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.

LEARNING OBJECTIVES AND TASKS

- Explain the rationale for a systematic approach to intervention development

- Describe ecological and systems approaches to intervention development

- Explain the causal logic of public health problems and solutions

- List the steps, tasks, and processes of Intervention Mapping

- Explain how to use theory and evidence in intervention development

BOX 1.1. MAYOR'S PROJECT

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 through-out 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, & Smerecnik, 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 road map 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.
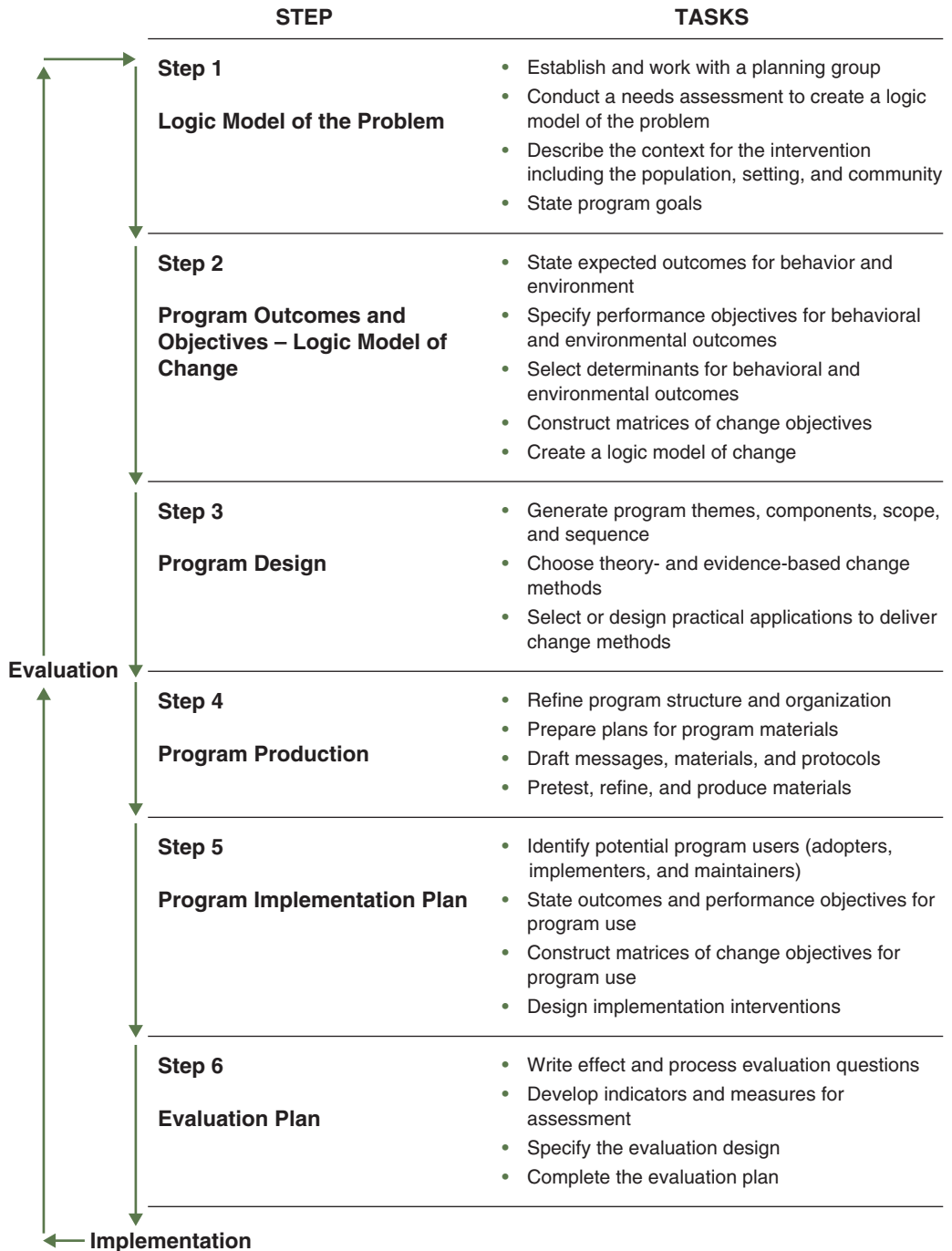
STEP	TASKS

Step 1

Logic Model of the Problem

- 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

Program Outcomes and Objectives – Logic Model of Change

- 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

Program Design

- 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

Program Production

- Refine program structure and organization
- Prepare plans for program materials
- Draft messages, materials, and protocols
- Pretest, refine, and produce materials

Step 5

Program Implementation Plan

- 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

Evaluation Plan

- Write effect and process evaluation questions
- Develop indicators and measures for assessment
- Specify the evaluation design
- Complete the evaluation plan

Evaluation

Implementation

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
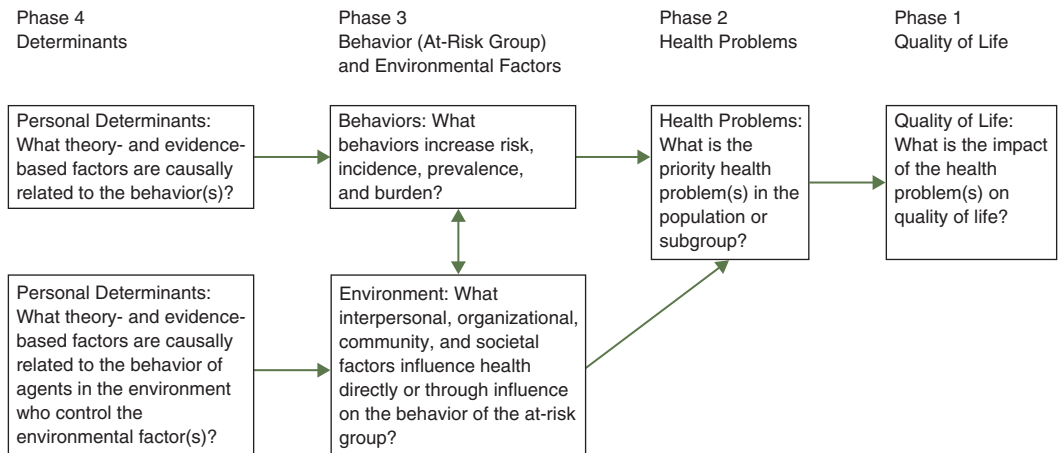
Phase 4 Determinants	Phase 3 Behavior (At-Risk Group) and Environmental Factors	Phase 2 Health Problems	Phase 1 Quality of Life
Personal Determinants: What theory- and evidence-based factors are causally related to the behavior(s)?	Behaviors: What behaviors increase risk, incidence, prevalence, and burden?	Health Problems: What is the priority health problem(s) in the population or subgroup?	Quality of Life: What is the impact of the health problem(s) on quality of life?
Personal Determinants: What theory- and evidence-based factors are causally related to the behavior of agents in the environment who control the environmental factor(s)?	Environment: What interpersonal, organizational, community, and societal factors influence health directly or through influence on the behavior of the at-risk group?		

Figure 1.2 Logic Model of the Problem

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
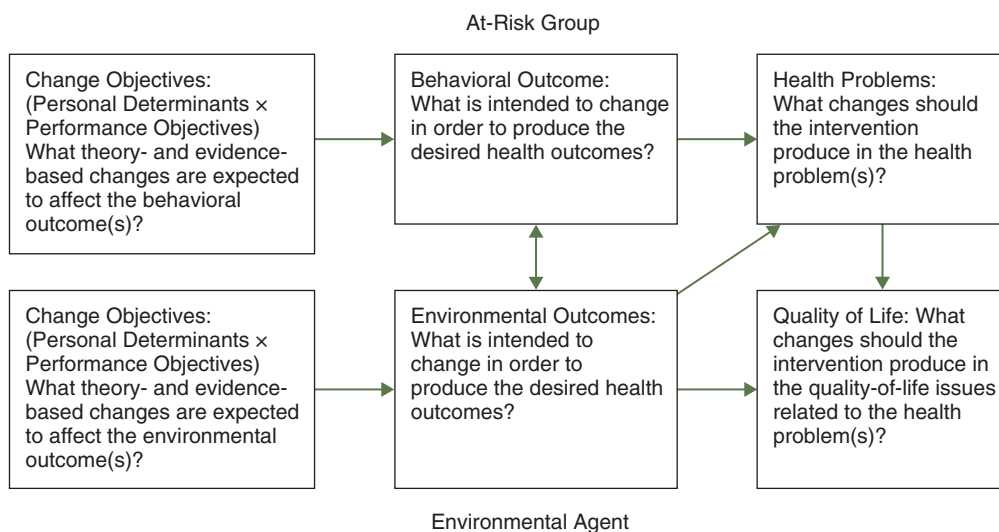

Figure 1.3 Logic Model of Change

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

Original Provisional List	Additions From Empirical Literature	Theoretical Additions (Some From Empirical Literature)	Additions From New Research
Lack of knowledge of HIV transmission	Do not perceive condoms as pregnancy prevention	Intention to use condoms	Disconfirmed lack of knowledge about HIV or STIs
Lack of knowledge of STIs	Perceive condoms as embarrassing	Subjective norms	Argument that condoms don't work is an excuse, not a belief
Peers don't use condoms	Did not express personal responsibility for having condoms	Perceived norms	Experience with condoms associated with embarrassment
Perception that condoms don't work	Lower family connectedness	Self-efficacy for negotiating and discussing condom use with their partner	Teens wanted to be more skillful
Attitudes toward condom use	Parents' permissive attitudes about sex	Skills	Girls and boys expressed that condoms were the responsibility of the other gender
Experience with condom use: don't like condoms	Community perceptions of gender inequality in sex	Outcome expectations	Perception of no risk of HIV with only one partner (mistook "serial monogamy" for monogamy)
Gender: males do not want to use condoms	Nonopen communication		
Lack of salience—not knowing someone with AIDS	Neighborhood characteristics, such as high unemployment		
Lack of confidence in using condoms	Lack of access to family planning services		
	Lack of parental supervision		
	Parental trust		
	Association with deviant peers		
	Coercive parenting		

