


## Step 2: Preparing Matrices of Change Objectives



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Planning Health Promotion Programs: An  
Intervention Mapping Approach

### Step 2: Preparing Matrices of Change Objectives

- Task 1: State expected change or program outcomes for health-related behavior and environmental conditions
- Task 2: Subdivide behavior and environmental conditions into performance objectives
- Task 3: Select important and changeable personal and external determinants of behavior and environmental conditions
- Task 4: Create a matrix of change objectives for each level of intervention planning (individual, interpersonal, organizational, community, and societal) by crossing performance objectives with determinants and writing change objectives

### Creating a matrix of change objectives

	Determinant 1	Determinant 2
<b>Performance objective 1</b>	change objective	change objective
<b>Performance objective 2</b>	change objective	change objective

### Example partial matrix for condom use

Performance Objectives	Knowledge	Risk Perception	Self-Efficacy
1. Plan condom use	K.1. Describe use of condoms in preventing HIV/STD, pregnancy	RP.1. Describe how lack of planning increases risk of pregnancy, HIV/STD	SE.1. Talk about being confident to plan ahead for using condoms
2. Buy a condom	K.2. Identify places Zaii. List condom types		SE.2. Talk about feeling confident about buying a condom
3. Carry condoms	K.3. List different ways to carry condoms	RP.3. Describe how not carrying a condom increases risk	SE.3. Talk about feeling confident about carrying condoms

### What needs to change?

The diagram illustrates the progression from Phase 4 to Phase 1. Phase 4 includes Determinants. Phase 3 includes Behavioral Factors and Environmental Factors. Phase 2 includes Health Problems. Phase 1 includes Quality of Life Indicators. Environmental factors are further categorized into Societal, Community, Organizational, and Interpersonal levels.

### Logic Model of Change

The Logic Model of Change shows two parallel paths: one for the At Risk Group and one for the Environmental Agent. Both paths start with Change Objectives leading to Determinants, then Performance Objectives, Behavioral Outcomes, and Health, finally leading to Quality of Life. The first path also includes Environmental Outcomes. The first three stages (Change Objectives, Determinants, Performance Objectives) are labeled as the Logic of Change (Step 2), and the final two stages (Behavioral Outcomes, Health) are labeled as Outcomes (Step 1).

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### Task 1: Stating what health behaviors and environmental conditions need to change

- ◆ Identify health-related behaviors of at-risk group
- ◆ State behavioral outcomes
- ◆ Identify environmental conditions—at the interpersonal, organizational, community, society levels
- ◆ State environmental outcomes

### Identify health-related behaviors of the at-risk group

- ◆ Work from the needs assessment to identify behavior related to increased risk
- ◆ Prioritize behaviors in terms of relevance and changeability
- ◆ Restate risk behavior as health-promoting behavior
- ◆ Focus on a variety of types of behaviors

### Risk reduction behaviors

#### Risk factors

- ◆ A way of understanding causes of disease and factors associated with higher prevalence and incidence of disease in different populations

#### Reducing risk factors

- ◆ Underlying assumption that, if an intervention can reduce prevalence of risk factors, it can reduce prevalence of the disease (depending on how closely they are linked)
- ◆ Difficulty in interventions based on risk factors is that not all risk factors are clearly behavioral causes of the disease

### Health Promoting Behaviors

- ◆ A health-promoting behavior is, in some cases, the opposite of a risk behavior
- ◆ Increasing the practice of health-promoting behaviors viewed as action taken to enhance health or provide protection



### Adherence and self-Management Behaviors

#### Adherence

- ◆ Extent to which a patient follows through with a recommended action

#### Self-Management

- ◆ Includes self-regulation of responses to illness and its management
- ◆ Monitoring
- ◆ Goal setting
- ◆ Planning
- ◆ Strategy execution
- ◆ Evaluation



### Stating behavioral outcomes

- ◆ Stated as behaviors to be accomplished as a result of the program
- ◆ Examples of health-related behavioral outcomes
  - ✓ Increase eating of low-fat foods to include five servings of fruits and vegetables per day
  - ✓ Reduce total fat intake to 30% of calories
  - ✓ Use condoms correctly and consistently when having sexual intercourse
  - ✓ Monitor symptoms of asthma to detect early changes in status of illness.

