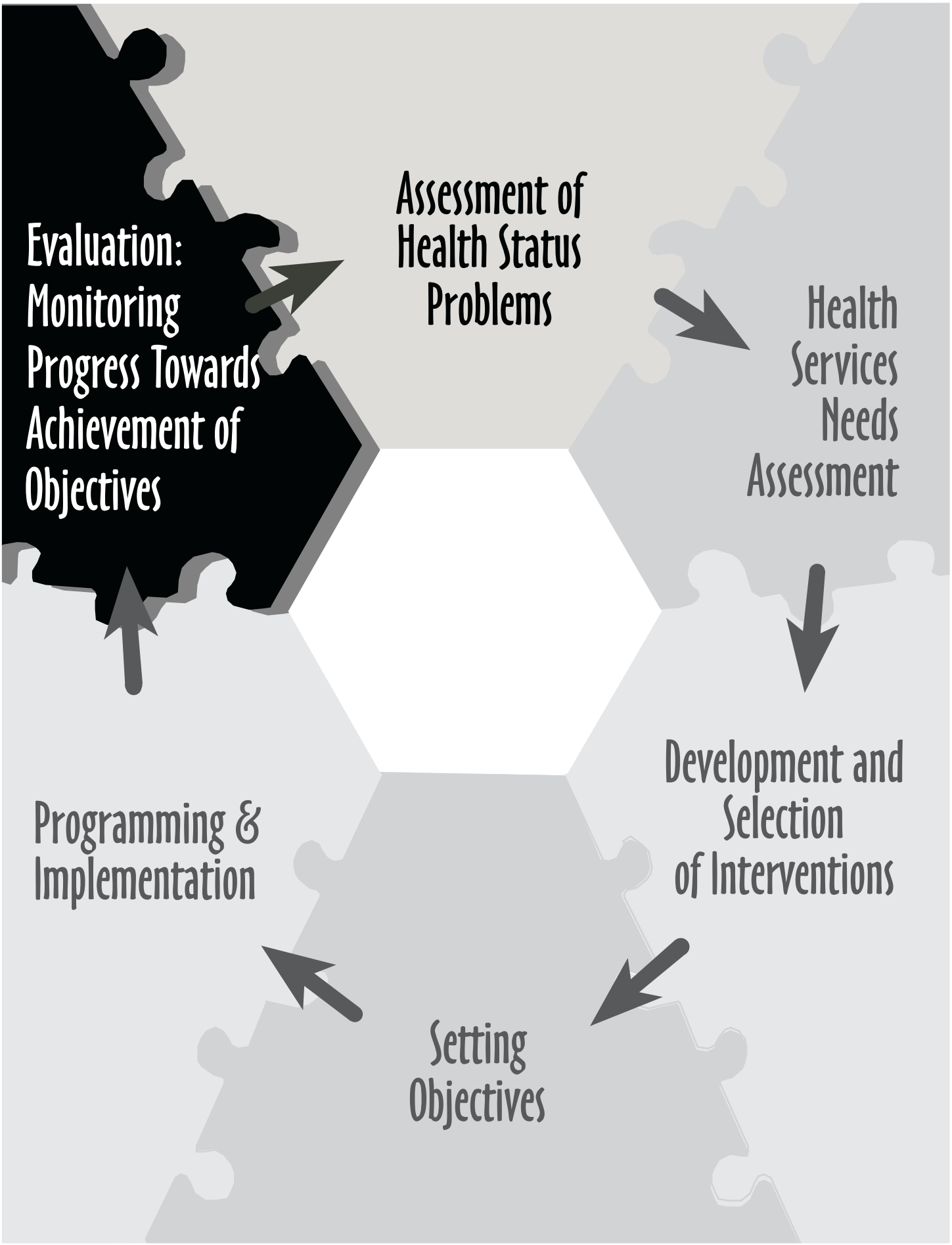
Assessment of Health Status Problems
Health Services Needs Assessment
Development and Selection of Interventions
Setting Objectives
Programming & Implementation
Evaluation: Monitoring Progress Towards Achievement of Objectives

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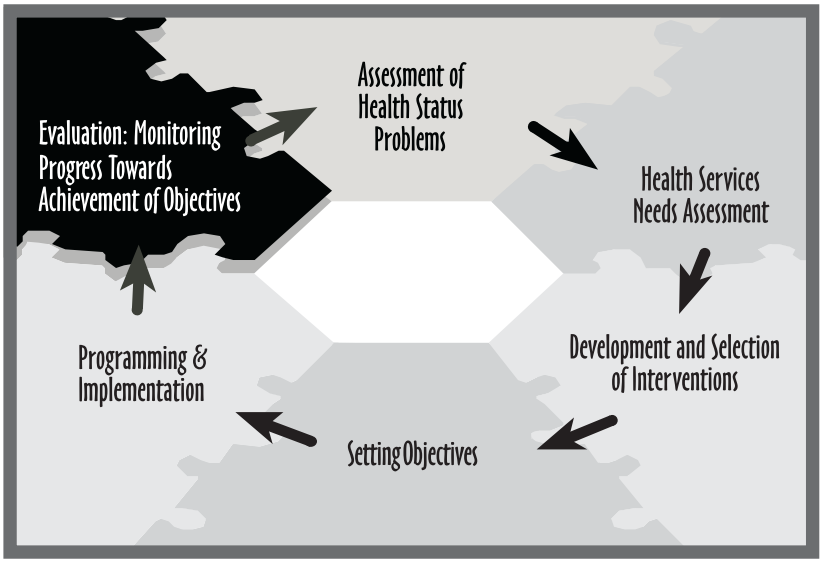
The BIG Picture...

Figure 1.



You are about to proceed through a self-instructional manual that was designed to help you develop skills in one of the steps of the rational planning process. There are six manuals in this series, each of which explains a step in the process and how to accomplish it:

1. Assessment of Health Status Problems
2. Health Services Needs Assessment
3. Development and Selection of Interventions
4. Setting Objectives
5. Programming and Implementation
6. Evaluation: Monitoring Progress Towards Achievement of Objectives

Each of the steps builds on the ones that precede it and contributes to the ones that follow. This circular process is diagrammed in *Figure 1*.

Assessment of health status problems is the foundation step for the entire planning process. This step involves careful specification of the dimensions of a problem and analysis of its precursors. In the second step, the focus shifts from the health problem to health services. A health services needs assessment examines the adequacy of existing services to prevent the problem by attacking its precursors or compensating for their effects. Where existing services fall short, unmet needs for service become apparent. Step three involves development of interventions to meet these unmet needs. This is the step that links needs and interventions and constitutes the essential rationality of the

planning process. Step three also involves a deliberate selection process, in which each alternative intervention is compared to a set of relevant criteria to identify the most appropriate one to be implemented. Once an intervention has been selected, it is possible to develop measurable objectives (step four) which, as a whole, constitute one or more hypotheses regarding how the program's activities are expected to contribute to an improvement in the problem. The objectives form a blueprint of the program, which is further elaborated in step five, including placement in the organization, job descriptions, budgeting, and implementation activities.

Step six in the cycle of program planning is evaluation. Evaluation involves comparisons between actual experience and standards. There are two major ways of thinking about evaluation. One is a research activity, called evaluation research. The second is an administrative function called monitoring. Monitoring involves assessment of progress towards achievement of the objectives of a program. By monitoring the extent to which targets are achieved, you can determine whether the program has fallen short on some objectives. If it has, this information should trigger an in-depth search for the reasons the targets were not achieved. This search, in turn, is part of the health status problem and service needs assessments in the next round of planning. Monitoring progress towards achievement of objectives is the topic of the last self-instructional manual in this series. We did not develop a manual on evaluation research because these methods are discussed extensively in other sources.

These six manuals present a framework for program planning that encourages development of creative, responsive, and comprehensive interventions. The framework is useful for addressing problems that range from the very simple to the most complex. It allows for movement back and forth to revise earlier steps based on information that may emerge later in the process. The circular planning cycle may be entered at any point and rational progress can be made as long as the sequence of steps is understood and followed. An emerging problem, for example, may require careful attention to every step in the process, starting with assessment of the health status problem, and ending with an evaluation of the selected intervention. Planning in the context of well-understood problems and ongoing programs, however, may require emphasizing the objectives and programming steps which need frequent adjustments to stay on track. The framework is also flexible enough to be used at any jurisdictional level. While the relative emphasis on particular steps is likely to vary across jurisdictions, the framework provides a common frame of reference.

Program planning serves as a bridge between and among theories, measurement sciences, substantive content, and actual practice of public health. These manuals offer you technical guidance for carrying out the six steps in the planning process. Your planning skills will be enhanced further by training in such analytic areas as epidemiology, biostatistics, decision analysis and evaluation research, and in interactive domains like community development, group process, and leadership. Your greatest challenge as a program planner is to use the rational planning framework to apply each of these skills in the right amount and at the right time to combat public health problems effectively.