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, & Argys, 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 1.2   Examples of Theories for Intervention Mapping Steps and Questions

Intervention Mapping Step	Decision (Sample Question)	Examples of Theories
Step 1	Needs assessment (What quality-of-life issues are related to [a specific] health problem?)	Quality-of-life theories
Step 2	Behaviors (What behaviors benefit [a specific] health outcome?) Environmental conditions (What agents control harmful or health promoting environmental conditions?) Personal determinants (What factors influence the risk behavior or the health promoting behavior?)	Self-regulatory theories Power theories Value-expectancy theories
Step 3	Change methods and practical applications (What strategies have been shown to influence [specific] determinants and behavior?)	Persuasive communication theories
Step 4	Messages (What factors have been shown to influence comprehension and retention of messages?)	Theories of Information Processing
Step 5	Implementation (What factors have been shown to influence implementation of similar interventions?)	Diffusion theories Dissemination and implementation models

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; Schaafsma, 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

Topic	Intervention Title	References
Acute Stroke Therapy	The T.L.L. Temple Foundation Stroke Project	Morgenstern et al. (2002) Morgenstern et al. (2003)
Adolescent Reproductive Health	Project Community-Embedded Reproductive Health Care for Adolescents (CERCA)	Decat et al. (2013)
Alcohol Abuse Prevention	Preventing Alcohol Abuse Among Undergraduates	Whittingham, Ruiter, Castermans, Huiberts, & Kok (2008)
Asthma Self-Management	Watch, Discover, Think, and Act	Bartholomew et al. (2000b) Bartholomew et al. (2000c) Shegog et al. (2001)
Asthma Management in Hispanic Children	Familias	Fernández et al. (2000a) Fernández et al. (2000b)
Breast Cancer (going to provider with symptoms)	Promoting Early Presentation of Breast Cancer	Burgess et al. (2008)
Breast Cancer Screening	Mammography Barriers for Underserved African American Women	Highfield, Bartholomew, Hartman, Ford, & Balihe (2014)
Breast Cancer Screening	Project Healthy Outlook on the Mammography Experience (HOME)	Vernon et al. (2008)
Breast and Cervical Cancer Screening	Cultivando La Salud	Fernández, Gonzales, Tortolero-Luna, Partida, & Bartholomew (2005)
Breastfeeding	Early Postnatal Breastfeeding Support	Kronborg, Væth, Olsen, Iversen, & Harder (2007)
Blood Pressure Dissemination	Improving Blood Pressure Treatment in the Community	Bartholomew et al. (2009)
Cancer and Work	Work-Related Guidance Tool for Those Diagnosed With Cancer	Munir, Kalawsky, Wallis, & Donaldson-Feilder (2013)
Cervical Cancer Prevention	Cervical Cancer Prevention Among Latina Immigrants	Scarinci, Bandura, Hidalgo, & Cherrington (2012)
Cervical Cancer Screening	Love Yourself Before You Take Care of Your Family	Hou, Fernández, Baumler, & Parcel (2002) Hou, Fernández, & Parcel, (2004)
Childhood Obesity Prevention	Healthy and Active Parenting Program for Early Years (HAPPY)	Taylor et al. (2013)
Childhood Obesity Prevention	Identification and Prevention of Dietary- and Lifestyle-Induced Health Effects in Children and Infants (IDEFICS)	De Henauw et al. (2011) Verbestel et al. (2011)
Childhood Obesity Prevention	ToyBox	De Craemer et al. (2014) De Decker et al. (2014) Duvinage et al. (2014)
Childhood Overweight Prevention	Training Program for Nurses and Physicians	Dera-de Bie, Gerver, & Jansen (2013)
Chlamydia trachomatis Testing	SafeFriend	Theunissen et al. (2013)

Table 1.3 (*Continued*)

Topic	Intervention Title	References
Chronic Disease Management	Chronic Disease Self-Management Program (CDSMP)	Detaille, van der Gulden, Engles, Heerkens, & van Dijk (2010)
Colorectal Cancer Screening	Tailored Interactive Intervention to Increase CRC Screening	Vernon et al. (2011)
Cyberbullying	Stop Online Bullying	Jacobs, Völlink, Dehue, & Lechner (2014)
Cystic Fibrosis	Cystic Fibrosis Family Education Program	Bartholomew, Czyzewski, Swank, McCormick, & Parcel (2000a) Bartholomew et al. (1997)
Diabetes Self-Management	Persian Diabetes Self-Management Education Program	Shakibazadeh, Bartholomew, Rashidian, & Larijani (2015)
Diet and Physical Activity	Waste the Waist	Gillison et al. (2012)
Flu Vaccination	A Program to Increase Influenza Vaccine Uptake Among Workers in Health Care Settings	Looijmans-van den Akker et al. (2011)
Flu Vaccination	Deliberately Vaccinated for You	Riphagen-Dalhuisen et al. (2013)
Fruit and Vegetable Promotion	The Pro Children Intervention	Pérez-Rodrigo et al. (2005)
Forgetfulness	Determining the Psychosocial Determinants of Forgetfulness	Mol, Ruiter, Verhey, Dijkstra, & Jolles (2008)
Global Health	School-Based Sexuality and HIV/AIDS Education Program in Tanzania	Mkumbo et al. (2009)
Healthy Lifestyle Promotion	Prescribe Vida Saludable	Sanchez et al. (2009)
Hepatitis B Screening	HBV Screening Programme Aimed at Turkish Immigrants	Van Der Veen, van Empelen, & Richardus (2012)
HIV Management	Intervention to Promote Sexual Health	van Kesteren, Kok, Hospers, Schippers, & de Wildt (2006)
HIV Prevention	AIDS Risk Reduction Program for Dutch Drug Users	van Empelen, Kok, Schaalma, & Bartholomew (2003)
HIV Prevention	Gay Cruise	Kok, Harterink, Vriens, de Zwart, & Hospers (2006)
HIV Prevention	Queermasters: The Online Gay Health Show	Mikolajczak, Kok, & Hospers (2008)
HIV Prevention	Project Growing, Reaching, Advocating for Change and Empowerment (GRACE)	Corbie-Smith et al. (2010)
HIV Treatment	Self-Management Program to Optimize Long-Term Adherence to Antiretroviral Therapy Among Persons Living With HIV	Côté, Godin, Garcia, Gagnon, & Rouleau (2008)
Injection Drug Users	Efficacy of a Computer-Tailored Intervention to Promote Safer Injection Practices Among Drug Users	Gagnon, Godin, Alary, Bruneau, & Otis (2010)
Injury Prevention	iPlay	Collard, Chinapaw, van Mechelen, & Verhagen (2009)

Table 1.3 (*Continued*)

Topic	Intervention Title	References
Internet-Delivered Interventions	Understanding and Improving Adolescents' Exposure to Internet-Delivered Interventions	Crutzen et al. (2008)
Leg Ulcers	Lively Legs	Heinen, Bartholomew, Wensing, van de Kerkhof, & van Achterberg (2006)
Low Back Pain	Enhancing Implementation of Physical Therapy Guidelines for Management of Patients With Low Back Pain	Rutten et al. (2014)
Medical Communication Skills	Communication Skills Training Programme for Specialists With Patients With Medically Unexplained Physical Symptoms	Weiland et al. (2013)
Medication Adherence	Program to Improve Medication Adherence Among Rheumatoid Arthritis Patients	Zwikker et al. (2012)
Medication Guidelines	Strategy to Implement the Insurance Medicine Guidelines for Depression	Zwerver, Schellart, Anema, Rammeloo, & van der Beek (2011)
Mental Disorders	Workplace Intervention for Sick-Listed Employees With Common Mental Disorders	van Oostrom et al. (2007) van Oostrom et al. (2008)
Mental Health	Program to Increase Effective Behaviors by Patients and Clinicians in Psychiatric Services	Koekkoek, van Meijel, Schene, & Hutschemaekers (2010)
Mental Health Service Delivery	Online Mental Health Continuing Education Program for Pharmacy Staff	Wheeler, Fowler, & Hattingh (2013)
Nutrition	Conscious Eating, How Do You Do It?	Springvloet, Lechner, & Oenema (2014)
Nutrition	Fruit and Vegetable Nutrition Program	Cullen, Bartholomew, & Parcel (1997) Cullen, Bartholomew, Parcel, & Kok (1998) Hoelscher et al. (2002)
Nutrition	School-Based Interventions to Increase Fruit and Vegetable Intake	Reinaerts, de Nooijer, & de Vries (2008)
Obesity Prevention	GRIPP Program Focused on Weight Maintenance Among Overweight Adults	van Genugten, van Empelen, Flink, & Oenema (2010)
Obesity Prevention	Text-Driven and a Video-Driven, Web-Based, Computer-Tailored Intervention to Prevent Obesity	Walthouwer, Oenema, Soetens, Lechner, & de Vries (2013)
Overweight Prevention	Balance@Work	Verweij, Proper, Weel, Hulshof, & van Mechelen (2009)
Overweight Management	Minimal Intervention Strategy (MIS) to Address Overweight and Obesity	Fransen et al. (2008)
Overweight Prevention	Dutch Obesity Intervention in Teenagers	Singh et al. (2006)
Overweight Prevention	Netherlands Research Programme Weight Gain Prevention (NHF-NRG)	Kremers et al. (2005) Kwak et al. (2007)
Overweight Prevention	FATaintPHAT	Ezendam, Oenema, van de Looij-Jansen, & Brug (2007)

Table 1.3   (*Continued*)