## Identifying environmental conditions

### Environmental Factors Related to Risk

- ◆ Social or physical conditions that influence risk behavior
- ◆ Act as indirect causes of the health problem
- ◆ Or, cause the health problem directly
- ◆ Can be prioritized in terms of their relevance and changeability

## Examples of interpersonal environment

- ◆ **Families** - primary influence for socialization of children and continue to effect behavior throughout life
- ◆ **Peer groups** - beginning with playmates and continuing with friends, neighbors, coworkers, and members of organizations with which individuals affiliate (e.g., churches, social clubs, service groups)
- ◆ **Influential roles** - special influence through a role, e.g., teachers, coaches, religious leaders, health care providers
- ◆ **Support from social networks** - emotional support, information or advice, material support, maintenance of social identity, and social outreach

## Organizational environment

### Organizational environments

- ◆ Norms
- ◆ Policies
- ◆ Practices
- ◆ Facilities

### Examples of health-related organizational elements:

- ◆ Policies that exert strong control over behavior (e.g., worksite bans on smoking)
- ◆ Preventive health care policies
- ◆ Health care facility characteristics (e.g., service hours might determine whether workers obtain care)

## Examples of community level environment

- ◆ Availability of work and income
- ◆ Quality and quantity of housing
- ◆ Health care
- ◆ Availability of recreational resources
- ◆ Smoking and other health ordinances
- ◆ Law enforcement, judicial practices
- ◆ Treatment resources for social problems such as child abuse, violence, and drug addiction
- ◆ Social capital (capacity of the community to form and maintain problem-solving relationships)

## Examples of societal level environment

- ◆ Legislation
- ◆ Enforcement
- ◆ Regulation
- ◆ Resource allocation
- ◆ Policies, programs, and facilities of large political and geographic groups
- ◆ Societal influences often function through governments

## Stating the environmental outcomes

- ◆ Consider the needs assessment and identify environmental factors that require change
- ◆ Clearly state the desired environmental outcome to be achieved by the health promotion program
- ◆ For example, a lack of low-fat food options at school that contributes to high-fat diets of schoolchildren can be restated as follows: **Increase the availability of low-fat foods offered in school lunch and breakfast programs to include options with less than 30% of calories from fat at every meal**

### Stating health-promoting environmental conditions – an example

To support dietary change in elementary school children

- ◆ Organizational level  
School provides cafeteria meals with less than 30% of calories from fat
- ◆ Community level  
Commodities available to schools that can be prepared with less than 30% of calories from fat



### Stating health promoting environmental conditions *Project Sun Protection is Fun (SPF)*

Interpersonal level

- ◆ Apply SPF 15+ sunscreen to children at least 30 minutes before going outside
- ◆ Reapply SPF 15+ sunscreen to children every 1.5 to 2 hours, or after swimming or profuse sweating
- ◆ Dress children in protective clothing such as hats, sleeved shirts, long shorts, & sunglasses
- ◆ Direct children to play in shaded areas



### Stating health promoting environmental conditions- *Project SPF*

Organizational level

- ◆ Provide SPF 15+ sunscreen in the preschool day care centers for staff to apply to children
- ◆ Increase the amount of shade in the play areas
- ◆ Schedule activities so children are not outside during peak sun hours
- ◆ Eliminate unnecessary sun exposure



### Stating health promoting environmental conditions

Community or societal level

- ◆ Pass building codes for pre-school establishments to require built environment shade

### Thinking about environmental agents

- ◆ Who is in charge?
- ◆ Who can make the change?

### Task 2: Subdividing behavioral and environmental outcomes into performance objectives

- ▶ Clarify exact performance expected from someone affected by the intervention
- ▶ Observable subset of performance
- ▶ Address the question: **What do the participants of this program need to do to perform the behavior?**

### Performance objectives example

Behavior: Using condoms correctly and consistently

Performance objectives:

- ▼ Buy condoms
- ▼ Carry or have condoms easily available
- ▼ Negotiate the use of a condom with a partner
- ▼ Sub-objectives such as: State goal, negotiate mutually desirable goals, refuse to have sex without a condom
- ▼ Correctly apply condoms during use
- ▼ Maintain use over time

### Performance objectives example

Behavior: Eating a diet with less than 30% of calories from fat

Performance objectives:

- ▼ Read food labels
- ▼ Check percentage of calories from fat
- ▼ Select low fat food with percentage of calories from fat less than 30%
- ▼ Select a variety of nonfat fruits and vegetables
- ▼ Prepare food without adding extra fat
- ▼ Avoid the use of fat additives

