step 5: Program Implementation Plan

In Step 5 (Chapter 8), the planner completes the following tasks:

1. Identify potential program users (adopters, implementers, and maintainers)
2. State outcomes and performance objectives for program use
3. Construct matrices of change objectives for program use
4. Design implementation interventions

The purpose of this step is to design a plan to promote program implementation (beginning with adoption and extending through maintenance).
Consideration of program implementation actually begins in Step 1 (needs assessment) and continues in this step. To devise an implementation intervention, the planning team will develop new matrices, using the process from Step 2, with these matrices addressing performance objectives and determinants of program adoption, implementation, and maintenance. Linking of each performance objective with a determinant produces a change objective to promote program use. The team then matches change methods and applications to these objectives to develop theory-informed plans for program adoption, implementation, and maintenance.

In this step, the planning team would ask, “Where can the intervention reach the relevant populations?” “In the chosen venues, who would be in charge of adoption? Implementation? Maintenance?” “What specific performance would be necessary at each stage?” and “What would motivate performance?”

The tasks for this step require the planner to identify potential implementers. Sometimes the program adopters, for example, health department administrators, are different from those who will do the day-to-day implementation. Further, those who are in roles to ensure program maintenance may be a different group. This process will be greatly helped by making sure that the right people are at the table in the planning group. It is never too late to be more inclusive by adding new members. For example, to adopt a program to change school lunch nutritional content, a school principal might order the program for review, ask food service managers for opinions about the program, and form a task force for food service change. To implement the program, the focus may change from the principal to the food service staff, who can make changes in menus, orders, and preparation. For maintenance of the program, the performance objectives might switch back to administrators, who can integrate the new procedures into the routine practices of the school. The planner then uses theory and evidence to hypothesize determinants of the adoption, implementation, and maintenance performance objectives. The product for Step 5 is a detailed plan for accomplishing program use by influencing behavior of individuals or groups who will make decisions about adopting and using the program.

**Step 6: Evaluation Plan**

In Step 6 (Chapter 9), the planner completes the following tasks:

1. Write effect and process evaluation questions
2. Develop indicators and measures for assessment
3. Specify the evaluation design
4. Complete the evaluation plan
An evaluation plan is actually begun in the needs assessment and is developed throughout each step. In the process of Intervention Mapping, planners make decisions about goals to change behavior, environment, health and quality of life, change objectives, change methods, applications, and implementation. The decisions, although informed by theory and evidence from research, still may not be optimal or may even be completely wrong. Through effect and process evaluation, planners can determine the impact of the intervention and can begin to understand the influence of decisions that were made at each planning step (Grant, Treweek, Dreischulte, Foy, & Guthrie, 2013; Patton, 2008, 2012; Rossi et al., 2004; Steckler & Linnan, 2002; Windsor, Clark, Boyd, & Goodman, 2003).

To evaluate the effect of an intervention, researchers analyze the change in health and quality-of-life problems, behavior and environment, and their determinants. Optimally, planners have defined these factors in a measurable way during the preceding steps. Effect evaluation may show positive, negative, or mixed effects or show no effect at all. Planners want to understand the reasons behind the effects that were achieved, regardless of what those effects were. They need to know more about the process and the changes in intermediate variables. They ask such questions as the following: “Were the behaviors and determinants well specified?” “Were change methods well matched to influence determinants?” “Were practical applications appropriate to deliver the change methods and did they reach the populations?” “Was the implementation complete and appropriate?”

**Core Processes for Using Theory and Evidence**

Processes for understanding a problem or answering a question with empirical data and theory can be complex and time-consuming; sometimes planners do not persevere through the difficulties. Consequently, the understanding of a health problem often is incomplete, and attempts to solve the problem are faulty. Therefore, we provide detail about how to undertake these core processes and give examples in the Intervention Mapping steps where they are used (Steps 1, 2, 3, and 5). The core processes include the following:

1. Posing questions
2. Brainstorming to figure out what the planning team already knows about potential answers to the question
3. Reviewing findings from the empirical literature for both theory- and evidence-based answers to the question
4. Reviewing theories for additional constructs
5. Assessing and addressing needs for new data
6. Developing a working list of answers, then moving on to the next question (Buunk & Van Vugt, 2013; Ruiter et al., 2012)

