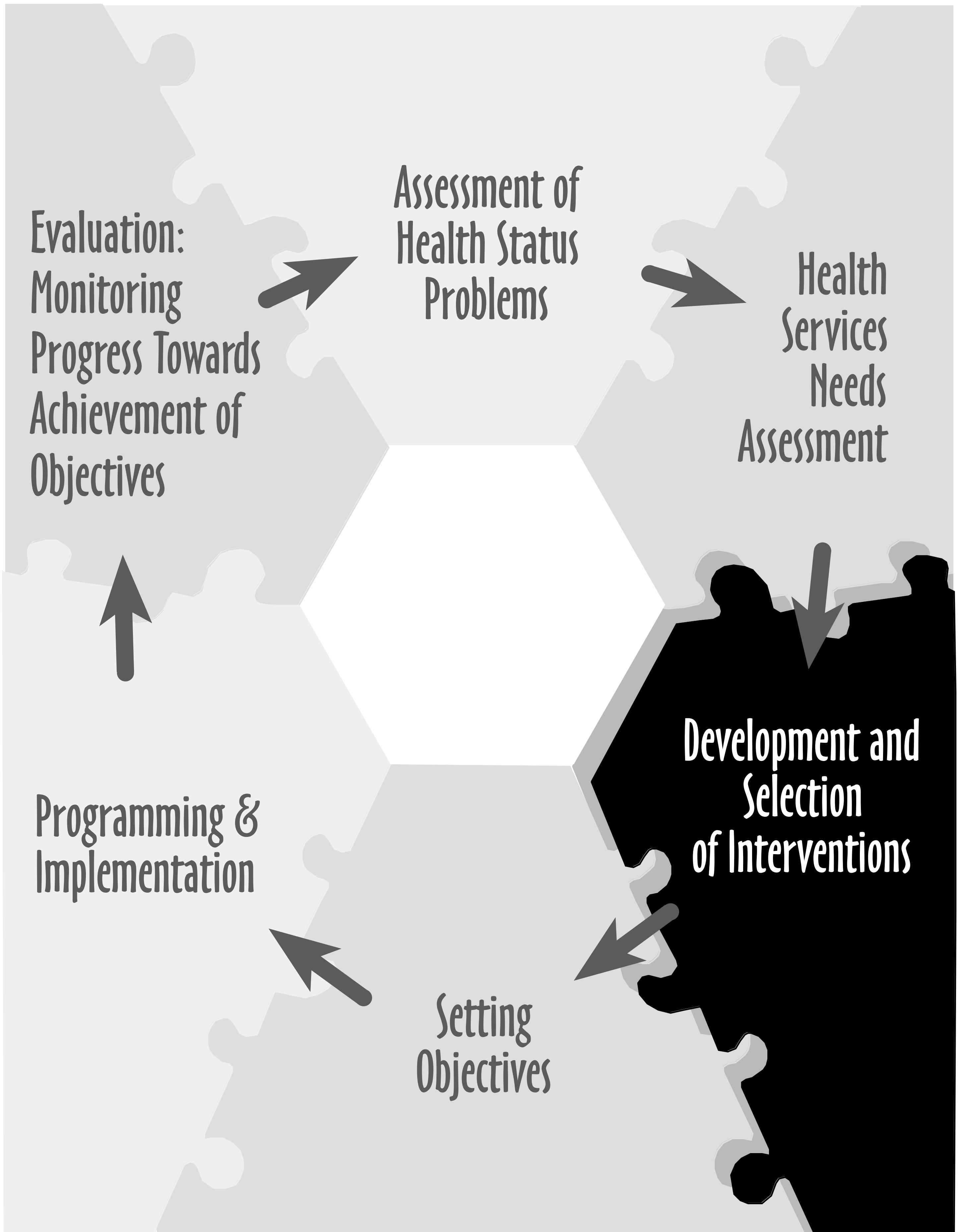
Assessment of
Health Status
Problems
Health
Services
Needs
Assessment
Development and
Selection
of Interventions
Setting
Objectives
Programming &
Implementation
Evaluation:
Monitoring
Progress Towards
Achievement of
Objectives

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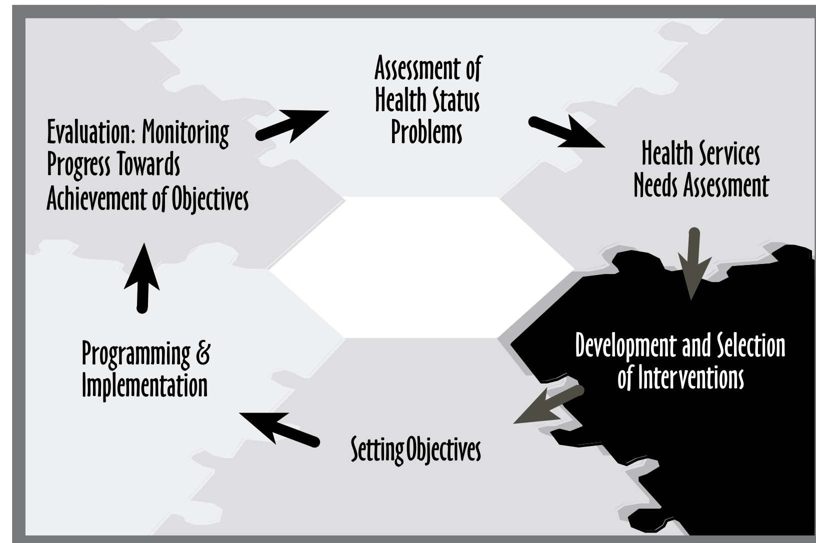
The BIG Picture...