### Stroke project at-risk group performance objectives

Behavior: Arriving at the hospital in time to get treatment for acute stroke

Performance objectives (persons in proximity):

- ▼ Note symptoms and compare to those for possible stroke
- ▼ Call 911 immediately (do not call primary care provider for triage)
- ▼ Insist on rapid care from EMS (transport at highest level)
- ▼ Insist on rapid care in ED
- ▼ Ask about stroke treatment in the ED

### Performance objectives for changing environmental conditions

The basic question to ask to determine performance objectives for changing environmental conditions is:

**What does [someone in the environment] need to do to accomplish the environmental outcome?**

- ▼ Agent may be different for each of the performance objectives
- ▼ Environmental change usually requires people outside the at-risk population to take action to modify the environmental conditions

### Figuring out who can take the actions for environmental change

- ▼ Who in the environment has control over the environmental condition
- ▼ Who can modify the environmental conditions
- ▼ For example, family members, policy makers, lawmakers, resource controllers, or service providers

### Interpersonal level performance objectives - Project SPF:

Dress children in protective clothing

- ▼ Parents and preschool staff ensure protective clothing is with child at preschool day care center
- ▼ Parents and preschool staff ensure protective clothing is worn before going outside
- ▼ Parents and preschool staff ensure protective clothing stays on child when outside



### Interpersonal level performance objectives - Project SPF

Direct children to play in the shade

- ▼ Parents and preschool staff locate shaded areas
- ▼ Parents and preschool staff plan activities for shaded areas



### Organizational level performance objectives - Project SPF

Provide SPF 15+ sunscreen in the preschool

- ▼ Preschool directors purchase or obtain sunscreen with a SPF 15+
- ▼ Preschool teachers modify the daily schedule to allow time to apply sunscreen to children



### Organizational level performance objectives- Project SPF

Increase the amount of shade in play areas

- ▼ Preschool staff will assess the adequacy of the current natural and structural shaded areas and determine ways to increase shade
- ▼ Preschool director will assess available resources for accomplishing changes to increase shade
- ▼ Preschool director and/or governing board will seek additional resources to accomplish changes to increase shade



### Organizational level performance objectives

School provides meals that are <30% of calories from fat

- ▼ Food service directors will modify menus to include more low fat foods
- ▼ Food service directors will modify purchase order specifications to reduce the fat content of vendor prepared food
- ▼ Nutritionists and cooks will modify recipes to reduce the fat content
- ▼ Cooks will modify cooking practices to reduce the fat content of prepared foods



### Stroke project environmental performance objectives for the emergency department

Behavior: Treat eligible stroke patients with rtPA (ED staff)

- ▼ Complete the neurological evaluation in 60 minutes (to physician 10 minutes; to CT scan 25; to CT read 45; to start treatment 60)
- ▼ Order CT scan immediately upon patient arrival or EMS call
- ▼ Obtain accurate onset time of stroke symptoms
- ▼ Document onset time of stroke symptoms
- ▼ Interpret CT scan in ED
- ▼ Send lab work immediately (HCT, platelets, glucose, PT, PTT)
- ▼ Make a rapid differential diagnosis of stroke (use NIH neuro exam protocol)

### Using theory to specify performance objectives

- ▼ Transtheoretical Model Stage of Change: Project PANDA objectives have to do with movement across stages
- ▼ Self-Regulation: *Watch, Discover, Think and Act* program objectives follow steps of self-regulation
- ▼ Negotiation: Condom use intervention objectives come from various approaches to negotiation
- ▼ Coping: *CF Family Education Program* objectives come from coping theory (Lazarus and Folkman)

### Example of self-regulatory objectives

- Condom use and other safer sex practices among HIV+ men who have sex with men
- ▼ Self-observe sexual behavior and compare sexual behavior to standard of safer sex
  - ▼ Identify when a problem exists
  - ▼ Implement solutions:
    - Decide to use non-penetrative sexual techniques, or
    - Decide to use condoms for anal sex
      - ▼ Purchase condoms
      - ▼ Carry condoms or have condoms easy available
      - ▼ Negotiate condoms for anal sex
      - ▼ Use condoms correctly and consistently
      - ▼ Maintain use over time
  - ▼ Implement selected coping strategies
  - ▼ Evaluate actions and return to monitoring