Posing Questions

The first task for the core processes is to pose a question. The first questions asked are often to analyze causes of the health problem, and later questions concern determinants of behavior and environmental conditions, interventions, and program implementation (Buunk & Van Vugt, 2013; Ruiter et al., 2012). This example illustrates the process of posing questions. A work group in one of our health education methods classes began work on a project to prevent pregnancy and the transmission of HIV and other sexually transmitted infections (STIs) among urban adolescents. Over the course of the project, they asked a number of questions, including the following:

- **Health problem.** What are the health problems related to HIV, STIs, and pregnancy in adolescents (ages 13–18) in the United States?

- **Behaviors.** What are important risk behaviors for the transmission of HIV and STIs, and for pregnancy among adolescents? How do these risk behaviors vary for different groups, such as boys and girls?

- **Determinants.** After defining the health problems and the behavioral risks, the group asked a question concerning determinants of the risk behavior of not using condoms: Why do adolescents have sexual intercourse without using condoms? Why don’t adolescent males use condoms when having vaginal sex with steady girlfriends? Why do girls have sex with boys who do not use condoms? The group then asked questions about determinants of the health-promoting behavior: Why would girls carry condoms? Why would adolescents discuss condom use with their partners?

- **Change methods.** Then the focus of the questions shifted to potential solutions or theory- and evidence-based change methods: How can we help specific subgroups of adolescents use condoms? Which change methods can be translated into appropriate practical applications?

Brainstorming Answers

The second core process is “brainstorming” or “free association.” In response to the question, planning group members propose (unedited) possible answers. In this way, the group members can ascertain their current knowledge and practice wisdom and can make a list of provisional answers. Making a provisional list of answers to a question is a creative
process that primarily involves free association with the aim of generating as many explanations as possible in response to a question (Buunk & Van Vugt, 2013; Ruiter et al., 2012). The planners can later drop explanations that are poorly supported in the literature. Planners should avoid getting stuck on a single explanation too soon. In formulating these provisional explanations, health educators, as applied behavioral scientists, typically use theoretical and empirical knowledge, whether consciously or not. Doing so is unavoidable at this stage, but the brainstorming should be as open as possible and should not be limited to data- or theory-informed items.

As the students worked to discover determinants for condom use, they generated many answers to the question: Why do adolescents have sexual intercourse without using condoms? (See example in Table 1.1.) The students brainstormed determinants based on what they knew from many sources about condom use. They stimulated creativity by asking related questions, by taking the sexually active adolescent’s perspective, and by narrowing the question to particular populations and situations. At this stage their answers included a combination of personal beliefs, local knowledge, practice wisdom, and evidence-informed answers.

Table 1.1  Provisional List of Answers Regarding Condom Use Among Adolescents

<table>
<thead>
<tr>
<th>Original Provisional List</th>
<th>Additions From Empirical Literature</th>
<th>Theoretical Additions (Some From Empirical Literature)</th>
<th>Additions From New Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of knowledge of HIV transmission</td>
<td>Do not perceive condoms as pregnancy prevention</td>
<td>Intention to use condoms Subjective norms Perceived norms Self-efficacy for negotiating and discussing condom use with their partner Skills Outcome expectations</td>
<td>Disconfirmed lack of knowledge about HIV or STIs Argument that condoms don’t work is an excuse, not a belief Experience with condoms associated with embarrassment Teens wanted to be more skillful Girls and boys expressed that condoms were the responsibility of the other gender Perception of no risk of HIV with only one partner (mistook “serial monogamy” for monogamy)</td>
</tr>
<tr>
<td>Lack of knowledge of STIs</td>
<td>Perceive condoms as embarrassing Did not express personal responsibility for having condoms Lower family connectedness</td>
<td></td>
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<tr>
<td>Peers don’t use condoms Perception that condoms don’t work</td>
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<tr>
<td>Experience with condom use: don’t like condoms Gender: males do not want to use condoms Lack of salience—not knowing someone with AIDS Lack of confidence in using condoms</td>
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<tr>
<td>Attitudes toward condom use</td>
<td>Nonopen communication Neighborhood characteristics, such as high unemployment</td>
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<tr>
<td>Intention to use condoms Subjective norms Perceived norms Self-efficacy for negotiating and discussing condom use with their partner Skills Outcome expectations</td>
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<tr>
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For this preliminary list, there is no reason for health educators to favor one explanation over another; however, in the subsequent processes, they should take into account two criteria for good answers: (1) an explanation should describe a process (an explanation of causation) and (2) an explanation should be plausible. For example, socioeconomic status on the students’ list may be an important contextual factor or root cause of lack of condom use, but it may need to be explored further to describe a process that explains behavior better. A useful aid is to represent the explanation in a logic model schematic that shows causation (Earp & Ennett, 1991). A plausible explanation is one that can survive when it is depicted visually and examined critically, using logic to evaluate the relationships among the various elements in the model.