Topic	Intervention Title	References
Parent−Child Communication	What Should We Tell the Children About Relationships and Sex?	Newby, Bayley, & Wallace (2011)
Physical Activity	Active *plus*	van Stralen et al. (2008)
Physical Activity	Healthy Ageing—Physical Activity Program (HA-PAP)	Van Schijndel-Speet, Evenhuis, van Empelen, van Wijck, & Echteld (2013)
Physical Activity	I Move	Friederichs et al. (2014)
Physical Activity	Stages of Change for Moderate-Intensity Physical Activity in Deprived Neighborhoods	Kloek, van Lenthe, van Nierop, Schrijvers, & Mackenbach (2006)
Physical Activity	Worksite Physical Activity Intervention	McEachan, Lawton, Jackson, Conner, & Lunt (2008)
Physical Activity	YouRAction	Prins, van Empelen, Beenackers, Brug, & Oenema (2010)
Quality Improvement	Designing a Quality Improvement Intervention	van Bokhoven et al. (2003)
Relationship and Sex Education	Positive Relationships: Eliminating Coercion and Pressure in Adolescent Relationships (PR:EPARe)	Arnab et al. (2013)
Return-to-Work	Participatory Return-to-Work Intervention for Temporary Agency Workers and Unemployed Workers Sick-Listed due to Musculoskeletal Disorders	Vermeulen, Anema, Schellart, van Mechelen, & van der Beek (2009)
Return-to-Work	Designing a Return-to-Work Program for Occupational Low Back Pain	Ammendolia et al. (2009)
Safety Programs	Randomized, Controlled Intervention of Machine Guarding and Related Safety Programs in Small Metal Fabrication Businesses.	Brosseau, Parker, Samant, & Pan (2007) Parker et al. (2009)
School-Based Obesity Prevention	Healthy Lifestyles Programme (HeLP)	Lloyd, Logan, Greaves, & Wyatt (2011) Wyatt et al. (2013)
School Health Promotion	SchoolBeat	Leurs, Jansen, Schaalma, Mur-Veeman, & de Vries (2005)
Service Utilization	Promoting Access to Health Services (PATHS)	Suzuki et al. (2012)
Smoking Cessation	Happy Ending	Brendryen, Kraft, & Schaalma (2010)
STI/HIV Prevention	Uma Tori!	Bertens, Eiling, van den Borne, & Schaalma (2009) Bertens, Schaalma, Bartholomew, & van den Borne (2008)
STI/HIV Prevention	Programme to Prevent Sexually Transmittable Infections	Wolfers, van den Hoek, Brug, & de Zwart (2007)
STI Testing	ROsafe	Wolfers, de Zwart, & Kok (2012)
Stroke Prevention	Teaching Others to Live With Stroke (TOOLS)	Schmid, Andersen, Kent, Williams, & Damush (2010)

Table 1.3   *(Continued)*

Topic	Intervention Title	References
Sun Protection	Sun Protection Is Fun!	Tripp, Herrmann, Parcel, Chamberlain, & Gritz (2000)
Teen Motherhood	The Teenage Mothers Project	Leerlooijer et al. (2013)
Urinary Incontinence	Program to Promote Adherence to Pelvic Floor Muscle Exercise	Alewijnse, Mesters, Metsemakers, & van den Borne (2002)
Violence	Padres Trabajando por la Paz	Murray, Kelder, Parcel, & Orpinas (1998)
Vitality in Older Adults	Vital@Work	Strijk, Proper, van der Beek, & van Mechelen (2009)
Work-Related Health Problems	Be Active and Relax "Vitality in Practice" (VIP)	Coffent et al. (2012)
Worksite Health	An Intervention at the Worksite for Older Construction Workers	OudeHengel, Joling, Proper, van der Molen, & Bongers (2011)
Worksite Wellness	Working on Wellness (WOW)	Kolbe-Alexander et al. (2012)

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/ (Centers for Disease Control and Prevention, 2015) or the website for Cancer Control P.L.A.N.E.T. at 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

ActKnowledge & Aspen Institute Roundtable on Community Change. (2003, July). *Making sense: Reviewing program design with theory of change.* Retrieved from http://www.theoryofchange.org/pdf/making_sense.pdf

Alewijnse, D., Mesters, I. E., Metsemakers, J. F., & van den Borne, B. H. (2002). Program development for promoting adherence during and after exercise therapy for urinary incontinence. *Patient Education and Counseling*, *48*(2), 147–160.

American Journal of Community Psychology. (2007). [Systems thinking issue]. *American Journal of Community Psychology*, *39*(3–4).

Ammendolia, C., Cassidy, D., Steensta, I., Soklaridis, S., Boyle, E., Eng, S., . . . Côté, P. (2009). Designing a workplace return-to-work program for occupational low back pain: An intervention mapping approach. *BMC Musculoskeletal Disorders*, *10*, 65.

Arnab, S., Brown, K., Clarke, S., Dunwell, I., Lim, T., Suttie, N., . . . de Freitas, S. (2013). The development approach of a pedagogically-driven serious game to support relationship and sex education (RSE) within a classroom setting. *Computers & Education*, *69*, 15–30.

Aro, A. R., & Absetz, P. (2009). Guidance for professionals in health promotion: Keeping it simple—but not too simple. *Psychology & Health*, *24*(2), 125–129.

Averett, S. L., Rees, D. I., & Argys, L. M. (2002). The impact of government policies and neighborhood characteristics on teenage sexual activity and contraceptive use. *American Journal of Public Health*, *92*(11), 1773–1778.

Bandura, A. (1986). *Social foundations of thought and action: A Social Cognitive Theory.* Englewood Cliffs, NJ: Prentice-Hall.

Bartholomew, L. K., Cushman, W. C., Cutler, J. A., Davis, B. R., Dawson, G., Einhorn, P. T., . . . ALLHAT Collaborative Research Group. (2009). Getting clinical trial results into practice: Design, implementation, and process evaluation of the ALLHAT Dissemination Project. *Clinical Trials*, *6*(4), 329–343.

Bartholomew, L. K., Czyzewski, D. I., Parcel, G. S., Swank, P. R., Sockrider, M. M., Mariotto, M. J., . . . Seilheimer, D. K. (1997). Self-management of cystic fibrosis: Short-term outcomes of the Cystic Fibrosis Family Education Program. *Health Education & Behavior*, *24*(5), 652–666.

Bartholomew, L. K., Czyzewski, D. I., Swank, P. R., McCormick, L., & Parcel, G. S. (2000a). Maximizing the impact of the Cystic Fibrosis Family Education Program: Factors related to program diffusion. *Family & Community Health*, *22*(4), 27–47.

Bartholomew, L., Gold, R., Parcel, G., Czyzewski, D., Sockrider, M., Fernández, M., . . . Swank, P. (2000b). Watch, Discover, Think, and Act: Evaluation of computer-assisted instruction to improve asthma self-management in inner-city children. *Patient Education and Counseling*, *39*(2), 269–280.

Bartholomew, L. K., & Mullen, P. D. (2011). Five roles for using theory and evidence in the design and testing of behavior change interventions. *Journal of Public Health Dentistry*, *71*(S1), S20–S33.

Bartholomew, L., Shegog, R., Parcel, G., Gold, R., Fernández, M., Czyzewski, D., . . . Berlin, N. (2000c). Watch, Discover, Think, and Act: A model for patient education program development. *Patient Education and Counseling*, *39*(2), 253–268.

Bauermeister, J. A., Zimmerman, M. A., & Caldwell, C. H. (2011). Neighborhood disadvantage and changes in condom use among African American adolescents. *Journal of Urban Health*, *88*(1), 66–83.

Bauman, L. J., Karasz, A., & Hamilton, A. (2007). Understanding failure of condom use intention among adolescents completing an intensive preventive intervention. *Journal of Adolescent Research*, *22*(3), 248–274.

Becker, A. B., Israel, B. A., & Allen, A. (2005). Strategies and techniques for effective group process in community-based participatory research partnerships. In B. A. Israel, E. Eng, A. J. Schultz, & E. Parker (Eds.), *Methods in community-based participatory research for health* (pp. 52–72). San Francisco, CA: Jossey-Bass.

Belansky, E. S., Cutforth, N., Chavez, R. A., Waters, E., & Bartlett-Horch, K. (2011). An adapted version of intervention mapping (AIM) is a tool for conducting community-based participatory research. *Health Promotion Practice*, *12*(3), 440–455.

Bell, J. (2009). Why embarrassment inhibits the acquisition and use of condoms: A qualitative approach to understanding risky sexual behaviour. *Journal of Adolescence*, *32*(2), 379–391.

Berkman, L. F., Kawachi, I., & Glymour, M. M. (Eds.). (2014). *Social epidemiology* (2nd ed.). New York, NY: Oxford University Press.

Bertens, M. G., Eiling, E. M., van den Borne, B., & Schaalma, H. P. (2009). Uma Tori! Evaluation of an STI/HIV-prevention intervention for Afro-Caribbean women in the Netherlands. *Patient Education and Counseling*, *75*(1), 77–83.

Bertens, M. G., Schaalma, H. P., Bartholomew, L. K., & van den Borne, B. (2008). Planned development of culturally sensitive health promotion programs: An intervention mapping approach. In P. Swanepoel & H. Hoeken (Eds.), *Adapting health communication to cultural needs: Optimizing documents in South-African health communication on HIV/AIDS prevention* (pp. 11–30). Amsterdam, Netherlands: John Benjamins.

Black, D. S., Sun, P., Rohrbach, L. A., & Sussman, S. (2011). Decision-making style and gender moderation of the self-efficacy–condom use link among adolescents and young adults: Informing targeted STI/HIV prevention programs. *Archives of Pediatrics & Adolescent Medicine*, *165*(4), 320–325.

Bluethmann, S., Bartholomew, L. K., Murphy, C. C., & Vernon, S. W. (2014). Analysis of behavior theory use in physical activity intervention development for breast cancer survivors. *Annals of Behavioral Medicine*, *47*(S1), S193.

Bobrova, N., Sergeev, O., Grechukhina, T., & Kapiga, S. (2005). Social-cognitive predictors of consistent condom use among young people in Moscow. *Perspectives on Sexual and Reproductive Health*, *37*(4), 174–178.