Table of Contents

What is this manual about?

This is a self-instructional manual designed to teach you the process of using objectives to monitor a public health program. This process will be especially useful to you in the management and evaluation of a program. As you work through this manual, you may wish to practice the method in a program or project that you are currently developing.

Introduction

Program evaluation is one step in the rational planning process. As shown in *Figure 1,* rational planning is a circular process in which one step leads to the next, and then the cycle repeats itself. There is also iteration, or movement back and forth among the steps. This allows you to use information gained at each step to revise the previous steps, as well as to inform subsequent ones. For this manual, it is especially important to understand the relationships among three of the steps: problem assessment, setting objectives, and evaluation. Objectives are derived from assessment of health status problems and they are the foundation of program evaluation.

Evaluation involves systematic comparisons between actual program activities and outcomes on the one hand and standards for the same activities and outcomes on the other, in order to make a judgment about the value of the program. The information resulting from evaluation can be used for making decisions about whether the program should be continued or changed. In program evaluation, two general strategies may be used: evaluation research and monitoring.

Evaluation research involves the application of social science research methods to determine whether a program causes observed effects. If a program has a logical hypothesis and measurable objectives, it can be subjected to evaluation research methods. Evaluation research is the strategy to use when the effectiveness of a new program (*e.g*., demonstration project) must be determined. Planning for evaluation research involves construction of a research design, selection of an appropriate control group, and development of strategies for subject recruitment, data collection, and analysis. The methods of evaluation research are described in numerous textbooks (eg, Fink, 1993; Patton, 1997; Rossi & Freeman, 1993; Grembowski, 2001).

Evaluation research plays an important role in public health program development. But, for many programs, the evaluation question is not whether the program caused the observed effects. Rather, the key questions are whether the program, which is already known to have the capacity to be effective, was con-

ducted as planned, and whether the anticipated results were achieved. Answering these questions does not require the sophisticated methods, expertise, time, and financial resources required for evaluation research. In this case, monitoring is the evaluation strategy for the job.

Monitoring is an administrative function which can and should be an integral part of the ongoing operations of every program. Monitoring involves systematically comparing activities of the program and indicators of the participants' chracteristics with targets set by the program in its objectives. By monitoring the extent to which targets are achieved, staff can determine the progress of the program in meeting its objectives. If the program has fallen short on some objectives, this information should trigger an in-depth search for the reasons the expected targets were not achieved. This search, in turn, is part of the health problem and service assessments in the next round of planning.

In this manual, you will learn:

- What program monitoring is and how it is related to evaluation;
- How to develop tables during the planning phase that will be used for monitoring your program;
- How to complete the tables at specified times during the program's operation; and
- How to interpret and use the information you obtain from monitoring.

What is monitoring and how can it be used in program evaluation?

Monitoring of a program involves charting progress towards achievement of objectives in both short-term and long-term time frames. The objectives that make up the program hypothesis serve as the basis for monitoring. To monitor objectives, formulas to measure progress must be created, and the data to calculate the formulas must be available. Scores and indexes calculated from the formulas can then be used to make systematic comparisons between activities and outcomes on one hand and objectives on the other in order to assess the program's value. Monitoring, therefore, is one strategy for program evaluation.

Terminology

There are terms specific to the monitoring process which are important for you to understand. These are presented in *Table 1*. The first three are a review for you since you have already developed program objectives. You will learn more about the other terms as you progress through this manual.

Table 1. Monitoring Terminology

Indicator: Expected program outcome that corresponds to health and related conditions of the population.

Activity: What the program does.

Target: Numerical quantity that indicates the minimum desirable level of achievement for a particular activity or indicator. A target usually has two parts: 1) quantity or amount, and 2) date of anticipated achievement.

Formula to measure progress: Numerical calculation for determining the extent to which objectives are achieved.

Weight: Numerical ranking to indicate relative importance of objectives.

Achievement score: Value produced when the formula is applied. Used to monitor the achievement of specific operational, program, and policy objectives.

Achievement index: Measure of the overall extent to which operational, program, and policy objectives are achieved. Calculated from the achievement scores.

Creating monitoring tables for the proposal

Monitoring does not begin after the program has been in operation. It is a process that begins in the planning stage. This is what you will learn next as you develop monitoring tables. To demonstrate the concepts, the policy, program and operational objectives of a low birthweight prevention program in fictitious York County will be used. For your review, the background information on this program is presented in *Figure 2*. and the program objectives and hypotheses are diagrammed in *Figure 3*. *Tables 2, 3,* and *4* summarize the monitoring plan that

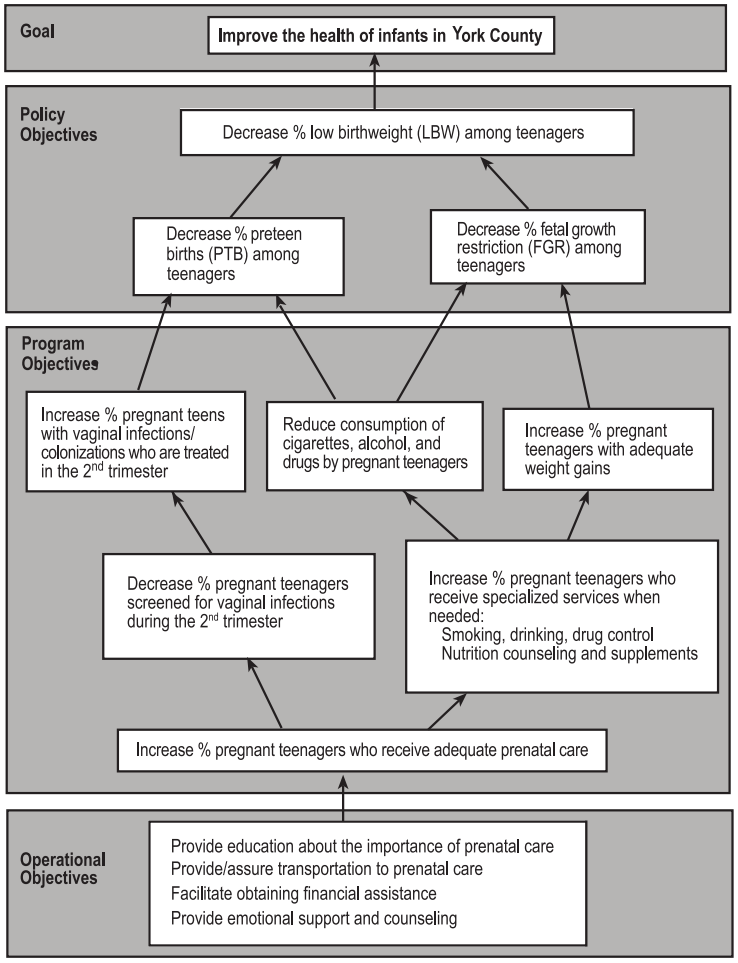
Figure 2. Background of the York County Low Birthweight Prevention Program

York County leaders were alarmed about the high incidence of low birthweight (LBW), and its components, preterm birth (PTB) and fetal growth restriction (FGR), since these conditions put infants at risk for medical and developmental complications and even death. A task force was formed to investigate the problem. The planners found that adolescents had disproportionately high rates of these problems. Their assessment also revealed that these neonatal conditions have been very resistant to interventions, with the expected link between prenatal care and these outcomes controversial. Nevertheless, with the emergence of new directions for interventions in recent years, prenatal services, especially those likely to be used by adolescents, had been revised to focus intensively on recognition and treatment of vaginal infections, modification of behavioral risks like smoking, drinking alcohol, and drug use, and improvement of maternal nutrition in York County. Yet a large percentage of teenagers were not beginning prenatal care early enough or receiving it in sufficient quantity and depth to realize the potential benefits of these services. Further analysis of the problem and services revealed that pregnant teenagers:

- Felt it was unimportant to seek early prenatal care or to continue with care once they started it;
- Had no transportation to prenatal clinics;
- Had difficulty paying for prenatal care; and
- Were often single and without emotional support from families.

It was decided to design a program that would use trained lay women to help the pregnant teenagers gain access to prenatal care by dealing with identified barriers to care and by providing emotional support.

Figure 3. York County LBW Prevention Program Hypotheses



corresponds with the program hypotheses.

The format of all three tables is systematic and consistent. The first two columns on the left include indicators for policy and program objectives, activities for operational objectives, and numerical targets. These were developed previously as the objectives were constructed. The third column is for recording formulas to measure progress towards achievement of the targets. The fourth column is used to assign weights for the objectives according to their relative importance. These two new columns are discussed in more detail below.