**Reviewing Findings From Published Research**

The next core process is to support or refute provisional answers to the questions that the planning group has asked. We suggest a simple process here, but urge the reader to consult the many expert sources in the burgeoning field of systematic review and evidence-based public health. Basic how-to guidance is available from many sources (Briss, Mullen, & Hopkins, 2005; Cochrane, 2014; Community Preventive Services Task Force, 2015; Cooper, Hedges, & Valentine, 2009; Higgins & Green, 2008, 2011; Peters, 2014). Not every literature review need be a formal systematic study; however, every literature review should be clearly linked to a question, should specify parameters so that the nature of the numerator (what studies are used in the evidence summary) is understood in terms of the denominator (what studies were conducted or reported), and should specify what variation exists in the quality of evidence. The following questions will help guide a basic review:

1. What question(s) do you want to answer?
2. What evidence will address the questions?
3. What are the inclusion and exclusion criteria for the evidence?
4. How will you find the evidence you want? What is the search strategy?
5. Which evidence from the search process meets your criteria?
6. How will you document answers to your question(s)?
7. What metric will you use to judge strength of the evidence?
8. How will you summarize the findings and draw conclusions based on the data and the limitations?

The review in Table 1.1 generated evidence supporting both theory-informed and nontheoretical answers to the question at hand. This may
be described as a topical approach to theory. The question that the students asked for their initial literature review was not about theory but was about the topic at hand—adolescent unprotected sex. When the students approached the literature, they found some issues related to unprotected sex that were not explicitly theory-informed such as not perceiving condoms as pregnancy prevention (Bobrova, Sergeev, Grechukhina, & Kapiga, 2005), perceiving condoms as embarrassing (Bell, 2009), not taking personal responsibility for having condoms (Parkes, Henderson, & Wight, 2005), low family connectedness and parents’ permissive attitudes about sex (Kao & Manczak, 2013), perceptions of gender inequality in sex (Bauman, Karasz, & Hamilton, 2007), and closed communication (Crosby et al., 2000). The group also found a number of studies that reported the relation of theoretical constructs to unsafe sex, including intention to use condoms and perceived social norms (Bobrova et al., 2005; Villarruel, Jemmott, Jemmott, & Ronis, 2007) and self-efficacy for negotiating and discussing condom use with partners (Bell, 2009; Black, Sun, Rohrbach, & Sussman, 2011).

From the literature review, the group of students also became interested in information on the wider social context of why adolescents might not protect against pregnancy and STIs. They found that researchers had demonstrated that community characteristics—such as proportion of families living below the poverty line, low levels of education, and high unemployment—were highly related to birthrates among young teenagers (Penman-Aguilar, Carter, Snead, & Kourtis, 2013). They also discovered that other neighborhood characteristics, such as neighborhood economic disadvantage, high unemployment (Bauermeister, Zimmerman, & Caldwell, 2011), and access to family planning services had been linked to adolescent contraceptive use (Averett, Rees, & Argy, 2002; Smith, Novello, & Chacko, 2011). This broader search located evidence that parental monitoring, parental trust, and unsupervised time were associated with sexual activity (Borawski, Ievers-Landis, Lovegreen, & Trapl, 2003).