Borawski, E. A., Ievers-Landis, C. E., Lovegreen, L. D., & Trapl, E. S. (2003). Parental monitoring, negotiated unsupervised time, and parental trust: The role of perceived parenting practices in adolescent health risk behaviors. *Journal of Adolescent Health*, *33*(2), 60–70.

Braveman, P., Egerter, S., & Williams, D. R. (2011). The social determinants of health: Coming of age. *Annual Review of Public Health*, *32*, 381–398.

Brendryen, H., Kraft, P., & Schaalma, H. (2010). Looking inside the black box: Using intervention mapping to describe the development of the automated smoking cessation intervention "Happy Ending." *Journal of Smoking Cessation*, *5*(1), 29–56.

Briss, P. A., Mullen, P. D., & Hopkins, D. P. (2005). Methods used for reviewing evidence and linking evidence to recommendations in the community guide. In P. A. Zaza, P. A. Briss, & K. W. Harris (Eds.), *The guide to community preventive services: What works to promote health?* (pp. 431–448). New York, NY: Oxford University Press.

Brosseau, L. M., Parker, D., Samant, Y., & Pan, W. (2007). Mapping safety interventions in metalworking shops. *Journal of Occupational and Environmental Medicine*, *49*(3), 338–345.

Brug, J., Oenema, A., & Ferreira, I. (2005). Theory, evidence and Intervention Mapping to improve behavior nutrition and physical activity interventions. *International Journal of Behavioral Nutrition and Physical Activity*, *11*, 2.

Brug, J., van Dale, D., Lanting, L., Kremers, S., Veenhof, C., Leurs, M., . . . Kok, G. (2010). Towards evidence-based, quality-controlled health promotion: The Dutch recognition system for health promotion interventions. *Health Education Research*, *25*(6), 1100–1106.

Bryman, A. (2006). Integrating quantitative and qualitative research: How is it done? *Qualitative Research*, *6*(1), 97–113.

Burgess, C. C., Bish, A. M., Hunter, H. S., Salkovskis, P., Michell, M., Whelehan, P., & Ramirez, A. J. (2008). Promoting early presentation of breast cancer: Development of a psycho-educational intervention. *Chronic Illness*, *4*(1), 13–27.

Buunk, A. P., & Van Vugt, M. (2013). *Applying social psychology: From problems to solutions* (2nd ed.). London, United Kingdom: Sage.

Cavanuagh, N., & Cheney, K. S. W. D. (2002). Community collaboration—A weaving. *Journal of Public Health Management & Practice 8*(1), 13–20.

Centers for Disease Control and Prevention. (1999). Framework for program evaluation in public health. *Morbidity and Mortality Weekly Report*, *48*, 1–40. Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4811a1.htm

Centers for Disease Control and Prevention. (2011, October). *Introduction to program evaluation for public health programs: A self-study guide*. Retrieved from http://www.cdc.gov/eval/guide/CDCEvalManual.pdf

Centers for Disease Control and Prevention. (2015). *Effective interventions: HIV prevention that works*. Retrieved from https://effectiveinterventions.cdc.gov/

Chen, H. T. (2014). *Practical program evaluation: Theory-driven evaluation and the integrated evaluation perspective* (2nd ed.). Los Angeles, CA: Sage.

Cochrane Collaboration. (2014). *Cochrane Reviews*. Retrieved from http://www.cochrane.org/cochrane-reviews

Coffent, J. K., Hendriksen, I. J. M., Duijts, S. F., Proper, K. I., van Mechelen, W., & Boot, C. R. L. (2012). The development of the Be Active & Relax "Vitality in Practice" (VIP) project and design of an RCT to reduce the need for recovery in office employees. *BMC Public Health*, *12*, 592.

Collard, D. C. M., Chinapaw, M. J. M., van Mechelen, W., & Verhagen, E. A. L. M. (2009). Design of the iPlay study: Systematic development of a physical activity injury prevention programme for primary school children. *Sports Medicine*, *39*(11), 889–901.

Community Preventive Services Task Force. (2015, July). *The guide to community preventive services*. Retrieved from http://www.thecommunityguide.org/index.html

Connell, J. P., & Kubisch, A. C. (1996). Applying a theories of change approach to the evaluation of comprehensive community initiatives: Progress, prospects, and problems. In K. Fulbright-Anderson, A. C. Kubisch, & J. P. Connell (Eds.), *New approaches to evaluating community initiatives: Vol. 2. Theory, measurement, and analysis* (pp. 15–44). Washington, DC: The Aspen Institute.

Cooper, H., Hedges, L. V., & Valentine, J. C. (2009). *The handbook of research synthesis and meta-analysis* (2nd ed.). New York, NY: Russell Sage Foundation.

Corbie-Smith, G., Akers, A., Blumenthal, C., Council, B., Wynn, M., Muhammad, M., & Stith, D. (2010). Intervention mapping as a participatory approach to developing an HIV prevention intervention in rural African American communities. *AIDS Education & Prevention*, *22*(3), 184–202.

Côté, J., Godin, G., Garcia, P. R., Gagnon, M., & Rouleau, G. (2008). Program development for enhancing adherence to antiretroviral therapy among persons living with HIV. *AIDS Patient Care and STDs*, *22*(12), 965–975.

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Los Angeles, CA: Sage.

Crosby, R. A., DiClemente, R. J., Wingood, G. M., Sionéan, C., Cobb, B. K., & Harrington, K. (2000). Correlates of unprotected vaginal sex among African American female adolescents: Importance of relationship dynamics. *Archives of Pediatrics & Adolescent Medicine*, *154*(9), 893–899.

Crosby, R. A., Salazar, L. F., & DiClemente, R. J. (2011). Ecological approaches in the new public health. In R. J. DiClemente, L. Salazar, & R. A. Crosby (Eds.), *Health behavior theory for public health: Principles, foundations, and applications* (pp. 231–251). Burlington, MA: Jones & Bartlett Learning.

Crutzen, R., de Nooijer, J., Brouwer, W., Oenema, A., Brug, J., & de Vries, N. K. (2008). Internet-delivered interventions aimed at adolescents: A Delphi study on dissemination and exposure. *Health Education Research*, *23*(3), 427−439.

Cullen, K. W., Bartholomew, L. K., & Parcel, G. S. (1997). Girl scouting: An effective channel for nutrition education. *Journal of Nutrition Education*, *29*, 86−91.

Cullen, K. W., Bartholomew, L. K., Parcel, G. S., & Kok, G. (1998). Intervention mapping; Use of theory and data in the development of a fruit and vegetable nutrition program for Girl Scouts. *Journal of Nutrition Education*, *30*, 188−195.

Curry, L. A., Krumholz, H. M., O'Cathain, A., Plano Clark, V. L., Cherlin, E., & Bradley, E. H. (2013). Mixed methods in biomedical and health services research. *Circulation. Cardiovascular Quality and Outcomes*, *6*(1), 119−123.

Decat, P., Nelson, E., De Meyer, S., Jaruseviciene, L., Orozco, M., Segura, Z., . . . Degomme, O. (2013). Community embedded reproductive health interventions for adolescents in Latin America: Development and evaluation of a complex multi-centre intervention. *BMC Public Health*, *13*, 31.

De Craemer, M., De Decker, E., De Bourdeaudhuij, I., Verloigne, M., Duvinage, K., Koletzko, B., . . . Cardon, G. (2014). Applying the Intervention Mapping protocol to develop a kindergarten-based, family-involved intervention to increase European preschool children's physical activity levels: The ToyBox-Study. *Obesity Reviews*, *15*(S3), S14−S26.

De Decker, E., De Craemer, M., De Bourdeaudhuij, I., Verbestel, V., Duvinage, K., Iotova, V., . . . Cardon, G. (2014). Using the Intervention Mapping protocol to reduce European preschoolers' sedentary behavior, an application to the ToyBox-Study. *International Journal of Behavioral Nutrition and Physical Activity*, *11*, 19−35.

De Henauw, S., Verbestel, V., Mårild, S., Barba, G., Bammann, K., Eiben, G., . . . Pigeot, I. (2011). The IDEFICS community-oriented intervention programme: A new model for childhood obesity prevention in Europe? *International Journal of Obesity*, *35*(S1), S16−S23.

DeLemos, J., Rock, T., Brugge, D., Slagowski, N., Manning, T., & Lewis, J. (2007). Lessons from the Navajo: Assistance with environmental data collection ensures cultural humility and data relevance. *Progress in Community Health Partnerships*, *1*(4), 321−326.

Dera-de Bie, E., Gerver, W. J., & Jansen, M. (2013). Training program for overweight prevention in the child's first year: Compilation and results. *Nursing & Health Sciences*, *15*(3), 387−397.

Detaille, S. I., van der Gulden, J. W. J., Engels, J. A., Heerkens, Y. F., & van Dijk, F. J. H. (2010). Using Intervention Mapping (IM) to develop a self-management programme for employees with a chronic disease in the Netherlands. *BMC Public Health*, *10*, 353.

de Vries, H., Weijts, W., Dijkstra, M., & Kok, G. (1992). The utilization of qualitative and quantitative data for health education program planning, implementation, and evaluation: A spiral approach. *Health Education & Behavior*, *19*(1), 101−115.

DiClemente, R. J., Salazar, L., & Crosby, R. A. (2011). *Health behavior theory for public health: Principles, foundations, and applications.* Burlington, MA: Jones & Bartlett Learning.

Duvinage, K., Ibrügger, S., Kreichauf, S., Wildgruber, A., De Craemer, M., De Decker, E., . . . Koletzko, B. (2014). Developing the intervention material to increase physical activity levels of European preschool children: The ToyBox-study. *Obesity Reviews*, *15*(S3), S27–S39.

Earp, J. A., & Ennett, S. T. (1991). Conceptual models for health education research and practice. *Health Education Research*, *6*(2), 163–171.