### Validating performance objectives

- ▼ Obtain a review and feedback from representatives of the community
- ▼ Through focus groups or interviews, potential program participants can be asked if the performance objectives fit with their views of how they would go about performing the health-related behaviors
- ▼ Getting feedback from individuals who have had experience with the health behavior or the environmental condition
- ▼ Often overlooked, but in some cases essential, is direct observation of the health behavior or environmental condition

### Cystic Fibrosis Family Education Program performance objective validation

- ▼ Ranking of objective importance by a panel of medical and psychosocial experts
- ▼ Revision of the objectives
- ▼ Ranking by Cystic Fibrosis Center medical directors (all 120 national directors)
- ▼ Revision of the objectives

### Validation of performance objectives for condom use (van Empelen & Kok, 2005)

- ▼ Study of the prediction of health-related behavior from the performance objectives
- ▼ Examined the role of preparatory performance in explaining condom use among adolescents
- ▼ Prospective survey study among 400 secondary school students.
- ▼ Condom use with steady sex partners explained by **decision to use condoms with steady sex partners**
- ▼ Relationship mediated by **buying and carrying condoms and communicating condom use with steady sex partners**

### Validation of condom use objectives

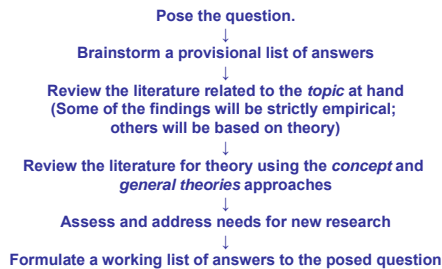
Thus, from the evidence available, van Empelen and Kok (2005) derived the performance objectives that young people:

- ▼ Decide to use condoms
- ▼ Buy condoms
- ▼ Have condoms available at all times
- ▼ Discuss condom use with their partner
- ▼ Use condoms

### Task 3: Selecting relevant and changeable personal and external determinants

- **Personal determinants:** Factors that rest within individuals (people at risk or agents in the environment), are subject to their direct control, and influence behavior
- **External determinants:** Factors that rest outside the individual and influence health behavior or environmental conditions

## Core processes



## Posing the question

- ◆ Why would a person perform a certain behavior?
  - ◆ Why would a certain environmental agent make an environmental modification?
- For Example:
- ◆ Looking at the needs assessment risk model you can ask "Why do sexually active adolescents have unprotected sex?"
  - ◆ Looking at the health promoting behavior and performance objectives you can ask "Why might sexually active adolescents use condoms?"

## Reviewing the Literature

- ◆ Begin with the topic or issue at hand, e.g. adolescent condom use
- ◆ Next look at the provisional list and review the theoretical constructs that show up in the list or that have been used to explain the health behavior or environmental condition of interest or related behaviors or conditions
- ◆ Finally, review other theories – look at familiar theories to see if they have something to offer in answer to the question

## New Data Collection

- ◆ Collect data from the at-risk groups and environmental agents
- ◆ Identify additional determinants
- ◆ Understand how determinants manifest in a particular group
- ◆ Qualitative methods, such as focus groups or interviews, can be helpful in generating new ideas for determinants or in checking out some of the findings from the research literature
- ◆ Another way to judge whether a determinant is important is to measure the determinant in subgroups of the population: those who practice the behavior and those who do not

## Refining the list of determinants

- ◆ Targeting determinants that have weak evidence of association or no theoretical relation to the behavior of interest will lead to a weak program
- ◆ Rate strength of association with the behavior or environmental condition - relevance
- ◆ Consider changeability

## Basis for rating relevance and changeability

- ◆ Basis for rating relevance and changeability based on evidence from the research literature
- ◆ Occasionally the planner will need to collect data from the at-risk group and from others in the field
- ◆ In addition, decisions to retain or delete determinants may be based entirely on a theoretical or conceptual basis when data are not available

### Task 4: Creating matrices of change objectives for each level of intervention planning

- ✘ Cross performance objectives with determinants
- ✘ Write change objectives
- ✘ Consider the environmental levels
  - ✘ Individual
  - ✘ Interpersonal
  - ✘ Organizational
  - ✘ Community
  - ✘ Societal

### Change objectives

- ◆ Write change objectives for personal and external determinants
- ◆ Ask: **What has to change in [determinant] in order for a program participant to do [performance objective]?**

### Selecting intervention levels

- ◆ Construct a separate matrix for each level of intervention for which performance objectives have been written
- ◆ The final number of matrices of program objectives different for each program
- ◆ Number of matrices influenced by complexity of the problem, span of the program across levels, and diversity of the population