Sometimes evidence in response to a well-defined question may be scarce. For example, another student working group was interested in the question: “What factors predict cervical cancer screening in young women in Ghana?” The students were disappointed that they could find only three references directly related to the specific question in their defined priority population. They broadened their search in two ways: (1) research studies in populations that were arguably similar (sharing demographic and cultural characteristics) to young women in Ghana—young women in other West African countries—and (2) research studies about similar behaviors—other cancer screenings.
Accessing and Using Theory

When reviewing the literature by topic as described above, planners will encounter theory. In addition, planners can find useful information by specifically searching theories. Table 1.2 presents examples of types of theories that might be applied for the various questions. Notice that these theories do not apply equally to all steps and that adequate use of the core processes enables a planning group to apply multiple theories or models throughout the planning process. In a problem-driven context, all theories, theoretical models, and constructs are potentially useful within the parameters that the theory describes (Buunk & Van Vugt, 2013; Kok, Schaalma, Ruiter, van Empelen, & Brug, 2004). One challenge is to find the best theory or combination of theoretical constructs first to understand, and then to solve, the problem at hand. Limiting the pool of candidate theories too soon may lead to an inadequate solution of a practical problem or, worse, to conclusions that are counterproductive. A theory that is helpful in making one decision might not be very helpful for making another.

Both brainstorming and searching the literature will have turned up theoretical constructs. The next core process task is to continue to refine, add to, and discard provisional answers based on theoretical concepts, and the planning group will need to look specifically for theory-related answers. The student group first searched the literature using the topic approach pertaining to adolescent sexual behavior, condom use, and the

<table>
<thead>
<tr>
<th>Intervention Mapping Step</th>
<th>Decision (Sample Question)</th>
<th>Examples of Theories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Needs assessment (What quality-of-life issues are related to [a specific] health problem?)</td>
<td>Quality-of-life theories</td>
</tr>
<tr>
<td>Step 2</td>
<td>Behaviors (What behaviors benefit [a specific] health outcome?)</td>
<td>Self-regulatory theories</td>
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<td>Environmental conditions (What agents control harmful or health promoting environmental conditions?)</td>
<td>Power theories</td>
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<td>Personal determinants (What factors influence the risk behavior or the health promoting behavior?)</td>
<td>Value-expectancy theories</td>
</tr>
<tr>
<td>Step 3</td>
<td>Change methods and practical applications (What strategies have been shown to influence [specific] determinants and behavior?)</td>
<td>Persuasive communication theories</td>
</tr>
<tr>
<td>Step 4</td>
<td>Messages (What factors have been shown to influence comprehension and retention of messages?)</td>
<td>Theories of Information Processing</td>
</tr>
<tr>
<td>Step 5</td>
<td>Implementation (What factors have been shown to influence implementation of similar interventions?)</td>
<td>Diffusion theories Dissemination and implementation models</td>
</tr>
</tbody>
</table>
prevention of HIV, STIs, and pregnancy. However, even when searching the literature through the health problem or behavioral topic, the group discovered theoretical ideas, as depicted in Table 1.1.

A second approach to accessing theoretical ideas is through concepts that turn up during brainstorming. Even though the ideas from the brainstorming are usually initially stated in lay terms, there may be some advantage to relabeling them with their theoretical labels. The information that can be garnered about a theoretical construct can be somewhat more precise than that related to a simple lay concept. For example, on the students’ original list, the idea of lack of confidence appeared. This concept might also be labeled as the theoretical construct of self-efficacy, giving the students the opportunity to find out more about the construct by reading what Bandura has to say about self-efficacy (Bandura, 1986; Mulvihill, 1996). When group members explored the construct of self-efficacy in the literature, they found two kinds of self-efficacy—self-efficacy for negotiating condom use as separate from self-efficacy in applying a condom.

Accessing theory from a construct approach can also lead to considering the parent theory and to a general theories approach to accessing theory. A general theories approach is simply perusing a theory that might offer insight into one’s question. The student group might have used the general theories approach to access Social Cognitive Theory (Kelder, Hoelscher, & Perry, 2015). As it turned out, the group approached this theory through the construct of self-efficacy and also followed the construct of intention back to the parent theory, the Theory of Planned Behavior (see Chapter 2; Montaño & Kasprzyk, 2015). As the group members explored these theories, they found that self-efficacy is closely related to skills, perceived norms, and outcome expectations, so they added perceived norms and skills for negotiating condom use and applying a condom to the list (Table 1.1). Further, they encountered methods for influencing self-efficacy and began to think ahead about the intervention. None of this useful information would have been available if the group had not looked beyond the concept of confidence.