Economos, C. D., & Irish-Hauser, S. (2007). Community interventions: A brief overview and their application to the obesity epidemic. *The Journal of Law, Medicine & Ethics*, *35*(1), 131–137.

Elliot, V. S. (2008, June). Healthy people 2020: National agenda shifts to risks, roots of disease. *American Medical News.* Retrieved from http://www.amednews .com/article/20080602/health/306029976/2/

Ezendam, N. P., Oenema, A., van de Looij-Jansen, P. M., & Brug, J. (2007). Design and evaluation protocol of "FATaintPHAT," a computer-tailored intervention to prevent excessive weight gain in adolescents. *BMC Public Health*, *7*, 324.

Faridi, Z., Grunbaum, J. A., Gray, B. S., Franks, A., & Simoes, E. (2007). Community-based participatory research: Necessary next steps. *Preventing Chronic Disease*, *4*(3). Retrieved from http://www.cdc.gov/pcd/issues/2007/jul/06_0182.htm

Fernández, M. E., Bartholomew, K., Linares, A., Lopez, A., Sockrider, M., Czyzewski, D., . . . Parcel, G. S. (2000a). *Qualitative research in the planning of a school-based asthma intervention: The FAMILIAS Project.* Paper presented at the Prevention Research Center Conference, Centers for Disease Control and Prevention, Atlanta, GA.

Fernández, M. E., Bartholomew, L. K., Lopez, A., Tyrrell, S., Czyzewski, D., Sockrider, M. M., & Abramson, S. (2000b). *Using Intervention Mapping in the development of a school-based asthma management intervention for Latino children and families: The FAMILIAS Project.* Paper presented at the meeting of the American Public Health Association, Boston, MA.

Fernández, M. E., Gonzales, A., Tortolero-Luna, G., Partida, S., & Bartholomew, L. K. (2005). Using intervention mapping to develop a breast and cervical cancer screening program for Hispanic farmworkers: Cultivando La Salud. *Health Promotion Practice*, *6*(4), 394–404.

Fiscella, K., Franks, P., Gold, M. R., & Clancy, C. M. (2000). Inequality in quality: Addressing socioeconomic, racial, and ethnic disparities in health care. *Journal of the American Medical Association*, *283*(19), 2579–2584.

Foster-Fishman, P. G., Nowell, B., & Yang, H. (2007). Putting the system back into systems change: A framework for understanding and changing organizational and community systems. *American Journal of Community Psychology*, *39*(3–4), 197–215.

Fransen, G. A., Hiddink, G. J., Koelen, M. A., van Dis, S. J., Drenthen, A. J., van Binsbergen, J. J., & van Woerkum, C. M. (2008). The development of a minimal

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

Frechtling, J. A. (2007). *Logic modeling methods in program evaluation*. San Francisco, CA: Jossey-Bass.

Friederichs, S. A. H., Oenema, A., Bolman, C., Guyaux, J., van Keulen, H. M., & Lechner, L. (2014). I Move: Systematic development of a web-based computer tailored physical activity intervention, based on motivational interviewing and Self-Determination Theory. *BMC Public Health*, *14*, 212.

Gagnon, H., Godin, G., Alary, M., Bruneau, J., & Otis, J. (2010). A randomized trial to evaluate the efficacy of a computer-tailored intervention to promote safer injection practices among drug users. *AIDS and Behavior*, *14*(3), 538–548.

Gillison, F., Greaves, C., Stathi, A., Ramsay, R., Bennett, P., Taylor, G.,... Chandler, R. (2012). "Waste the waist": The development of an intervention to promote changes in diet and physical activity for people with high cardiovascular risk. *British Journal of Health Psychology*, *17*(2), 327–345.

Glanz, K., & Bishop, D. B. (2010). The role of behavioral science theory in development and implementation of public health interventions. *Annual Review of Public Health*, *31*, 399–418.

Glanz, K., Rimer, B. K., & Viswanath, K. (Eds.). (2015). *Health behavior: Theory, research, and practice* (5th ed.). San Francisco, CA: Jossey-Bass.

Godin, G., Gagnon, H., Alary, M., Levy, J. J., & Otis, J. (2007). The degree of planning: An indicator of the potential success of health education programs. *Promotion & Education*, *14*(3), 138–142.

Grant, A., Treweek, S., Dreischulte, T., Foy, R., & Guthrie, B. (2013). Process evaluations for cluster-randomised trials of complex interventions: A proposed framework for design and reporting. *Trials*, *14*, 15.

Green, L. W., & Kreuter, M. W. (1999). *Health promotion planning: An educational and ecological approach* (3rd ed.). Mountain View, CA: Mayfield.

Green, L. W., & Kreuter, M. W. (2005). *Health program planning: An educational and ecological approach* (4th ed.). New York, NY: McGraw-Hill Professional.

Green, L. W., & Mercer, S. L. (2001). Can public health researchers and agencies reconcile the push from funding bodies and the pull from communities? *American Journal of Public Health*, *91*(12), 1926–1929.

Hawe, P., Shiell, A., & Riley, T. (2009). Theorising interventions as events in systems. *American Journal of Community Psychology*, *43*(3–4), 267–276.

Heinen, M. M., Bartholomew, L. K., Wensing, M., van de Kerkhof, P., & van Achterberg, T. (2006). Supporting adherence and healthy lifestyles in leg ulcer patients: Systematic development of the Lively Legs program for dermatology outpatient clinics. *Patient Education and Counseling*, *61*(2), 279–291.

Higgins, J. P. T., & Green, S. (Eds.). (2008). *Cochrane handbook for systematic reviews of interventions*. Chichester, England: Wiley-Blackwell.

Higgins, J. P. T., & Green, S. (Eds.). (2011). *Cochrane handbook for systematic reviews of interventions: Version 5.1.0*. Retrieved from www.cochrane-handbook.org

Highfield, L., Bartholomew, L. K., Hartman, M. A., Ford, M. M., & Balihe, P. (2014). Grounding evidence-based approaches to cancer prevention in the community: A case study of mammography barriers in underserved African American women. *Health Promotion Practice*, *15*(6), 904–914.

Hixon, A. L. (2003). Beyond cultural competence. *Academic Medicine*, *78*(6), 634.

Hochbaum, G. M., Sorenson, J. R., & Lorig, K. (1992). Theory in health education practice. *Health Education Quarterly*, *19*(3), 295–313.

Hoelscher, D. M., Evans, A., Parcel, G. S., & Kelder, S. H. (2002). Designing effective nutrition interventions for adolescents. *Journal of the American Dietetic Association*, *102*(S3), S52–S63.

Horn, K., McCracken, L., Dino, G., & Brayboy, M. (2008). Applying community-based participatory research principles to the development of a smoking-cessation program for American Indian teens: "Telling our story." *Health Education & Behavior*, *35*(1), 44–69.

Hou, S. I., Fernández, M. E., Baumler, E., & Parcel, G. S. (2002). Effectiveness of an intervention to increase Pap test screening among Chinese women in Taiwan. *Journal of Community Health*, *27*(4), 277–290.

Hou, S. I., Fernández, M. E., & Parcel, G. S. (2004). Development of a cervical cancer educational program for Chinese women using Intervention Mapping. *Health Promotion Practice*, *5*(1), 80–87.

Institute of Medicine, Committee on Health Literacy. (2004). *Health literacy: A prescription to end confusion*. Washington, DC: National Academies Press.

Israel, B. A., Schulz, A. J., Parker, E. A., & Becker, A. B. (1998). Review of community-based research: Assessing partnership approaches to improve public health. *Annual Review of Public Health*, *19*, 173–202.

Israel, B. A., Schultz, A. J., Parker, E. A., Becker, A. B., Allen, A. J., III, & Guzman, J. R. (2008). Critical issues in developing and following community based participatory research principles. In M. Minkler & N. Wallerstein (Eds.), *Community-based participatory research for health: From process to outcomes* (2nd ed., pp. 47–66). San Francisco, CA: Jossey-Bass.

Israel, B. A., Parker, E. A., Rowe, Z., Salvatore, A., Minkler, M., López, J., . . . Halstead, S. (2005). Community-based participatory research: Lessons learned from the Centers for Children's Environmental Health and Disease Prevention Research. *Environmental Health Perspectives*, *113*(10), 1463–1471.

Jacobs, N. C., Völlink, T., Dehue, F., & Lechner, L. (2014). Online Pestkoppenstoppen: Systematic and theory-based development of a web-based tailored intervention for adolescent cyberbully victims to combat and prevent cyberbullying. *BMC Public Health*, *14*, 396.

Jones, S. C., & Donovan, R. J. (2004). Does theory inform practice in health promotion in Australia? *Health Education Research*, *19*(1), 1–14.

Kao, T. A., & Manczak, M. (2013). Family influences on adolescents' birth control and condom use, likelihood of sexually transmitted infections. *The Journal of School Nursing*, *29*(1), 61–70.

Kass, N. E. (2001). An ethics framework for public health. *American Journal of Public Health*, *91*(11), 1776–1782.

Kelder, S., Hoelscher, D., & Perry, C. L. (2015). How individuals, environments, and health behaviour interact: Social Cognitive Theory. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior: Theory, research, and practice* (5th ed., pp. 285–325). San Francisco, CA: Jossey-Bass.

Kirby, D. (2004, August). BDI logic models: A useful tool for designing, strengthening and evaluating programs to reduce adolescent sexual risk-taking, pregnancy, HIV and other STDs. Retrieved from http://recapp.etr.org/recapp/documents/BDILOGICMODEL20030924.pdf

Kloek, G. C., van Lenthe, F. J., van Nierop, P. W., Schrijvers, C., & Mackenbach, J. P. (2006). Stages of change for moderate-intensity physical activity in deprived neighborhoods. *Preventive Medicine*, *43*(4), 325–331.

Koekkoek, B., van Meijel, B., Schene, A., & Hutschemaekers, G. (2010). Development of an intervention program to increase effective behaviours by patients and clinicians in psychiatric services: Intervention Mapping study. *BMC Health Services Research*, *10*, 293.