Developing formulas to measure progress

To evaluate progress towards achievement of objectives, it is necessary to create formulas to correspond to each indicator/target and activity/target pair. There are three types of formulas (Guild, 1990), each based on the principle that a score of 1.00 is complete accomplishment. A score of 0–.99 signifies that the activity or indicator fell short of the target; a score that exceeds 1.00 indicates greater than expected achievement.

The simplest type of formula is to score 1.00 if the target is reached and 0.00 if it is not reached. This formula can be used with any type of target, but it does not allow for an indication of partial progress towards achievement of the objective.

A second type of formula can be used when the target is a date. A score of 1.00 is given if the activity is completed at the projected time. Since 0.08 is the decimal equivalent of 1/12 or one of twelve months, 1.00 $\pm$ 0.08 is used to designate a score for each month early (+) or late (–).

A third type of formula can be used when the target is a percent, proportion or number. A score is calculated by dividing the level of actual achievement by the level of anticipated achievement (*i.e.*, the target). This type of formula is most frequently used in practice, as suggested by *Tables 2-4.*

Assigning weights

Weights may be used to show that accomplishment of some objectives is relatively more important than accomplishment of others. In the York County Low Birthweight Prevention Program, greater weight (*2* and *3*) has been assigned to some operational activity/target pairs (see *Table 2*) than to others. The objectives with higher weights are believed to be more likely to contribute to accomplishment of the program and policy objectives. There has also been weighting of the program objectives (see *Table 3*). The operational and program objectives related to use of prenatal care, vaginal infections, smoking, and nutrition have been given the highest weight. These are major emphases of the services that Resource Mothers are trying to assure to pregnant adolescents. In contrast to operational

Table 2. York County Low Birthweight Prevention Program Operational Objectives,* Year 1

Activity	Target	Formula to Measure	Weight
% who receive one in-person encounter with a Resource Mother per week during pregnancy	90%	% who receive 1 encounter/week 90	3
% visits during which education about the importance of prenatal care is provided	70%	% visits with pnc education 70	3
% in need for whom transportation to prenatal services is provided	95%	% in need with pnc transportation 95	2
% eligible who receive assistance obtaining financial support	85%	% eligible helped with financial assistance 85	1
% assessed for issues that would benefit from counseling and support	100%	% with psychsocial assessment 100	2
% who receive appropriate counseling and support for issues identified in the assessment	85%	% in need who get counseling/support 85	2

*Activities refer to all pregnant adolescents ≤ 18 years who participate in the program.

Table 3. York County Low Birthweight Prevention Program Program Objectives,* Years 1-3

Indicator	Target	Formula to Measure Progress	Weight
% who start prenatal care before 14 weeks gestation	35% increase	% increase / 35	3
% who have 7 or more prenatal visits	35% increase	% increase / 35	2
% screened for vaginal infections during the 2nd trimester	80%	% screened for vaginal infections/2nd trimester / 80	3
% smokers who participate in cessation programs/activities	75%	% smokers using cessation programs / 75	3
% drug/alcohol abusers who participate in cessation programs	75%	% substance abusers in cessation programs / 75	2
% WIC eligibles who enroll in WIC	90%	% eligibles enrolled in WIC / 90	3
% who receive nutrition counseling	90%	% who receive nutrition counseling / 90	2
% vaginal infections/colonizations treated with antibiotics in 2nd trimester	80%	% vaginal infections/colonizations treated in 2nd trimester / 80	3
% smokers who decrease daily average consumption	40%	% smokers who decrease daily average consumption / 40	1
% smokers who quit	10%	% smokers who quit / 10	3
% alcohol users who quit	80%	% alcohol users who quit / 80	1
% drug/alcohol abusers who quit	10%	% substance abusers who quit / 10	2
% with adequate weight gains	20% increase	% increase in adequate weight gains / 20	3

* Indicators refer to all pregnant adolescents ≤18 years who participate in the program.

Table 4. York County Low Birthweight Prevention Program Policy Objectives,* Years 1-3

Indicator	Target	Formula to Measure Progress
% who have a low birthweight infant	15% reduction	$\frac{\%\ \text{reduction}}{15}$
% who have a preterm birth	15% reduction	$\frac{\%\ \text{reduction}}{15}$
% who have fetal growth restriction	5% reduction	$\frac{\%\ \text{reduction}}{5}$

* Indicators refer to all pregnant adolescents ≤18 years who participate in the program.

and program objectives, the policy objectives (see *Table 4*) are not weighted, signifying that all three of them are considered by the planners to be of equal importance. In other situations, it may be appropriate to assign different weights to these objectives as well.

Developing a data collection plan

Tables like those on the previous pages depict a logical framework for program monitoring that is easily understood. To be used effectively, however, special attention must be given to identifying and collecting the data necessary to calculate formulas and, thus, monitor achievement of the objectives. Unfortunately, it is not uncommon for this step to fall through the cracks in the rush to meet proposal deadlines, only to discover at a later date that the data required to monitor the objectives are simply not available. To avoid such situations, it is important to develop detailed plans for data ascertainment during the planning process.

It is tempting to begin this task by examining existing data sources for items you think you might need. You may end up with exactly those sources, but if you start with them, you are likely to miss some important opportunities for better data. The most critical step in planning your data collection strategy is to figure out exactly what data you need. Since your monitoring tables are already in process, getting started is straightforward. Examine each indicator and activity and think about how you can measure it. Sometimes, especially when measuring program activities, this is easy. An encounter between a health provider and a client, for example, either happens or not, and can be readily documented.

Selecting measures for indicators of program and policy objectives is often more difficult. For example, to measure *% drug/alcohol abusers who participate in cessation programs* (Table 3), you must be able to measure a sensitive behavior, substance abuse, accurately, distinguish it from substance use, and then define cessation program (meeting which qualifications?) and decide what constitutes participation (a specfied minimum number of encounters?).

A careful review of the activities and indicators in *Tables 2-4* suggest many questions that would have to be answered before deciding on specific measures. Sometimes, finding the answers is very difficult. Measuring phenomena like quality of life or functional ability, for example, requires techniques that are not widely known and precise data collection conditions that may not be available to you. When measures of a program's objectives are not obvious, it is wise to consult with experts in measurement or indicator development.

Once you a have determined what data you need, you can move on to considering how to get it. A review of *Tables 2, 3,* and *4* suggests that data to monitor the objectives in this program would probably come from several sources: the adolescent patients, resource mothers, medical providers, and related programs. Some of the data may already be available. For example, birth certificates are filed for all deliveries, and they include information on weight and gestational age at birth. Prenatal records usually document use of care and laboratory tests for vaginal infections, with corresponding results. The main issues to consider with regard to existing data sources are availability and quality. Are the data available to you for monitoring purposes? This is not only a question of whether you can obtain them from their owner, but whether they are available frequently enough to be useful to you. With regard to quality, you need to consider whether the process by which the data are collected meets acceptable standards for quality control. Some useful questions to ask are: What do you know about how they are collected? Are many people involved? Do they have adequate preparation and supervision? Are the measures “hard” (like weight) or “soft” and subject to human interpretation, like quantity of cigarettes consumed? In what ways might the process of data collection affect the accuracy of the results of your evaluation?

For a new program, like the York County Low Birthweight Prevention Program, many items needed to create measures are unlikely to be available. All of the activities of the program are being conducted anew, and even items required for indicators of program objectives may not be routinely collected, although they could be of interest to other providers. If data sources do not already exist, you must decide how to ascertain the data you need. This is another multistep process that may involve constructing data collection instruments and administration protocols, and deciding how and when the data will be processed. Within existing organizations, it is often possible to "piggy-back" your program's data requirements onto an operating information system. This is much more efficient

than developing a new one.

Regardless of availability, it is sometimes simply not feasible to ascertain the data you really need to monitor progress on a given objective. The cost may be too great, or data collection may be too difficult. This information may lead you to decide that an alternative course of action, modifying the objective, is the wisest choice -- yet another example of iteration in the program planning process.

Evaluation narrative

A narrative description of evaluation plans is usually required in grant applications. The narrative should explain the monitoring tables, highlighting their full correspondence with the objectives of the program. It should also include a list of the measures you plan to use, the data items required to create the measures, and the source of those data items. This can be done most efficiently in another table. Any unusual issues related to your measures should be discussed in narrative form. For example, if you had a choice of three measures to use for an indicator, why did you choose the one you did? Your narrative should also include information on the frequency of data collection, as well as specific plans for data analysis and reporting.

Calculating achievement scores and achievement indexes

Monitoring tables are developed during the planning stages. Their usefulness, however, does not become apparent until the formulas are applied and the results are interpreted.