**Identifying and Addressing the Need for New Research**

The previous core processes are important before the planners jump into research so that they are clear about what questions to ask. With the previous core processes, the planners will have assembled a set of answers from both the theoretical and the empirical literature that fit with, suggest changes to, or add to the provisional explanations. In some cases this information provides insight into the exact processes of the provisional answers. The information may, at the same time, raise questions that the
planning team had not thought of before. For example, the planners would want to know whether certain theoretical constructs that look promising were actually explanatory in their population. They would also want to know the particular way an explanation found in published research is operating in their population.

Often, health promotion planners use a combination of qualitative and quantitative techniques to explore the questions of interest in their population (Bryman, 2006; Creswell, 2013; de Vries, Weijts, Dijkstra, & Kok, 1992; Morgan, 2006; Steckler, McLeroy, Goodman, Bird, & McCormick, 1992; see Chapter 4). For example, for a question regarding determinants, planners first search the available theoretical and empirical literature on the cause of the behavior or environmental condition of interest to find theories and data. They might then use a qualitative method to find out the population’s ideas about determinants of their behavior and then conduct a quantitative study using a structured questionnaire with questions that are based on the results of the qualitative phase. Some factors cannot be measured just by asking members of the population because perceptions may be different from reality; planners may need information from key observers. In some situations qualitative methods are used later in the research process to better understand the findings from a quantitative approach (Curry et al., 2013; Morgan, 2006, 2007; Östlund, Kidd, Wengström, & Rowa-Dewar, 2011; Steckler et al., 1992).

For example, the student working group needed more information from their priority population about the items on the provisional list to determine whether the proposed factors were valid in their population. The group conducted individual interviews and focus groups with both boys and girls from their local area. They learned a lot about youth experiences with protected and unprotected sex and the reasons for both occurrences. The new data called into question the adolescents’ lack of knowledge about HIV or STIs in their population. The adolescents also felt that the argument that condoms don’t work is more of an excuse and less of a belief about effectiveness. The adolescents who had tried condoms expressed some embarrassment with the process of using condoms and a need for a greater level of skills and self-efficacy. With this new information the group was able to move on to the next core process.

**Formulating the Working List of Answers**

At this point the planning team is ready to summarize and complete its provisional list of answers into a working list for which the evidence is sufficient. The planners will consider the criteria of plausibility and process and also judge their answers for relevance or importance (strength of association) and changeability. Relevance is the strength of the evidence
for the causal relationship between the determinant and the behavior (unprotected sex). Changeability is the strength of the evidence that the proposed change can be realized by an intervention. The latter criterion requires health educators to consider that some determinants may be changed by interventions directed at the individual, and other determinants by interventions directed at the environment. For questions regarding determinants, answers that remain on the list will be factors that are both important and changeable. For a solutions or methods question, answers that remain on the list will be methods that have been shown to produce significant change in similar situations. After this process, the planning group will have enough information to finalize a list of important determinants and depict the causal model as a simple logic model (Earp & Ennett, 1991).

The Role of Culture in Intervention Planning

A theme that appears in each step of Intervention Mapping is the need to create culturally relevant programs for diverse groups (see Chapters 4 and 7). Often health educators work with groups of people who are members of a cultural group different from their own; often these are underserved groups. Program planning must be conducted with an awareness of the roles of cultural and power differences and with what some professional fields now label cultural humility (Tervalon, 2003; Tervalon & Murray-Garcia, 1998). The idea of cultural humility arose in the context of physician training when Tervalon (2003) and Tervalon and Murray-Garcia (1998) asserted that the idea of competency-based education does not map well to culture. Competency implies that it is possible to fully know another culture whereas humility indicates that it is impossible to do so (Levi, 2009). Because we can never become fully competent in another culture, an appropriate goal may be lifelong self-evaluation and self-critique. Although Tervalon and Murray-Garcia’s (1998) approach was originally proposed to redress the power imbalances in patient-physician relationships, it is equally applicable to health promotion (DeLemos et al., 2007; Minkler, 2004; Tervalon, 2003; Tervalon & Murray-Garcia, 1998; Wallerstein & Duran, 2006). The recognition that one is never fully competent in this domain should lead to the firm intention to develop communication skills that demonstrate flexibility, openness, and self-reflection so that cultural learning is possible (Hixon, 2003).