### Matrix for Consistently and Correctly Using Condoms during Sexual Intercourse (excerpt)

PERSONAL DETERMINANTS

Performance Objective (Adolescent)	Knowledge	Skills and self efficacy	Outcome expectations	Perceived norms
PO.1. Purchase condoms	K.1. Explain how to buy or obtain a condom	SSE.1.a. Discuss confidence in going into a store and buying condoms SSE.1.b. Express confidence in dealing with embarrassment when buying a condom		PN.1. Explain that peers go into stores and buy condoms
PO.1.a. Locate condom displays in drug or grocery store	K.1.a. List places where condoms can be purchased or obtained free			

### At-risk group matrix (child)- SPF Program

Performance Objectives (Children)	Personal Determinants			External Determinants	
	Attitudes and Outcome Expectations	Knowledge	Cues	Reinforcement	Norms
PO1: Cooperate with sun protection practices by parent or preschool staff	A.1. Express positive feeling toward being protected from the sun OE.1.Describes how cooperating will keep skin healthy		C.1.Parents and daycare teachers provide cues for cooperating with sunscreen application	R.1.Parents and daycare teachers praise the child for cooperating with sunscreen application	N.1.a.Preschool directors post pictures and guidelines for sun protection N.1.b.Children in the school talk to each other, parents, and teachers about sun protection
PO.1.1. Stand still for application	A.1.1.Expresses positive attitude toward being a helper	K.1.1.Tell about how standing still allows sunscreen to be put on evenly		R.1.1.Parents and daycare teachers praise the child for standing still and getting good coverage of sunscreen	

### Asthma in Hispanic Children – Parent Matrix Selected Change Objectives

Personal determinants				
Performance Objectives: Manage Asthma Problem Parents	Behavior Capability	Skills & Self-Efficacy (for dealing with competing advice)	Self-Efficacy / Skills	Outcome Expectations
Get a diagnosis of asthma				
Identify Problems (Watch and Discover)				
PO1. Observe child for pattern or details of symptoms	BC.1.Describe possible symptoms of asthma	SSECA.1. Express confidence & demonstrate ability to tell others that good asthma managers believe that getting diagnosis of asthma is important for the child's health	SSE.1.Express confidence & demonstrate ability to identify symptoms & environmental conditions	OE.1 Expect that getting a diagnosis of asthma when needed is the first step toward better health for the child
PO2. Discover that symptoms are recurrent	BC.2. Analyze the pattern of symptoms over time		SSE.2. Express confidence in being able to notice symptoms	OE.2. Expect that by noticing and describing symptoms over time she will be able to get better health care for the child

### Differentiating the intervention population

- ◆ Separate matrices for subgroups at any level of intervention (most often at the individual or at-risk group level)
- ◆ Describe two or more subgroups in which membership affects performance objectives or determinants of the health-related behavior or environmental condition
- ◆ Differentiating a population often occurs simultaneously with writing performance objectives or exploring determinants
- ◆ Ask: **Are either performance objectives or determinants substantially different for subgroups?**

### Variables to consider in differentiating populations

- ◆ Age and gender, geographic location, socioeconomic status, education, and cultural group
- ◆ Using stage theories and models such as child development, adult development
- ◆ Stages of change models
- ◆ Stages of organizational change

### Differentiation by developmental stage

- ◆ *Cystic Fibrosis Family Education Program* planners asked: What should the child with cystic fibrosis be able to do to manage the disease?
- ◆ Ages 4 through 18 years, so planners asked how the performance objectives would be different for the developmental stages represented by:
  - ✓ preschoolers ages 4 through 6
  - ✓ school-age children ages 7 through 11
  - ✓ adolescents ages 12 through 18

### Clarifying external determinants and environmental conditions

- ◆ Environmental conditions are external determinants
- ◆ Whether they appear in a matrix of their own (at an environmental level) or appear in a matrix of the at-risk group (as an external determinant) depends on the magnitude of the issue and whether it can be dealt with through the at-risk group or needs a full analysis and program components of its own

### Example of changing school lunches

- ◆ Identified “Availability of low-fat alternatives in the schools” as an environmental factor
- ◆ With performance objectives such as “Food service directors will modify menus to include more low-fat food”
- ◆ As a result, the planning team created a matrix for food service directors and did not need the external determinant “availability” on the at-risk matrix of student behavior