Kok, G., Gottlieb, N. H., Commers, M., & Smerecnik, C. (2008). The ecological approach in health promotion programs: A decade later. *American Journal of Health Promotion*, *22*(6), 437–442.

Kok, G., Gottlieb, N., Peters, G., Mullen, P. D., Parcel, G. S., Ruiter, R. A. C., . . . Bartholomew, L. K. (2015). A taxonomy of behavior change methods: An intervention mapping approach. *Health Psychology Review.* Advance online publication. doi: 10.1080/17437199.2015.1077155

Kok, G., Harterink, P., Vriens, P., de Zwart, O., & Hospers, H. J. (2006). The gay cruise: Developing a theory- and evidence-based Internet HIV-prevention intervention. *Sexuality Research and Social Policy*, *3*(2), 52–67.

Kok, G., Schaalma, H., Ruiter, R. A. C., van Empelen, P., & Brug, J. (2004). Intervention mapping: Protocol for applying health psychology theory to prevention programmes. *Journal of Health Psychology, 9*(1), 85–98.

Kolbe-Alexander, T., Proper, K. I., Lambert, E. V., van Wier, M. F., Pillay, J. D., Nossel, C., . . . Van Mechelen, W. (2012). Working on wellness (WOW): A worksite health promotion intervention programme. *BMC Public Health*, *12*, 372.

Kremers, S. P. J., Visscher, T. L. S., Brug, J., Chin, A. P., Schouten, E. G., Schuit, A. J., . . . Kromhout, D. (2005). Netherlands research programme weight gain prevention (NHF-NRG): Rationale, objectives and strategies. *European Journal of Clinical Nutrition*, *59*(4), 498–507.

Kreuter, M. W., De Rosa, C., Howze, E. H., & Baldwin, G. T. (2004). Understanding wicked problems: A key to advancing environmental health promotion. *Health Education & Behavior*, *31*(4), 441–454.

Krieger, J., Allen, C., Cheadle, A., Ciske, S., Schier, J. K., Senturia, K., & Sullivan, M. (2002). Using community-based participatory research to address social determinants of health: Lessons learned from Seattle Partners for Healthy Communities. *Health Education & Behavior*, *29*(3), 361–382.

Kronborg, H., Væth, M., Olsen, J., Iversen, L., & Harder, I. (2007). Effect of early postnatal breastfeeding support: A cluster-randomized community based trial. *Acta Paediatrica*, *96*(7), 1064–1070.

Kwak, L., Kremers, S. P. J., Werkman, A., Visscher, T. L. S., van Baak, M. A., & Brug, J. (2007). The NHF-NRG In Balance-project: The application of Intervention Mapping in the development, implementation and evaluation of weight gain prevention at the worksite. *Obesity Reviews*, *8*(4), 347–361.

Leerlooijer, J. N., Ruiter, R. A. C., Reinders, J., Darwisyah, W., Kok, G., & Bartholomew, L. K. (2011). The World Starts With Me: Using intervention mapping for the systematic adaptation and transfer of school-based sexuality education from Uganda to Indonesia. *Translational Behavioral Medicine*, *1*(2), 331–340.

Leerlooijer, J. N., Weyusya, J., Ruiter, R. A. C., Bos, A. E. R., Rijsdijk, L. E., Nshakira, N., . . . Kok, G. (2013). Empowering teenage mothers in Uganda: The development of a community based intervention to improve psychological and social well-being of unmarried teenage mothers. *BMC Public Health*, *13*, 816.

Leurs, M. T. W., Jansen, M. W. J., Schaalma, H. P., Mur-Veeman, I. M., & de Vries, N. K. (2005). The tailored schoolBeat-approach: New concepts for health promotion in schools in the Netherlands. In S. Clift & B. B. Jensen (Eds.), *The Health promoting school: International advances in theory, evaluation and practice* (pp. 89–107). Retrieved from http://www.euro.who.int/__data/assets/pdf_file/0012/111117/E90358.pdf?ua=1#page=88

Levi, A. (2009). The ethics of nursing student international clinical experiences. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, *38*(1), 94–99.

Lloyd, J., Logan, S., Greaves, C., & Wyatt, K. (2011). Evidence, theory and context—Using intervention mapping to develop a school-based intervention to prevent obesity in children. *International Journal of Behavioral Nutrition and Physical Activity*, *8*, 73–87.

Looijmans-van den Akker, I., Hulscher, M. E., Verheij, T. J. M., Riphagen-Dalhuisen, J., van Delden, J. J. M., & Hak, E. (2011). How to develop a program to increase influenza vaccine uptake among workers in health care settings? *Implementation Science*, *6*, 47–55.

Marmot, M. (2000). Social determinants of health: From observation to policy. *The Medical Journal of Australia*, *172*(8), 379–382.

McEachan, R. R., Lawton, R. J., Jackson, C., Conner, M., & Lunt, J. (2008). Evidence, theory and context: Using intervention mapping to develop a worksite physical activity intervention. *BMC Public Health*, *8*, 326.

McLeroy, K. (2006). Thinking of systems. *American Journal of Public Health*, *96*(3), 402.

Mikolajczak, J., Kok, G., & Hospers, H. J. (2008). Queermasters: Developing a theory- and evidence-based Internet HIV-prevention intervention to promote HIV-testing among men who have sex with men (MSM). *Applied Psychology*, *57*(4), 681–697.

Minkler, M. (2004). Ethical challenges for the "outside" researcher in community based participatory research. *Health Education & Behavior*, *31*(6), 684–697.

Minkler, M. (2005). Community-based research partnerships: Challenges and opportunities. *Journal of Urban Health*, *82*(S2), ii3–ii12.

Minkler, M., Thompson, M., Bell, J., Rose, K., & Redman, D. (2002). Using community involvement strategies in the fight against infant mortality: Lessons from a multisite study of the national Healthy Start experience. *Health Promotion Practice*, *3*(2), 176–187.

Mkumbo, K., Schaalma, H., Kaaya, S., Leerlooijer, J., Mbwambo, J., & Kilonzo, G. (2009). The application of Intervention Mapping in developing and implementing school-based sexuality and HIV/AIDS education in a developing country context: The case of Tanzania. *Scandinavian Journal of Public Health*, *37*(S2), 28–36.

Mol, M. E., Ruiter, R. A. C., Verhey, F. R., Dijkstra, J., & Jolles, J. (2008). A study into the psychosocial determinants of perceived forgetfulness: Implications for future interventions. *Aging and Mental Health*, *12*(2), 167–176.

Montaño, D. E., & Kasprzyk, D. (2015). Theory of Reasoned Action, Theory of Planned Behavior, and the Integrated Behavioral Model. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior: Theory, research, and practice* (5th ed., pp. 168–222). San Francisco, CA: Jossey-Bass.

Morgan, D. L. (2006). Practical strategies for combining qualitative and quantitative methods: Applications to health research. In C. N. Hesse-Biber & P. Leavy (Eds.), *Emergent methods in social research* (pp. 165–182). Thousand Oaks, CA: Sage.

Morgan, D. L. (2007). Paradigms lost and pragmatism regained: Methodological implications of combining qualitative and quantitative methods. *Journal of Mixed Methods Research*, *1*(1), 48–76.

Morgenstern, L. B., Bartholomew, L. K., Grotta, J. C., Staub, L., King, M., & Chan, W. (2003). Sustained benefit of a community and professional intervention to increase acute stroke therapy. *Archives of Internal Medicine*, *163*(18), 2198–2202.

Morgenstern, L. B., Staub, L., Chan, W., Wein, T. H., Bartholomew, L. K., King, M., . . . Grotta, J. C. (2002). Improving delivery of acute stroke therapy: The TLL Temple Foundation Stroke Project. *Stroke: A Journal of Cerebral Circulation*, *33*(1), 160–166.

Mulvihill, C. K. (1996). AIDS education for college students: Review and proposal for a research-based curriculum. *AIDS Education and Prevention*, *8*(1), 11–25.

Munir, F., Kalawsky, K., Wallis, D. J., & Donaldson-Feilder, E. (2013). Using intervention mapping to develop a work-related guidance tool for those affected by cancer. *BMC Public Health*, *13*, 6.

Murray, N., Kelder, S., Parcel, G., & Orpinas, P. (1998). Development of an intervention map for a parent education intervention to prevent violence among Hispanic middle school students. *Journal of School Health*, *68*(2), 46–52.

National Cancer Institute. (2007). *Greater than the sum: Systems thinking in tobacco control* (Publication no. 06-6085, Tobacco Control Monograph No. 18). Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, Author.

National Cancer Institute, Division of Cancer Control and Population Sciences. (n.d.). *Cancer control P.L.A.N.E.T.* Retrieved from http://cancercontrolplanet.cancer.gov/

National Center for Health Statistics. (2012). *Health, United States, 2011: With special feature on socioeconomic status and health*. Hyattsville, MD: U.S. Department of Health and Human Services.

Newby, K., Bayley, J., & Wallace, L. M. (2011). "What should we tell the children about relationships and sex?": Development of a program for parents using intervention mapping. *Health Promotion Practice*, *12*(2), 209–228.

Östlund, U., Kidd, L., Wengström, Y., & Rowa-Dewar, N. (2011). Combining qualitative and quantitative research within mixed method research designs: A methodological review. *International Journal of Nursing Studies*, *48*(3), 369–383.

Oude Hengel, K. M., Joling, C. I., Proper, K. I., van der Molen, H. F., & Bongers, P. M. (2011). Intervention Mapping as a framework for developing an intervention at the worksite for older construction workers. *American Journal of Health Promotion*, *26*(1), e1–e10.

Pamuk, E., Makuc, D., Heck, K., Reuben, C., & Lochner, K. (1998). *Socioeconomic status and health chartbook. Health, United States, 1998*. Hyattsville, MD: National Center for Health Statistics.