There are several important reasons for planners to be able to develop effective programs across cultures, including the expanding diversity within
countries, the reality of globalization and global health promotion practice, and the critical issue of health disparities (Braveman, Egerter, & Williams, 2011; Fiscella, Franks, Gold, & Clancy, 2000; National Center for Health Statistics, 2012; Pamuk, Makuc, Heck, Reuben, & Lochner, 1998; Phelan, Link, & Tehranifar, 2010; Richardson & Norris, 2010; Thomas, Quinn, Butler, Fryer, & Garza, 2011; Work Group for Community Health and Development, University of Kansas, n.d.-a, n.d.-b). The U.S. Healthy People 2010 objectives highlighted the health disparities between racial and ethnic groups, with particular emphasis on eliminating those disparities in infant mortality, cancer screening and management, cardiovascular disease, diabetes, HIV/AIDS, and childhood and adult immunizations (U.S. Department of Health and Human Services, 2001), whereas the 2020 report set even more aggressive objectives for the elimination of disparities (Elliot, 2008; Secretary’s Advisory Committee on National Health Promotion and Disease Prevention Objectives for 2020, 2010). The authors of The Community Tool Box (Work Group for Community Health and Development, University of Kansas, n.d.-a, n.d.-b) suggested that understanding culture is important for community builders and health promoters because attaining significant change requires people working together to build communities that are powerful enough to attain change; working effectively across cultures allows incorporation of the unique strengths and perspectives of many groups; cultural sensitivity can help overcome racial and ethnic divisions, which result in lost opportunities; full involvement of diverse groups in decision making can result in more effective programs; appreciation of cultural diversity goes hand in hand with a just and equitable society; and if we do not learn about the influences of cultural groups, we are missing an accurate view of our society and communities. See the Community Tool Box websites regarding cultural adaptation of interventions at http://ctb.ku.edu/en/tablecontents/section_1163.htm (Work Group for Community Health and Development, University of Kansas, n.d.-b) and regarding cultural competence at http://ctb.ku.edu/en/table-of-contents/culture/cultural-competence (Work Group for Community Health and Development, University of Kansas, n.d.-a).

Each planning step requires a specific aspect of a culturally relevant approach conducted by a self-aware planner and planning group. In Step 1, needs assessment (Chapter 4), the planner must be aware of the roles culture can play in both the causation and the outcomes of health problems. In Step 1, planners also conduct community, including cultural, assessments as a part of defining the priority population for the program. In Step 2, program outcomes and objectives (Chapter 5), culture can be an
important aspect of defining performance objectives and of understanding their determinants. Without the culturally correct matrix components, program materials are unlikely to be salient to the intended cultural group. In Steps 3 and 4, program components, change methods, and applications (Chapters 6 and 7), planners must maintain the participation of the intended audience in the development of materials and understand their responses to program materials.

Navigating the Book

The process of Intervention Mapping is essentially unchanged from the third edition text. However, we have rearranged the presentation of some aspects of the process. We also have tried to simplify some explanations and discard terms that have caused confusion.

Organization of the Book

The book has two sections. The first section, Foundations, contains an introductory chapter and two chapters that are reviews of theories often used in health education and promotion. Chapter 2 provides an overview of behavior-oriented theories, and Chapter 3 provides an overview of environment-oriented theories. The next six chapters explain the Intervention Mapping steps and include a case study example that runs at the end of each chapter. Further case studies can be found at the book’s website, www.wiley.com/go/bartholomew4e. The final chapter explains how to use Intervention Mapping to adapt evidence-based interventions for new populations and settings.