Table 5 is an example of how progress on operational objectives can be charted at the end of one year of program operation. The first four columns of this table are identical to those in *Table 2*. The fifth column shows the actual value (result) attained for each target in Year 1 of the program. The sixth column, labeled *Achievement Score*, shows the score produced when the formula is calculated. For the first indicator, for example, the target was 90%, but only 85% of the teenagers had one in-person encounter per week. Achievement, then, was 85/90 or 0.94. This value is less than 1.00, thus indicating that the program fell short of its target, although much progress was made. As seen in *Table 5*, achievement scores are calculated for each activity/target pair at the end of the time period.

In addition to calculating and reviewing achievement scores, an index for all of one type of objectives (in the case of *Table 5*, operational objectives) may be useful. At the bottom of *Table 5*, three different methods of calculating an achievement index are shown.

The first option is to use the simple scoring method of 1.00 (target met) or 0.00 (target not met) for each objective. An index is calculated by summing the number of targets met and then dividing by the total number of targets. In the example in *Table 5*, only one target was actually met so this method yielded an index value of 0.17, even though the program made significant progress on each objective.

The second option, average achievement for all objectives, is calculated by summing up the more informative achievement scores and then dividing by the total number of targets. This method shows the program in a much more favorable light (0.84) and is a better indication of overall accomplishment.

The third option, weighted average achievement for all objectives, introduces weights for each activity/target pair into the calculation. As you can see, the numerator is made up of the sum of the weighted scores, while the denominator is the total of all weights. In this particular case, the use of weights decreases the index value to 0.81 because the lowest achievement scores also carry greater weight.

Table 5. York County Low Birthweight Prevention Program Operational Objectives,* End of Year 1

Indicator	Target	Formula to Measure Progress	Weight	Actual Results	Achievement Score
% who receive one in-person encounter with a Resource Mother per week during pregnancy	90%	% who receive 1 encounter/week / 90	2	85%	0.94
% visits during which education about the importance of prenatal care is provided	70%	% visits with pnc education / 70	3	57%	0.81
% in need for whom transportation to prenatal services is provided	95%	% in need with pnc transportation / 95	2	75%	0.79
% eligible who receive assistance obtaining financial support	85%	% eligible helped with financial assistance / 85	1	85%	1.0
% assessed for issues that would benefit from counseling and support	100%	% with psychsocial assessment / 100	2	92%	0.92
% who receive appropriate counseling and support for issues identified in the assessment	85%	% in need who get counseling/support / 85	3	50%	0.59

* Activities refer to all pregnant adolescents ≤18 years who participate in the program.

Achievement Index Options:

1. Proportion of objectives completed completed: 1/6 = 0.17
2. Average achievement for all objectives:
$$\frac{.94+.81+.79+1.0+.92+.59}{6} = \frac{5.05}{6} = 0.84$$
3. Weighted average achievement for all objectives:
$$\frac{.94(2)+.81(3)+.79(2)+1.0(1)+.92(2)+.59(3)}{13} = \frac{1.88+2.43+1.58+1.00+1.84+1.77}{13} = \frac{10.50}{13} = 0.81$$

Table 6. York County Low Birthweight Prevention Program Program Objectives,* End of Year 3

Indicator	Target	Formula to Measure Progress	Weight	Actual Results	Achievement Score
% who start prenatal care before 14 weeks gestation	35% increase	% increase / 35	3	25%	0.71
% who have 7 or more prenatal visits	35% increase	% increase / 35	2	28%	0.80
% screened for vaginal infections during the 2nd trimester	80%	% screened for vaginal infections/2nd trimester / 80	3	60%	0.75
% smokers who participate in cessation programs/activities	75%	% smokers using cessation programs / 75	3	56%	0.75
% drug/alcohol abusers who participate in cessation programs	75%	% substance abusers in cessation programs / 75	2	40%	0.53
% WIC eligibles who enroll in WIC	90%	% eligibles enrolled in WIC / 90	3	86%	0.96
% who receive nutrition counseling	90%	% who receive nutrition couseling / 90	2	77%	0.86
% vaginal infections/colonizations treated with antibiotics in 2nd trimester	80%	% vaginal infections/colonizations treated in 2nd trimester / 80	3	84%	1.05
% smokers who decrease daily average consumption	40%	% smokers who decrease daily average consumption / 40	1	50%	1.25
% smokers who quit	10%	% smokers who quit / 10	3	15%	1.50
% alcohol users who quit	80%	% alcohol users who quit / 80	1	50%	0.63
% drug/alcohol abusers who quit	10%	% substance abusers who quit / 10	2	3%	0.30
% with adequate weight gains	20% increase	% increase in adequate weight gains / 20	3	15%	0.75

* Indicators refer to all pregnant adolescents ≤18 years who participate in the program.

Table 6, continued

Achievement Index Options:

1. Proportion of objectives completed: 3/13 = 0.23
2. Average achievement for all objectives:

$$\frac{.71+.80+.75+.75+.53+.96+.86+1.05+1.25+1.50+.63+.30+.75}{13} = \frac{10.84}{13} = 0.83$$

3. Weighted average achievement for all objectives:

$$\frac{.71(3)+.80(2)+.75(3)+.75(3)+.53(2)+.96(3)+.86(2)+1.05(3)+1.25(1)+1.50(3)+.63(1)+.30(2)+.75(3)}{31} =$$

$$\frac{2.13+1.60+2.25+2.25+1.06+2.88+1.72+3.15+1.25+4.50+.63+.60+2.25}{31} = \frac{26.27}{31} = 0.85$$

Table 7. York County Low Birthweight Prevention Program Policy Objectives,* End of Year 3

Indicator	Target	Formula to Measure Progress	Actual Results	Achievement Score
% who have a low birthweight infant	15% reduction	$\frac{\%\text{ reduction}}{15}$	9%	0.60
% who have a preterm birth	15% reduction	$\frac{\%\text{ reduction}}{15}$	10%	0.67
% who have fetal growth restricton	5% reduction	$\frac{\%\text{ reduction}}{5}$	6%	1.20

* Indicators refer to all pregnant adolescents $\leq$18 years who participate in the program.

Achievement Index Options:

1. Proportion of objectives completed: 1/3 = 0.33
2. Average achievement for all objectives:

$$\frac{.60+.67+1.2}{3} = \frac{2.47}{3} = 0.82$$

For program and policy objectives, scores for achievement are calculated by the same procedures, as shown in *Tables 6* and *7*. Achievement indexes are then calculated at the end of the program period (3 years in the York County program) or at more frequent intervals to monitor progress towards achievement of policy and program objectives.

Interpreting index values and using the information

The information derived from this process shows which objectives need more attention in subsequent years and whether any of them requires less intensive work. There are no universal cut-points above which the level of accomplishment is considered acceptable. Rather, each program should decide on its own cut-points, taking into consideration its special circumstances. Intuitively, one might consider a score of less than 70% undesirable and a score of 90% or more as a demonstration of substantial progress. However, a particular score must be interpreted within the context of the specific objectives and program being evaluated.

Achievement scores are useful inputs to evaluating the effectiveness of the program and deciding its future. In the York County LBW Prevention Program, the average achievement index for all of the policy objectives was 0.82. Given the persistent nature of the problem this program was designed to address, this overall achievement was considered quite favorable. Nevertheless, program managers will review individual objectives to determine which ones fell substantially short of their targets in order to make decisions about where to put future emphasis. They will also calculate the same indicators for the entire population of adolescents in the county to compare with countywide rates before the program and the rates of program participants. This analysis will suggest whether or not the program is affecting low birthweight in the entire population of adolescents.

Knowing the level of achievement of operational and program objectives is useful for making management decisions. Adjustments in resource allocations are often based upon the strengths and weaknesses of the program in meeting its objectives for a given year. The information in *Table 5*, for example, raises questions about the ability of the Resource Mothers to do the education and counselling activities they are intended to do. Do they have the time? Do they know these activities are part of their job responsibilities? Are they adequately informed about adolescent development to engage teens in these topics? The answers to these and other questions may lead to changes in qualifications, training, or operating procedures for the Resource Mothers.

Disadvantages and advantages of monitoring as a method for program evaluation

While monitoring is useful in evaluating a program, it does have some limitations. Monitoring does not document cause-effect relationships, and it has no external validity; that is, the results cannot be extrapolated to any other program. Also, as noted above, there are no firm guidelines for interpretation of the scores and indexes. Interpretation must be done within the context of the specific program being evaluated.

Even with these limitations, monitoring is valuable in many ways. The process is inexpensive and can be applied readily by anyone with entry-level training or experience. Monitoring includes a flexible set of methods that can be used in whole or in part to meet the needs of the program. It requires program planners to develop objectives that serve as the basis of the process and then to plan for necessary data so that the capability for monitoring is assured. And, most importantly, monitoring encourages the production of information for critical management decisions in both short-term and long-term time periods, and across all levels of program functioning. As a result, it is compatible with most government and foundation proposal guidelines, and is consistent with the federal government's efforts to conduct performance appraisals on the large-scale programs it supports (Government Performance and Results Act of 1993).