Parker, D. L., Brosseau, L. M., Samant, Y., Xi, M., Pan, W., Haugan, D., & Study Advisory Board. (2009). A randomized, controlled intervention of machine guarding and related safety programs in small metal-fabrication businesses. *Public Health Reports*, *124*(S1), 90–100.

Parkes, A., Henderson, M., & Wight, D. (2005). Do sexual health services encourage teenagers to use condoms? A longitudinal study. *The Journal of Family Planning and Reproductive Health Care*, *31*(4), 271–280.

Patton, M. Q. (2008). *Utilization-focused evaluation* (4th ed.). Los Angeles, CA: Sage.

Patton, M. Q. (2012). *Essentials of utilization-focused evaluation*. Los Angeles, CA: Sage.

Penman-Aguilar, A., Carter, M., Snead, M. C., & Kourtis, A. P. (2013). Socioeconomic disadvantage as a social determinant of teen childbearing in the U.S. *Public Health Reports*, *128*(S1), 5–22.

Pérez-Rodrigo, C., Wind, M., Hildonen, C., Bjelland, M., Aranceta, J., Klepp, K., & Brug, J. (2005). The pro children intervention: Applying the intervention mapping protocol to develop a school-based fruit and vegetable promotion programme. *Annals of Nutrition & Metabolism*, *49*(4), 267–277.

Peters, G. Y. (2014). A practical guide to effective behavior change: How to identify what to change in the first place. *European Health Psychologist*, *16*(5), 142–155.

Phelan, J. C., Link, B. G., & Tehranifar, P. (2010). Social conditions as fundamental causes of health inequalities: Theory, evidence, and policy implications. *Journal of Health and Social Behavior*, *51*(S), S28–S40.

Prins, R. G., van Empelen, P., Beenackers, M. A., Brug, J., & Oenema, A. (2010). Systematic development of the YouRActionprogram, a computer-tailored physical activity promotion intervention for Dutch adolescents, targeting personal motivations and environmental opportunities. *BMC Public Health*, *10*, 474.

Rakowski, W., & Breslau, E. S. (2004). Perspectives on behavioral and social science research on cancer screening. *Cancer*, *101*(S5), S1118–S1130.

Reinaerts, E., de Nooijer, J., & de Vries, N. K. (2008). Using intervention mapping for systematic development of two school-based interventions aimed at increasing children's fruit and vegetable intake. *Health Education*, *108*(4), 301–320.

Richard, L., Gauvin, L., & Raine, K. (2011). Ecological models revisited: Their uses and evolution in health promotion over two decades. *Annual Review of Public Health*, *32*, 307–326.

Richardson, L. D., & Norris, M. (2010). Access to health and health care: How race and ethnicity matter. *Mount Sinai Journal of Medicine*, *77*(2), 166–177.

Rimer, B. K. (2002). Perspectives on intrapersonal theories of health behavior. In K. Glanz, B. K. Rimer, & F. M. Lewis (Eds.), *Health behavior and health education: Theory, research, and practice* (3rd ed., pp. 144–159). San Francisco, CA: Jossey-Bass.

Riphagen-Dalhuisen, J., Frijstein, G., van der Geest-Blankert, M., Danhof-Pont, M., de Jager, H., Bos, N., . . . Hak, E. (2013). Planning and process evaluation of a multi-faceted influenza vaccination implementation strategy for health care workers in acute health care settings. *BMC Infectious Diseases*, *13*, 235.

Rossi, P. H., Lipsey, M. W., & Freeman, H. E. (2004). *Evaluation: A systematic approach* (7th ed.). Thousand Oaks, CA: Sage.

Ruiter, R. A. C., Massar, K., van Vugt, M., & Kok, G. (2012). Applying social psychology to understanding social problems. In A. G. de Zavala & A. Cichocka (Eds.), *Social psychology of social problems: The intergroup context* (pp. 337–362). London, United Kingdom: Palgrave Macmillan.

Rutten, G. M., Harting, J., Bartholomew, L. K., Braspenning, J. C., van Dolder, R., Heijmans, M. F., . . . Oostendorp, R. A. (2014). Development of a theory- and evidence-based intervention to enhance implementation of physical therapy guidelines for the management of low back pain. *Archives of Public Health*, *72*, 1.

Sanchez, A., Grandes, G., Cortada, J. M., Pombo, H., Balague, L., & Calderon, C. (2009). Modelling innovative interventions for optimising healthy lifestyle promotion in primary health care: "*Prescribe Vida Saludable*" phase I research protocol. *BMC Health Services Research*, *9*, 103.

Scarinci, I. C., Bandura, L., Hidalgo, B., & Cherrington, A. (2012). Development of a theory-based (PEN-3 and Health Belief Model), culturally relevant intervention on cervical cancer prevention among Latina immigrants using intervention mapping. *Health Promotion Practice*, *13*(1), 29–40.

Schaafsma, D., Stoffelen, J. M. T., Kok, G., & Curfs, L. M. G. (2013). Exploring the development of existing sex education programmes for people with intellectual disabilities: An intervention mapping approach. *Journal of Applied Research in Intellectual Disabilities*, *26*(2), 157–166.

Schmid, A. A., Andersen, J., Kent, T., Williams, L. S., & Damush, T. M. (2010). Using intervention mapping to develop and adapt a secondary stroke prevention program in Veterans Health Administration medical centers. *Implementation Science*, *5*, 97–107.

Secretary's Advisory Committee on National Health Promotion and Disease Prevention Objectives for 2020. (2010, July). *Healthy People 2020: An opportunity to address social determinants of health.* Retrieved from http://www.healthypeople.gov/sites/default/files/SocietalDeterminantsHealth.pdf

Shakibazadeh, E., Bartholomew, L. K., Rashidian, A., & Larijani, B. (2015). Persian Diabetes Self-Management Education (PDSME) program: Evaluation of effectiveness in Iran. *Health Promotion International.* Advance online publication. doi:10.1093/heapro/dav006

Shegog, R., Bartholomew, L. K., Parcel, G. S., Sockrider, M. M., Mâsse, L., & Abramson, S. L. (2001). Impact of a computer-assisted education program on factors related to asthma self-management behavior. *Journal of the American Medical Informatics Association*, *8*(1), 49–61.

Simons-Morton, D. G., Simons-Morton, B. G., Parcel, G. S., & Bunker, J. F. (1988). Influencing personal and environmental conditions for community health: A multilevel intervention model. *Family & Community Health*, *11*(2), 25–35.

Singh, A. S., Chin A Paw, M. J. M., Kremers, S. P. J., Visscher, T. L. S., Brug, J., & van Mechelen, W. (2006). Design of the Dutch Obesity Intervention in Teenagers (NRG-DOiT): Systematic development, implementation and evaluation of a school-based intervention aimed at the prevention of excessive weight gain in adolescents. *BMC Public Health*, *6*, 304.

Smith, P., Novello, G., & Chacko, M. R. (2011). Does immediate access to birth control help prevent pregnancy? A comparison of onsite provision versus off campus referral for contraception at two school-based clinics. *Journal of Applied Research on Children*, *2*(2), 8.

Society for Public Health Education. (n.d.). *Ethics: Code of ethics for the health education profession.* Retrieved from http://www.sophe.org/ethics.cfm

Springvloet, L., Lechner, L., & Oenema, A. (2014). Planned development and evaluation protocol of two versions of a web-based computer-tailored nutrition education intervention aimed at adults, including cognitive and environmental feedback. *BMC Public Health*, *14*, 47.

Steckler, A., & Linnan, L. A. (Eds.). (2002). *Process evaluation for public health interventions and research*. San Francisco, CA: Jossey-Bass.

Steckler, A., McLeroy, K. R., Goodman, R. M., Bird, S. T., & McCormick, L. (1992). Toward integrating qualitative and quantitative methods: An introduction. *Health Education Quarterly*, *19*(1), 1–8.

Stokols, D. (1996). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion*, *10*(4), 282–298.

Stone, E. G., Morton, S. C., Hulscher, M. E., Maglione, M. A., Roth, E. A., Grimshaw, J. M., . . . Shekelle, P. G. (2002). Interventions that increase use of adult immunization and cancer screening services: A meta-analysis. *Annals of Internal Medicine*, *136*(9), 641–651.

Strijk, J. E., Proper, K. I., van der Beek, A. J., & van Mechelen, W. (2009). The Vital@Work Study. The systematic development of a lifestyle intervention to improve older workers' vitality and the design of a randomised controlled trial evaluating this intervention. *BMC Public Health*, *9*, 408.

Suzuki, R., Peterson, J. J., Weatherby, A. V., Buckley, D. I., Walsh, E. S., Kailes, J. I., & Krahn, G. L. (2012). Using intervention mapping to promote the receipt of clinical preventive services among women with physical disabilities. *Health Promotion Practice*, *13*(1), 106–115.

Taylor, N. J., Sahota, P., Sargent, J., Barber, S., Loach, J., Louch, G., & Wright, J. (2013). Using intervention mapping to develop a culturally appropriate intervention to prevent childhood obesity: The HAPPY (Healthy and Active Parenting Programme for Early Years) study. *International Journal of Behavioral Nutrition and Physical Activity*, *10*, 142–172.

Tervalon, M. (2003). Components of culture in health for medical students' education. *Academic Medicine*, *78*(6), 570–576.

Tervalon, M., & Murray-Garcia, J. (1998). Cultural humility versus cultural competence: A critical distinction in defining physician training outcomes in multicultural education. *Journal of Health Care for the Poor and Underserved*, *9*(2), 117–125.

Theunissen, K. A. T. M., Hoebe, C. J. P. A., Crutzen, R., Kara-Zaïtri, C., de Vries, N. K., van Bergen, J. E. A. M., . . . Dukers-Muijrers, H. T. M. (2013). Using intervention mapping for the development of a targeted secure web-based outreach strategy named SafeFriend, for *Chlamydia trachomatis* testing in young people at risk. *BMC Public Health*, *13*, 996.