Changes From the Previous Editions

Readers familiar with the previous editions of Intervention Mapping will find several changes that may have an impact on their practice and teaching. We have made two changes that will be of interest to previous users of the book and of the Intervention Mapping process. For the fourth edition of the book, we have increased the focus on logic models in both Steps 1 and 2. The other change parses material between steps differently, with the inclusion of characteristics of the intervention, such as scope and sequence, with the choice of methods and practical applications in Step 3. This reshuffling enables more emphasis in Step 4 on the how-tos of writing and producing communications. These slight changes resulted in revised step names (Figure 1.1).

Chapter 10 offers a simplified process for using Intervention Mapping to adapt evidence-based interventions for new settings and populations.
Important Repeating Concepts in the Book

Throughout the book, several key concepts are repeated in different contexts. These are planning matrices, iterative planning, logic models, and evaluation.

Matrices as a Foundation for Intervention Planning

In Intervention Mapping, matrices that combine performance objectives with their determinants are the basis for program development. They are used in both planning a program (Step 2) and planning its implementation (Step 5). If a change method or practical application used in an intervention is not intended to change the objectives in the matrices, then either it does not belong in the program or the matrix is not adequate and should be revisited.

Planning as an Iterative Process

To describe program development, we have laid out a series of steps. This orderly presentation may suggest to the reader that every step is completed only once and in a rigid order. This is not the case. Each step provides the basis for the next; each step also generates new information that may suggest revision or embellishment of a previous step. With increasing ideas about the program, knowledge about the intended beneficiaries, community participation, and research and theory, a planner often needs to revisit and fine-tune a previous step. In addition to the process of revisiting prior steps, some processes are repeated in many of the steps. For example, using the core processes to access relevant theory and evidence, planning evaluation, involving stakeholders, and thinking about implementation all begin in the needs assessment and continue in each step. Also, each step provides information for generating an evaluation plan.

Logic Models

We described the use of logic models above in the descriptions of Steps 1 and 2. In the process of Intervention Mapping, the planner will build a logic model of the health problem causation in Step 1 and begin a logic model of change in Step 2. In Step 3, the planner will add change methods to the logic model of change. These are the only logic models that are necessary components of Intervention Mapping. However, in addition to the logic model that is pieced together as intervention development progresses, we present a number of models to help clarify relations among concepts, such as theoretical constructs (Chapters 2 and 3). We also use other graphic devices that do not imply causal relations, such as Figure 1.1, a depiction of
the steps involved in Intervention Mapping. When a figure is a logic model, that is, implies causal relations, we clearly label it as such.

**Program Evaluation**

Program evaluation begins with a thorough description of the program to be evaluated and its proposed causal pathways for change. This description is accomplished step-by-step in Intervention Mapping. First, in the needs assessment, the planner begins to formulate goals for program outcomes. These become part of the plan for evaluating effects (Chapter 9). In Step 2, the planner specifies desired changes in behavior and environment as well as their determinants, which again become further outcomes for evaluating effects. Steps 3, 4, and 5 guide the specification of program components and implementation plans that link closely to process evaluation. Step 4 also contains discussion of pretesting and pilot testing or formative evaluation of the program.

**Planning With Limited Resources**

Finally, we encourage health promotion planners to use Intervention Mapping regardless of the time or resources available. We point this out because we often hear people say that Intervention Mapping is not practical for use in the “real world.” We have also seen people belabor the importance of following the Intervention Mapping steps sequentially and to the “letter of the law” at the cost of losing constituent buy-in. To avoid these pitfalls, the planning group’s health promotion practitioner often works behind the scenes to draft end products for each IM step, for example, the matrices of change objectives. This can take an afternoon, a weekend, or a month, depending on the time available. Other time- and resource-saving strategies include using a rapid assessment approach to complete the needs assessment in Step 1, or having longer workshop-type meetings so that planning groups do not forget what has been accomplished between meetings. Above all, simply posing the key questions for each Intervention Mapping step, for example, “Why do adolescents have sexual intercourse without using condoms?” will result in a more well-defined program based in theory and evidence, and increase the potential for effective behavioral and environmental change.