Summary

In this manual, you have been introduced to monitoring and its role in the program planning process. Specifically, you have learned:

- What program monitoring is and how it is related to evaluation;
- How to develop tables during the planning phase that will be used for monitoring your program;
- How to complete the tables at specified times during the life of the program; and
- How to interpret and use the information you obtain from monitoring.

The explanation of concepts and the examples given here are only a beginning. You need to apply this new skill when working on your own programs. Start by developing your monitoring tables during the planning stage, paying close attention to data needs. Then you will be readily able to track your program's progress towards achievement of its objectives and, with the resulting information, to make important management decisions. In addition, the information you generate through monitoring will contribute substantially to future assessments of health problems and needs for services in your community -- thus, beginning the planning cycle anew.

Practice

You can practice developing monitoring tables for any of the four practice programs used throughout this series of manuals: Car Safety Program, Asthma Management Program, CSHCN Primary Care Improvement Program, and HIV Prevention Program. For the program of your choice, you will develop a monitoring table for one set of objectives, either operational or program level. Once your table is completed, you can interpret the data by answering a series of questions about the achievement scores and indexes.

Take a few minutes to orient yourself to the program you selected by reviewing the program's hypotheses. Then you will find three tables (*Tables A, B,* and *C*) to use in your practice session. Since it would be difficult for you to assign weights for a program that is not familiar to you, we have provided that information. Your job is to practice creating formulas and interpreting results for each objective. In practice *Table A*, the activity/indicator and target columns have been completed. The formula column has been left blank for you to complete. Give it a try, then compare your answers to those in practice *Table B*. In that table, the formula, weight, and result columns have been completed. You can now calculate the achievement score for each objective. Once you have done that, calculate the achievement index by the three methods you have been shown: the proportion of objectives completed, the average achievement, and the weighted average achievement methods. You can compare your answers to those in *Table C*.

Now that you have your calculations completed, interpret the scores and indexes by answering the following questions:

1. In comparing the three methods for calculating the achievement index, which one do you think best reflects the achievement of the program? Why?
2. Overall, how did the program do in meeting its (operational or program) objectives?
3. Are there specific objectives that will need more attention in subsequent years?
4. Are there specific objectives that will need less attention in subsequent years?

Car Safety Program

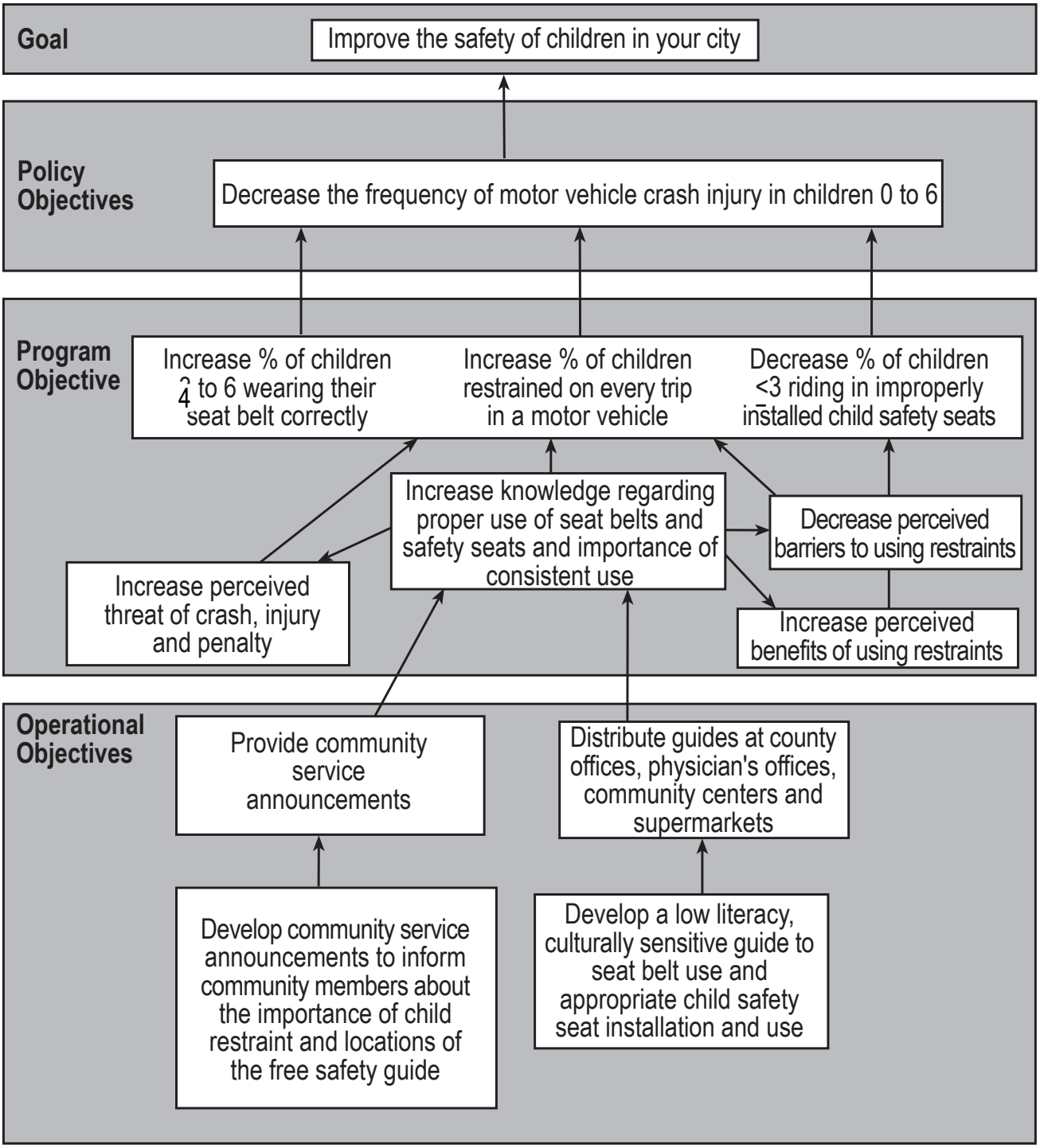


Table A. Car Safety Program
Program Objectives*—Year 1

Indicator	Target	Formula to Measure Progress	Weight	Results	Achievement Score
1. % who have knowledge regarding proper use of seat belts and safety seats and importance of consistent use	80%				
2. % who perceive the threat of crash, injury, and penalty	10% increase				
3. % who perceive benefits of using restraints	10% increase				
4. % who perceive barriers to using restraints	10% decrease				
5. Among children 4–6 years of age:					
% wearing their seat belt correctly	80%				
6. Among children ≤ 3 years of age:					
% who are riding in improperly installed child safety seats	7% decrease				
7. Among children 0–6 years age:					
% who are restrained on every trip in a motor vehicle	7% increase				

*refers to families with children 0–6 years of age unless otherwise noted

Table B. Car Safety Program
Program Objectives*—Year 1

Indicator	Target	Formula to Measure Progress	Weight	Results	Achievement Score
1. % who have knowledge regarding proper use of seat belts and safety seats and importance of consistent use	80%	% with knowledge about proper use and importance of consistent use / 80	2	77%	
2. % who perceive the threat of crash, injury, and penalty	10% increase	% increase / 10	1	7%	
3. % who perceive benefits of using restraints	10% increase	% increase / 10	1	13%	
4. % who perceive barriers to using restraints	10% decrease	% decrease / 10	2	8%	
5. Among children 4–6 years of age:					
% wearing their seat belt correctly	80%	% wearing their seat belt correctly / 80	3	78%	
6. Among children ≤ 3 years of age:					
% who are riding in improperly installed child safety seats	7% decrease	% decrease / 7	3	6%	
7. Among children 0–6 years age:					
% who are restrained on every trip in a motor vehicle	7% increase	% increase / 7	3	5%	

*refers to families with children 0-6 years of age unless otherwise noted

Achievement Index:

- Proportion of objectives completed:
- Average achievement for all objectives:
- Weighted average achievement for all objectives:

Table C. Car Safety Program
Program Objectives*—Year 1

Indicator	Target	Formula to Measure Progress	Weight	Results	Achievement Score
1. % who have knowledge regarding proper use of seat belts and safety seats and importance of consistent use	80%	% with knowledge about proper use and importance of consistent use / 80	2	77%	0.96
2. % who perceive the threat of crash, injury, and penalty	10% increase	% increase / 10	1	7%	0.70
3. % who perceive benefits of using restraints	10% increase	% increase / 10	1	13%	1.30
4. % who perceive barriers to using restraints	10% decrease	% decrease / 10	2	8%	0.80
5. Among children 4–6 years of age:					
% wearing their seat belt correctly	80%	% wearing their seat belt correctly / 80	3	78%	0.98
6. Among children ≤ 3 years of age:					
% who are riding in improperly installed child safety seats	7% decrease	% decrease / 7	3	6%	0.86
7. Among children 0–6 years age:					
% who are restrained on every trip in a motor vehicle	7% increase	% increase / 7	3	5%	0.71