Thomas, J. C., Sage, M., Dillenberg, J., & Guillory, V. J. (2002). A code of ethics for public health. *American Journal of Public Health*, *92*(7), 1057–1059.

Thomas, S. B., Quinn, S. C., Butler, J., Fryer, C. S., & Garza, M. A. (2011). Toward a fourth generation of disparities research to achieve health equity. *Annual Review of Public Health*, *32*, 399–416.

Tripp, M. K., Herrmann, N. B., Parcel, G. S., Chamberlain, R. M., & Gritz, E. R. (2000). Sun Protection Is Fun! A skin cancer prevention program for preschools. *Journal of School Health*, *70*(10), 395–401.

Trochim, W. M., Cabrera, D. A., Milstein, B., Gallagher, R. S., & Leischow, S. J. (2006). Practical challenges of systems thinking and modeling in public health. *American Journal of Public Health*, *96*(3), 538–546.

U.S. Department of Health and Human Services. (2001, January). *Healthy People 2010: Understanding and improving health*. Retrieved from http://www.health.gov/healthypeople/Document/html/uih/uih_2.htm#obj

van Bokhoven, M. A., Kok, G., & van der Weijden, T. (2003). Designing a quality improvement intervention: A systematic approach. *Quality & Safety in Health Care*, *12*(3), 215–220.

Van Der Veen, Y. J. J., van Empelen, P., & Richardus, J. H. (2012). Development of a culturally tailored internet intervention promoting hepatitis B screening in the Turkish community in the Netherlands. *Health Promotion International*, *27*(3), 342–355.

van Empelen, P., Kok, G. Schaalma. H. P., & Bartholomew, L. K. (2003). An AIDS risk reduction program for Dutch drug users: An intervention mapping approach to planning. *Health Promotion Practice*, *4*(4), 402–412.

van Genugten, L., van Empelen, P., Flink, I., & Oenema, A. (2010). Systematic development of a self-regulation weight-management intervention for overweight adults. *BMC Public Health*, *10*, 649.

van Kesteren, N. M., Kok, G., Hospers, H. J., Schippers, J., & de Wildt, W. (2006). Systematic development of a self-help and motivational enhancement intervention to promote sexual health in HIV-positive men who have sex with men. *AIDS Patient Care & STDs*, *20*(12), 858–875.

van Oostrom, S. H., Anema, J. R., Terluin, B., de Vet, H. C. W., Knol, D. L., & van Mechelen, W. (2008). Cost-effectiveness of a workplace intervention for sick-listed employees with common mental disorders: Design of a randomized controlled trial. *BMC Public Health*, *8*, 12.

van Oostrom, S. H., Anema, J. R., Terluin, B., Venema, A., de Vet, H. C. W., & van Mechelen, W. (2007). Development of a workplace intervention for sick-listed employees with stress-related mental disorders: Intervention Mapping as a useful tool. *BMC Health Services Research*, *7*, 127.

van Schijndel-Speet, M., Evenhuis, H. M., van Empelen, P., van Wijck, R., & Echteld, M. A. (2013). Development and evaluation of a structured programme for promoting physical activity among seniors with intellectual disabilities: A study protocol for a cluster randomized trial. *BMC Public Health*, *13*, 746.

van Stralen, M. M., Kok, G., de Vries, H., Mudde, A. N., Bolman, C., & Lechner, L. (2008). The Active *plus* protocol: Systematic development of two theory- and evidence-based tailored physical activity interventions for the over-fifties. *BMC Public Health*, *8*, 399.

Verbestel, V., De Henauw, S., Maes, L., Haerens, L., Mårild, S., Eiben, G., . . . De Bourdeaudhuij, I. (2011). Using the intervention mapping protocol to develop a community-based intervention for the prevention of childhood obesity in a multi-centre European project: The IDEFICS intervention. *International Journal of Behavioral Nutrition and Physical Activity*, *8*, 82–96.

Vermeulen, S. J., Anema, J. R., Schellart, A. J. M., van Mechelen, W., & van der Beek, A. J. (2009). Intervention mapping for development of a participatory return-to-work intervention for temporary agency workers and unemployed workers sick-listed due to musculoskeletal disorders. *BMC Public Health*, *9*, 216.

Vernon, S. W., Bartholomew, L. K., McQueen, A., Bettencourt, J. L., Greisinger, A., Coan, S. P., . . . & Myers, R. E. (2011). A randomized controlled trial of a tailored interactive computer-delivered intervention to promote colorectal cancer screening: Sometimes more is just the same. *Annals of behavioral medicine*, *41*(3), 284–299.

Vernon, S. W., del Junco, D. J., Tiro, J. A., Coan, S. P., Perz, C. A., Bastian, L. A., . . . DiClemente, C. (2008). Promoting regular mammography screening II. Results from a randomized controlled trial in US women veterans. *Journal of the National Cancer Institute*, *100*(5), 347–358.

Verweij, L. M., Proper, K. I., Weel, A. N. H., Hulshof, C. T. J., & van Mechelen, W. (2009). Design of the Balance@Work project: Systematic development, evaluation and implementation of an occupational health guideline aimed at the prevention of weight gain among employees. *BMC Public Health*, *9*, 461.

Villarruel, A. M., Jemmott, J. B., III, Jemmott, L. S., & Ronis, D. L. (2007). Predicting condom use among sexually experienced Latino adolescents. *Western Journal of Nursing Research*, *29*(6), 724–738.

Wallerstein, N. B., & Duran, B. (2006). Using community-based participatory research to address health disparities. *Health Promotion Practice*, *7*(3), 312–323.

Walthouwer, M. J. L., Oenema, A., Soetens, K., Lechner, L., & de Vries, H. (2013). Systematic development of a text-driven and a video-driven web-based computer-tailored obesity prevention intervention. *BMC Public Health*, *13*, 978.

Weiland, A., Blankenstein, A. H., Willems, M. H. A., Van Saase, J. L. C. M., Van der Molen, H. T., Van Dulmen, A. M., & Arends, L. R. (2013). Post-graduate education for medical specialists focused on patients with medically unexplained physical symptoms; Development of a communication skills training programme. *Patient Education and Counseling*, *92*(3), 355–360.

Weiss, B. D., & Coyne, C. (1997). Communicating with patients who cannot read. *The New England Journal of Medicine*, *337*(4), 272–274.

Wheeler, A., Fowler, J., & Hattingh, L. (2013). Using an intervention mapping framework to develop an online mental health continuing education program for pharmacy staff. *Journal of Continuing Education in the Health Professions*, *33*(4), 258–266.

Whittingham, J. R., Ruiter, R. A. C., Castermans, D., Huiberts, A., & Kok, G. (2008). Designing effective health education materials: Experimental pre-testing of a theory-based brochure to increase knowledge. *Health Education Research*, *23*(3), 414–426.

Windsor, R., Clark, N., Boyd, N. R., & Goodman, R. M. (2003). *Evaluation of health promotion, health education and disease prevention programs* (3rd ed.). New York, NY: McGraw-Hill.

W. K. Kellogg Foundation. (2006, February). *W. K. Kellogg Foundation logic model development guide*. Retrieved from https://www.wkkf.org/resource-directory/resource/2006/02/wk-kellogg-foundation-logic-model-development-guide

W. K. Kellogg Foundation. (2010). *W. K. Kellogg Foundation evaluation handbook*. Retrieved from https://www.wkkf.org/resource-directory/resource/2010/w-k-kellogg-foundation-evaluation-handbook

Wolfers, M. E. G., van den Hoek, C., Brug, J., & de Zwart, O. (2007). Using Intervention Mapping to develop a programme to prevent sexually transmittable infections, including HIV, among heterosexual migrant men. *BMC Public Health*, *7*, 141.

Wolfers, M., de Zwart, O., & Kok, G. (2012). The systematic development of ROsafe: An intervention to promote STI testing among vocational school students. *Health Promotion Practice*, *13*(3), 378–387.

Work Group for Community Health and Development, University of Kansas. (n.d.-a.). *Chapter 27. Cultural competence in a multicultural world*. Retrieved from http://ctb.ku.edu/en/table-of-contents/culture/cultural-competence

Work Group for Community Health and Development, University of Kansas. (n.d.-b.). *Section 4. Adapting community interventions for different cultures and communities*. Retrieved from http://ctb.ku.edu/en/tablecontents/section_1163 .htm

World Health Organization. (2011). *Standards and operational guidance for ethics review of health-related research with human participants*. Geneva, Switzerland: Author.

Wyatt, K. M., Lloyd, J. J., Abraham, C., Creanor, S., Dean, S., Densham, E., . . . Logan, S. (2013). The healthy lifestyles programme (HeLP), a novel school-based intervention to prevent obesity in school children: Study protocol for a randomised controlled trial. *Trials*, *14*, 95.

Yabroff, K. R., & Mandelblatt, J. S. (1999). Interventions targeted toward patients to increase mammography use. *Cancer Epidemiology, Biomarkers & Prevention*, *8*(9), 749–757.

Yabroff, K. R., O'Malley, A., Mangan, P., & Mandelblatt, J. (2001). Inreach and outreach interventions to improve mammography use. *Journal of the American Medical Women's Association (1972)*, *56*(4), 166–173, 188.

Yoo, S., Weed, N. E., Lempa, M. L., Mbondo, M., Shada, R. E., & Goodman, R. M. (2004). Collaborative community empowerment: An illustration of a six-step process. *Health Promotion Practice*, *5*(3), 256–265.

Zwerver, F., Schellart, A. J. M., Anema, J. R., Rammeloo, K. C., & van der Beek, A. J. (2011). Intervention mapping for the development of a strategy to implement the insurance medicine guidelines for depression. *BMC Public Health*, *11*, 9.

Zwikker, H., van den Bemt, B., van den Ende, C., van Lankveld, W., den Broeder, A., van den Hoogen, F., . . . van Dulmen, S. (2012). Development and content of a group-based intervention to improve medication adherence in non-adherent patients with rheumatoid arthritis. *Patient Education and Counseling*, *89*(1), 143–151.