**Summary**

Intervention Mapping is a series of steps, tasks, and processes to help health promotion and health education planners develop theory- and evidence-based programs. Well-designed and effective interventions should be
guided by theory and informed by empirical evidence regarding the targets for change. For example, meta-analyses of cancer-screening interventions have found that larger effect sizes are achieved when interventions are based on theory (Stone et al., 2002; Yabroff & Mandelblatt, 1999; Yabroff, O’Malley, Mangan, & Mandelblatt, 2001). However, no one theoretical model completely predicts or explains health behaviors or environmental changes (Institute of Medicine, Committee on Health Literacy, 2004; Rakowski & Breslau, 2004; Rimer, 2002). Therefore, a system is needed to help intervention developers choose useful theories and integrate relevant constructs from multiple theories to describe health problems and develop health promotion and health education solutions (Kok et al., 2004; van Bokhoven, Kok, & van der Weijden, 2003). Intervention Mapping ensures that theoretical models and empirical evidence guide planners in two areas:

- The identification of determinants of behavioral and environmental causes related to a health problem
- The selection of the most appropriate change methods and applications to address the identified determinants to achieve changes in behavioral and environmental outcomes related to a health problem

Intervention Mapping has been used to develop many programs, and Table 1.3 presents some examples. Intervention Mapping is also being used to further the description of intervention characteristics and to deconstruct why interventions were effective or not (Bluethmann, Bartholomew, Murphy, & Vernon, 2014; Brug et al., 2010). Further, Intervention Mapping is being used to help health promoters find and adapt evidence-based interventions (see Chapter 10; Leerlooijer et al., 2011) and to evaluate the quality of planning that has been used to create interventions (Kok et al., 2015). For example, the Netherlands has a system whereby organizations can ask for accreditation of their programs (Brug et al., 2010), and others have used Intervention Mapping as a checklist to evaluate the quality of program planning of existing programs (Gagnon, Godin, Alary, Levy, & Otis, 2007; Schaaafsma, Stoffelen, Kok, & Curfs, 2013).

Even though Intervention Mapping has not been directly compared to other processes for developing interventions, planners of the referenced projects and others considering guidance for intervention development think that the systematic process has been useful and flexible and that continued use will strengthen future program development (Aro & Absetz, 2009; Belansky et al., 2011; Hoelscher, Evans, Parcel, & Kelder, 2002).
Table 1.3  Programs Developed Using Intervention Mapping

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<td>Asthma Self-Management</td>
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<td>Bartholomew et al. (2000b)</td>
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<td>Bartholomew et al. (2000c)</td>
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<td>Asthma Management in Hispanic Children</td>
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<td>Chronic Disease Management</td>
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<td>Parent—Child Communication</td>
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### Discussion Questions and Learning Activities

1. Why is it important to apply a systematic approach to the development of health promotion programs? What are the risks if a systematic approach is not used for health promotion program development?

2. Explain what is meant by ecological and systems approaches to intervention development. Give examples of how factors at different ecological levels can have an impact on health.

3. Discuss why so many health promotion programs focus only on behavior change of individuals at risk for a health problem and do not address environmental influences.

4. Using tobacco control as an example, describe the types of interventions that have been used at the individual, organizational, community, and societal levels.

5. When using core processes for Intervention Mapping, the planners first pose a question, then brainstorm answers to the question. They also gather evidence from the literature, theory, or new data. To access theories three approaches can be used: the topic-related approach, the concept-related approach, and the general theories approach. Discuss how a planning group can identify theories to answer planning questions using each of these three approaches.

6. Access the website for Diffusion of Effective Behavioral Interventions at [www.effectiveinterventions.org/](http://www.effectiveinterventions.org/) (Centers for Disease Control and Prevention, 2015) or the website for Cancer Control P.L.A.N.E.T. at [cancercontrolplanet.cancer.gov/](http://cancercontrolplanet.cancer.gov/) (National Cancer Institute, Division...
of Cancer Control and Population Sciences, n.d.), and select three different health promotion/prevention intervention programs to review. Determine which ecological level the program is addressing for change, and describe how the intervention will make a change to improve health or prevent a health problem.

References


intervention strategy to address overweight and obesity in adult primary care patients in the Netherlands. *Family Practice, 25*(S1), i112–i115.