*refers to families with children 0-6 years of age unless otherwise noted

Achievement Index:

- Proportion of objectives completed: 1/7 = 0.14

- Average achievement for all objectives

$$\frac{.96 + .70 + 1.30 + .80 + .98 + .86 + .71}{7} = \frac{6.31}{7} = 0.90$$

- Weighted average achievement for all objectives:

$$\frac{.96(2) + .70(1) + 1.30(1) + .80(2) + .98(3) + .86(3) + .71(3)}{2+1+1+2+3+3+3} = \frac{13.17}{15} = 0.88$$

Asthma Management Program

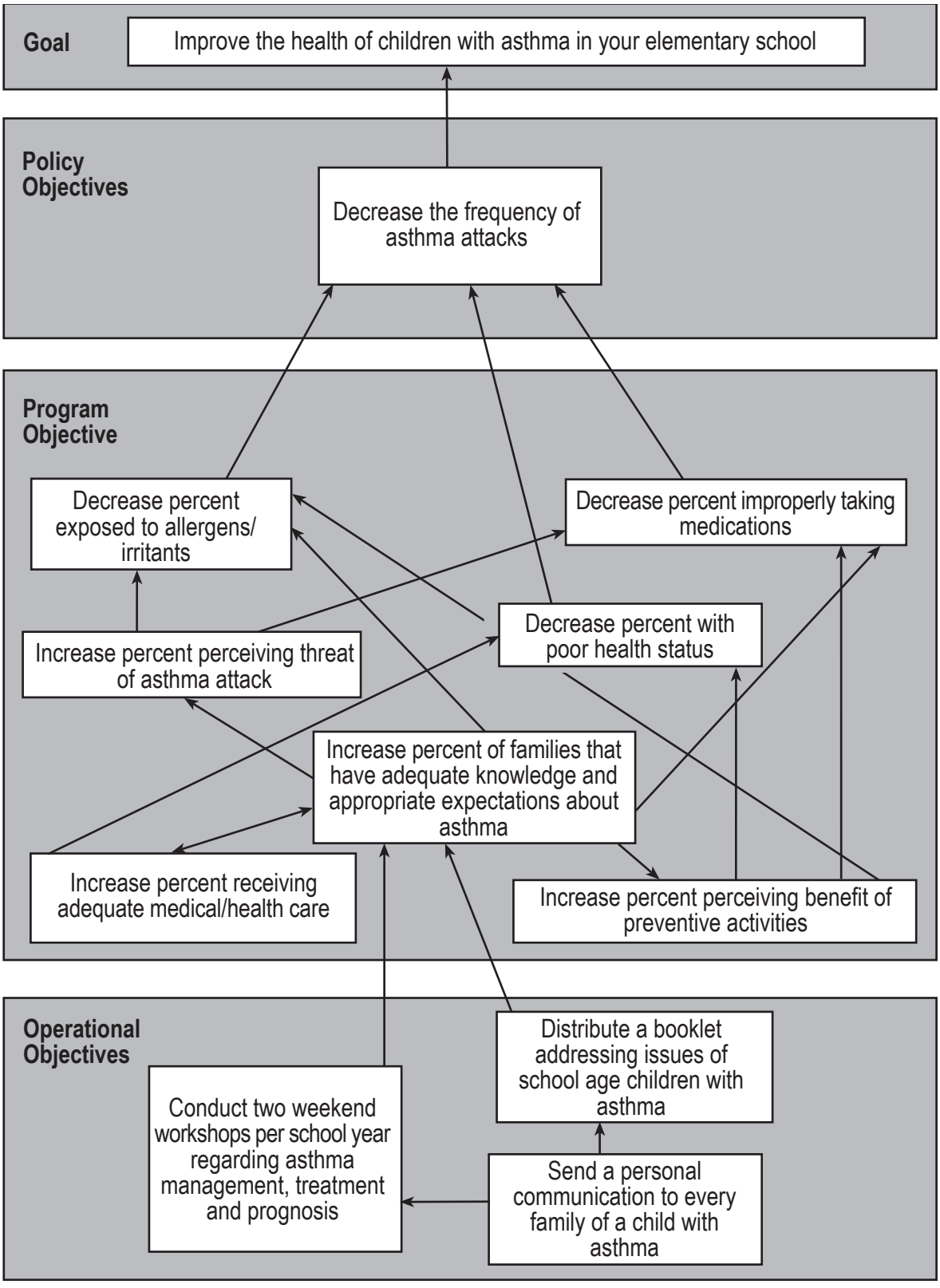


Table A . Asthma Management Program Program Objectives*—Year 1

Indicator	Target	Formula to Measure Progress	Weight	Results	Achievement Score
1. Among parents of children with asthma:					
% who have adequate knowledge and appropriate expectations about asthma	60% increase				
2. % receiving adequate medical/ health care	75%				
3. % perceiving threat of asthma attack	30% increase				
4. % perceiving benefit of preventive activities	50% increase				
5. % with poor health status	10% decrease				
6. % exposed to allergens/irritants	60% decrease				
7. % improperly taking medications	50% decrease				

*refers to children with asthma in the elementary school unless otherwise noted

Table B. Asthma Management Program Program Objectives* —Year 1

Indicator	Target	Formula to Measure Progress	Weight	Results	Achievement Score
1. Among parents of children with asthma:					
% who have adequate knowledge and appropriate expectations about asthma	60% increase	$\frac{\text{\% increase}}{60}$	3	45%	
2. % receiving adequate medical/ health care	75%	$\frac{\text{\% who receive adequate medical/ health care}}{75}$	2	62%	
3. % perceiving threat of asthma attack	30% increase	$\frac{\text{\% increase}}{30}$	1	15%	
4. % perceiving benefit of preventive activities	50% increase	$\frac{\text{\% increase}}{50}$	1	30%	
5. % with poor health status	10% decrease	$\frac{\text{\% decrease}}{10}$	2	8%	
6. % exposed to allergens/ irritants	60% decrease	$\frac{\text{\% decrease}}{60}$	3	35%	
7. % improperly taking medications	50% decrease	$\frac{\text{\% decrease}}{50}$	3	55%	

**refers to children with asthma in the elementary school unless otherwise noted*

Achievement Index:

- Proportion of objectives completed:
- Average achievement for all objectives:
- Weighted average achievement for all objectives:

Table C. Asthma Management Program
Program Objectives*—Year 1

Indicator	Target	Formula to Measure Progress	Weight	Results	Achievement Score
1. Among parents of children with asthma:					
% who have adequate knowledge and appropriate expectations about asthma	60% increase	$\frac{\%\ \text{increase}}{60}$	3	45%	0.75
2. % receiving adequate medical/ health care	75%	$\frac{\%\ \text{who receive adequate medical/ health care}}{75}$	2	62%	0.83
3. % perceiving threat of asthma attack	30% increase	$\frac{\%\ \text{increase}}{30}$	1	15%	0.50
4. % perceiving benefit of preventive activities	50% increase	$\frac{\%\ \text{increase}}{50}$	1	30%	0.60
5. % with poor health status	10% decrease	$\frac{\%\ \text{decrease}}{10}$	2	8%	0.80
6. % exposed to allergens/ irritants	60% decrease	$\frac{\%\ \text{decrease}}{60}$	3	35%	0.58
7. % improperly taking medications	50% decrease	$\frac{\%\ \text{decrease}}{50}$	3	55%	1.10

**refers to children with asthma in the elementary school unless otherwise noted*

Achievement Index:

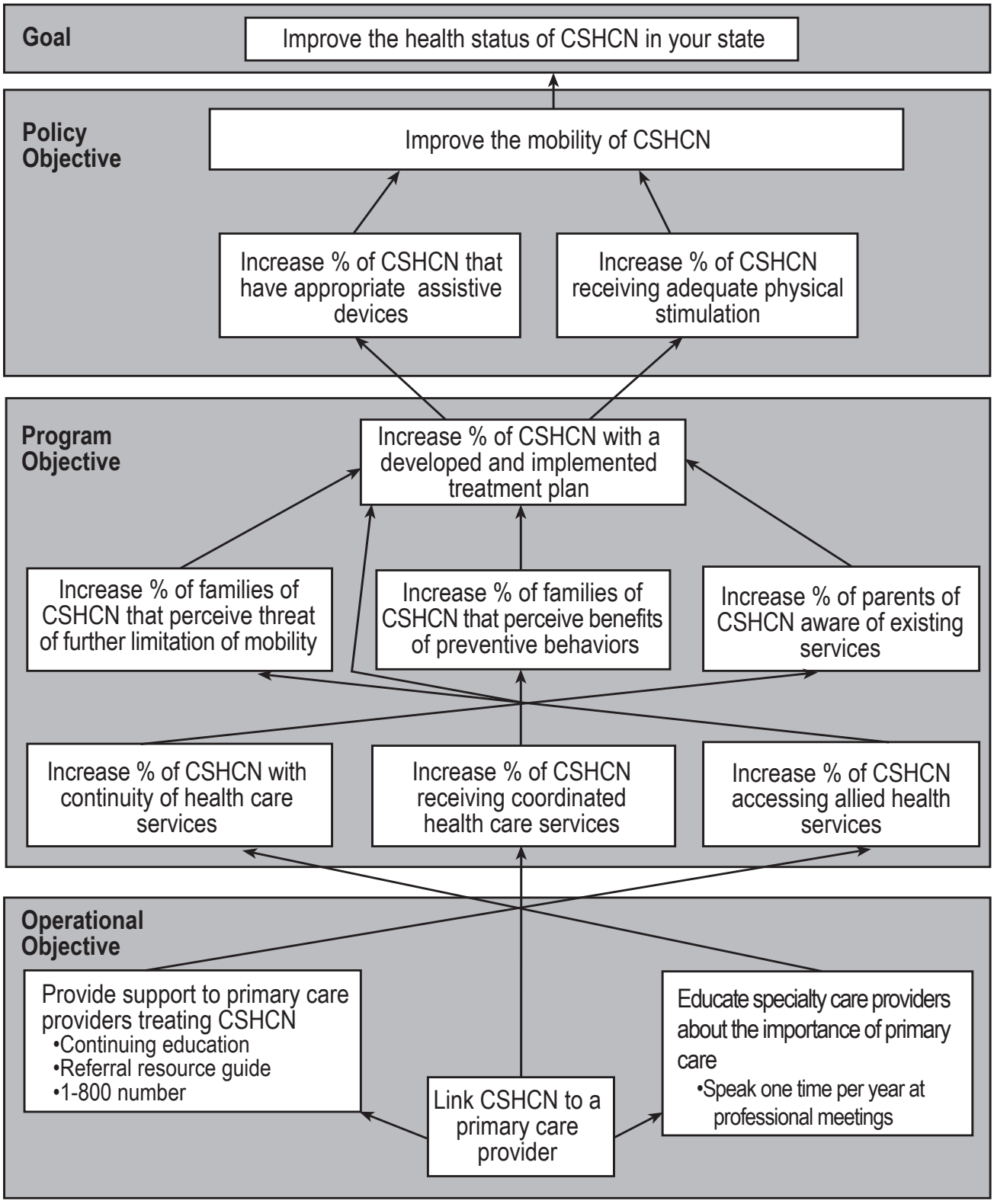
- Proportion of objectives completed: 1/7 = 0.14
- Average achievement for all objectives

$$\frac{.75 + .83 + .50 + .60 + .80 + .58 + 1.10}{7} = \frac{5.16}{7} = 0.74$$

- Weighted average achievement for all objectives:

$$\frac{.75(3) + .83(2) + .50(1) + .60(1) + .80(2) + .58(3) + 1.10(3)}{15} = \frac{11.65}{15} = 0.78$$

CSHCN Primary Care Improvement Program



Revised 2002

Table A. CSHCN Primary Care Improvement Program Operational Objectives—Year 1

Indicator	Target	Formula to Measure Progress	Weight	Results	Achievement Score
1. % CSHCN who are linked to a primary care provider	90%				
2. % of primary care providers who receive support through:					
• one continuing education program	35%				
• receiving a referral resource guide	95%				
• using the (800) phone number at least once	50%				
3. % of specialty care providers who attend a professional meeting where education on the importance of primary care for CSHCN is addressed	50%				

Table B. CSHCN Primary Care Improvement Program
Operational Objectives—Year 1

Indicator	Target	Formula to Measure Progress	Weight	Achievement Score
1. % CSHCN who are linked to a primary care provider	90%	% who are linked to a primary care provider / 90	3	83%
2. % of primary care providers who receive support through:				
• one continuing education program	35%	% who participate in one cont. ed. program / 35	3	25%
• receiving a referral resource guide	95%	% who receive the guide / 95	2	92%
• using the1-800 phone number at least once	50%	% who use the 1-800 number at least once / 50	1	53%
3. % of specialty care providers who attend a professional meeting where education on the importance of primary care for CSHCN is addressed	50%	% who attend prof. meeting / 50	2	42%

Achievement Index:

- Proportion of objectives completed:
- Average achievement for all objectives:
- Weighted average achievement for all objectives:

Table C. CSHCN Primary Care Improvement Program Operational Objectives—Year 1

Activity	Target	Formula to Measure Progress	Weight	Results	Achievement Score
1. % CSHCN who are linked to a primary care provider	90%	% who are linked to a primary care provider / 90	3	83%	0.92
2. % of primary care providers who receive support through:					
• 1 continuing education program	35%	% who participate in one cont. ed. program / 35	3	25%	0.71
• receiving a referral resource guide	95%	% who receive the guide / 95	2	92%	0.97
• using the (800) phone number at least once	50%	% who use the 1-800 number at least once / 50	1	53%	1.06
3. % of specialty care-providers who attend a professional meeting where education on the importance of primary care for CSHCN is addressed	50%	% who attend prof. meeting / 50	2	42%	0.84

Achievement Index:

- Proportion of objectives completed: 1/5 = 0.20
- Average achievement for all objectives:

$$\frac{0.92 + 0.71 + 0.97 + 1.06 + 0.84}{5} = \frac{4.5}{5} = 0.90$$

- Weighted average achievement for all objectives:

$$\frac{0.92\,(3) + 0.71\,(3) + 0.97\,(2) + 1.06\,(1) + 0.84\,(2)}{11} = \frac{9.57}{11} = 0.87$$

HIV Prevention Program

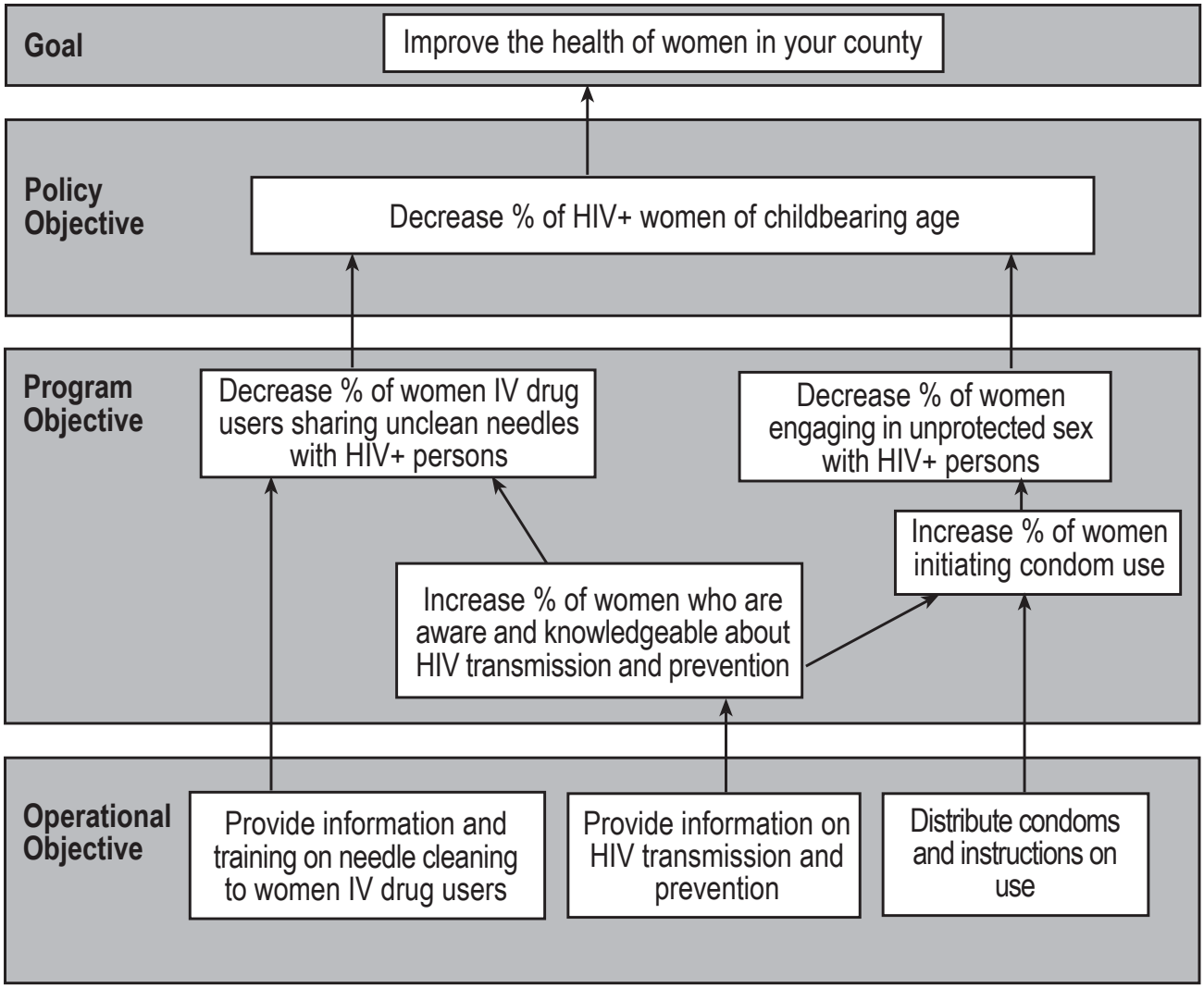


Table A. HIV Prevention Program Operational Objectives*—Year 1

Activity	Target	Formula to Measure Progress	Weight	Results	Achievement Score
1. # who receive condoms and instructions on use	4000				
2. % who receive information on HIV transmission and prevention	80%				
3. Among IV drug users:					
% who receive information and training on needle cleaning	75%				

*refers to women of childbearing age unless otherwise noted

Table B. HIV Prevention Program Operational Objectives* —Year 1

Activity	Target	Formula to Measure Progress	Weight	Results	Achievement Score
1. # who receive condoms and instructions on use	4000	# who receive condoms and instructions / 4000	3	5000	
2. % who receive information on HIV transmission and prevention	80%	% who receive information on HIV transmission and prevention / 80	2	70%	
3. Among IV drug users:					
% who receive information and training on needle cleaning	75%	% who receive information and training on needle cleaning / 75	1	45%	

*refers to women of childbearing age unless otherwise noted

Achievement Index:

- Proportion of objectives completed:
- Average achievement for all objectives
- Weighted average achievement for all objectives:

Table C. HIV Prevention Program Operational Objectives*—Year 1

Activity	Target	Formula to Measure Progress	Weight	Results	Achievement Score
1. # who receive condoms and instructions on use	4000	# who receive condoms and instructions / 4000	3	5000	1.25
2. % who receive information on HIV transmission and prevention	80%	% who receive information on HIV transmission and prevention / 80	2	70%	0.88
3. Among IV drug users:					
% who receive information and training on needle cleaning	75%	% who receive information and training on needle cleaning / 75	1	45%	0.60

*refers to women of childbearing age unless otherwise noted

Achievement Index:

- Proportion of objectives completed: 1/3 = 0.33
- Average achievement for all objectives

$$\frac{1.25 + .88 + .60}{3} = \frac{2.73}{3} = 0.91$$

- Weighted average achievement for all objectives:

$$\frac{1.25(3) + .88(2) + .60(1)}{3+2+1} = \frac{6.11}{6} = 1.02$$

Practice Answers

Car Safety Program

1. In comparing the three methods for calculating the achievement index, which one do you think best reflects the achievement of the program? Why?

   Both the average achievement (0.90) and the weighted average achievement (0.88) for all objectives reflect the significant progress of the program. The proportion of objectives completed (0.14) does not give an accurate description of the progress that was made on each objective.

2. Overall, how did the program do in meeting its program objectives?

   Overall, the program did very well in achievement of its program objectives. While the target was reached for only one objective (Objective 3), significant progress was made for all of the remaining objectives.

3. Are there specific objectives that will need more attention in subsequent years?

   More emphasis could be given for Objectives 2 and 7. More effort for Objective 7, getting children restrained on every trip in a motor vehicle, would be a priority since it was considered a critical objective (weighted 3). Also, if families perceived more of a threat of a crash, injury, or penalty (Objective 2), then they may be more motivated to restrain their children regularly. The program did quite well in increasing the percentage of families who perceive a benefit of using restraints and in decreasing the percentage of families who perceive barriers to using restraints. It would be helpful to look at the achievement of the operational objectives. Any underachievement of program activities could have affected achievement of program objectives. The operational objectives in question, then, would require more attention.

4. Are there specific objectives that will need less attention in subsequent years?

   If the planners would be satisfied with a lower achievement score for Objective 3, they may want to shift resources away from it to Objectives 2 and/or 7.

Asthma Management Program

1. In comparing the three methods for calculating the achievement index, which one do you think best reflects the achievement of the program? Why?

   Either the average achievement (0.74) or the weighted average achievement (0.78) for all objectives reflects the achievement of the program. The proportion of objectives completed (0.14) does not adequately reflect progress made on each objective.

2. Overall, how did the program do in meeting its program objectives?

   Since this was the first year, the program probably achieved an acceptable overall level of progress towards meeting its objectives. In future years, the level considered acceptable for achievement is likely to be higher than this year.

3. Are there specific objectives that will need more attention in subsequent years?

   The achievement scores for 3 of the 7 objectives (Objectives 3, 4, and 6) were low, ranging between 0.50 and 0.60. Objectives 3 and 4 deal with the perceptions of the children with asthma. Objective 6 deals with exposure to allergens and irritants. These objectives will need more attention in future years. Program planners will also need to look at the operational objectives to see how well those targets were met. A decision will need to be made about the feasibility of putting additional resources into the program or shifting resources in order to improve low achievement scores. For another 3 of the objectives, significant progress was made with achievement scores ranging form 0.75 to 0.83, but additional progress could be made in subsequent years.

4. Are there specific objectives that will need less attention in subsequent years?

   Only one objective was exceeded, Objective 7 dealing with the percentage of children with asthma who are improperly taking medications. Since the objective is very important and the level of overachievement is small, the program should not reduce its efforts in this area.

CSHCN Primary Care Improvement Program

1. In comparing the three methods for calculating the achievement index, which one do you think best reflects the achievement of the program? Why?

   Either the average achievement (0.90) or the weighted average achievement (0.87) for all objectives reflects the achievement of the program. The proportion of objectives completed (0.20) does not give an accurate description of the significant progress that was made with each objective.

2. Overall, how did the program do in meeting its operational objectives?

   Overall, the program was quite successful in achieving its operational objectives with an average achievement of 0.90 and a weighted average achievement of 0.87. The target for the third activity under Objective 2 was exceeded and substantial progress was made towards most of the other targets.

3. Are there specific objectives that will need more attention in subsequent years?

   The first activity under Objective 2, participation in one continuing education program, has a weight of 3 and a relatively low achievement score (0.71). This objective should be reviewed to determine why progress was slower than expected. A decision regarding whether or not to invest more resources in the activity should be based on that review.

4. Are there specific objectives that will need less attention in subsequent years?

   No, this program seems on target with its objectives. Only one target (the third activity under Objective 3) was exceeded and that was by a small margin.

HIV Prevention Program

1. In comparing the three methods for calculating the achievement index, which one do you think best reflects the achievement of the program? Why?

   The average achievement index (0.91) seems to give the most accurate reflection of the achievement of the program in meeting its operational objectives. If the proportion of objectives completed was used to monitor the program, a very low achievement (0.33) would be found even though significant progress was made with each objective. The weighted average achievement index (1.02) seems inflated since the highest weighted objective (Objective 1) was overachieved by 25%. The program did well with Objectives 1 and 2 but had less success with Objective 3. Thus the inflated score from the weighted average seems to overstate the level of achievement for this program.

2. Overall, how did the program do in meeting its operational objectives?

   Overall, the program did very well in achieving its targets. The target for Objective 1 was exceeded; the program provided condoms to more women of childbearing age than anticipated. Impressive progress was made for the remaining two operational objectives. The lowest achievement score (0.60) was for Objective 3 involving IV drug users, a very hard population to reach.

3. Are there specific objectives that will need more attention in subsequent years?

   Objective 3 could use more attention, although as previously mentioned, IV drug users are a hard population to reach. The program managers will need to consider if they want to put more resources into achieving this objective, and perhaps consider different methods for delivering these services. The program seems to be doing very well in providing condoms and reasonably well in delivering educational services about HIV to women of childbearing age. Current levels of effort for these two objectives should continue.

4. Are there specific objectives that will need less attention in subsequent years?

   Even though the target for Objective 1 (condom distribution) was overachieved, it is unlikely that the program would choose to reduce emphasis on this key objective, unless the only way to improve performance on Objective 3 is to shift resources from Objective 1. The program managers will have to consider the pros and cons of this predicament.

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