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 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.

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What is this manual about?

This is a self-instructional manual designed to teach you to develop alternative interventions to solve a health problem, and to select from that group of interventions the most appropriate option to implement. You will learn:

- How to develop a small number of feasible alternative programs from a lengthy list of unmet needs;
- Criteria that are frequently used to select a single program for implementation; and
- A method for applying the criteria to the alternative programs in order to decide which is the most appropriate choice.

The concepts in this manual are illustrated by several examples. You may wish to supplement these examples by developing alternative interventions for a health problem of importance to you or your agency and selecting one program to implement. For greatest benefit, read through the entire manual before you begin to develop alternative interventions.

Prerequisite skills and knowledge

- Ability to use basic methods of epidemiology, biostatistics, and database management
- Ability to critically review program evaluation and cost-effectiveness literature

Introduction

When the assessment of health services to address a health problem is complete, you know which services do not exist in your community at all, which ones exist but are not functioning well, and which are functioning well but covering only a portion of the people in need. With this information, you can go in a few different directions: 1) accept the situation and make no change; 2) educate the public and policy makers about the needs; 3) advocate for change; 4) begin to develop new policies or change old ones, or; 5) develop a plan to implement a program (Keppel & Freedman, 1995).

If you choose to develop a program plan, you will go to the third step in the rational planning process, *development and selection of interventions*. As you assessed the health problems and identified unmet needs for intervention, you

probably discovered your preferences for certain types of interventions. This is expected of you and other members of the planning group, since you are often chosen to represent different constituencies, each of which sees the problem and its solution differently. Rather than starting with a defense of your favorite intervention, however, it is prudent to proceed within a framework that allows all relevant objective information and points of view to be taken into account. A framework for this step in the planning process involves three activities: development of a few feasible alternative interventions, selection of criteria for decision-making, and assessment of the interventions according to the criteria. The final step is completed when an intervention is selected (Peoples-Sheps, 1997).

Development of alternative interventions

Developing alternative interventions starts with a list of unmet needs for service. This list is the end point of the health services needs assessment—and it is often long and includes diverse alternatives. The challenge now is to reduce the number of interventions on the list and shape the remaining options into a few programs from which the best one can be selected for implementation.

Reducing the list of options

In your assessment of the health status problem and related services, some winnowing of intervention possibilities already occurred. Services that address precursors with weak relationships to the problem, that have low prevalence in your population, and/or are not well understood may not have been included in the needs assessment at all. Among the services that were assessed, relatively higher priority was assigned to unmet needs for services that:

- Were identified from more than one perspective (*i.e.*, using more than one of the five measures of need);
- Aaddressed the strongest and/or most prevalent precursors; and/or
- Were least available or severely underutilized.

Prioritizing at the end of the needs assessment is a way of understanding what the most promising interventions might be. If the high priority interventions are few in number and require little development, they may be fashioned immediately into programs, in preparation for making a decision about which to implement. More often, though, the number of alternatives is large and it may be possible to develop them into several different types of programs. In these cases, you need to take a more systematic approach to further reducing the options. One way to accomplish this is by posing a series of questions, such as the ones shown in *Table 1* and discussed in the following pages.

In the discussion of each question, we refer to the situation in York County. York County is the setting for a fictitious case, used throughout this series of manuals, which started with a persistently high rate of low birthweight. In assessing the problem, the York County planners found that low birthweight was composed of two parts, preterm birth and fetal growth restriction, and that adolescents under 18 experienced high rates of both. The planners also found that pre-conceptional and prenatal services, which have potential for reducing the rates of both problems, were available but significantly underutilized by teenagers. Upon completion of the health services needs assessment, the planners concluded that the highest priority unmet needs were for interventions that minimize barriers to receiving care by adolescents. With this background they tackled the questions in *Table 1*. The decisions they reached are summarized in *Table 2*.

Question 1: Is there an identifiable subpopulation to whom the intervention should be addressed?

If a problem is uniformly dispersed across the population, or if it would be unwise to target any specific group, this question will not help to narrow the options. However, if there is a subgroup with substantially greater unmet needs than other subgroups, it may be appropriate to eliminate interventions that address the needs of the other subpopulation groups.

In York County, for example, adolescents were not receiving prenatal care and other prenatal services at an acceptable level, so the planners decided to target adolescents. Before making a decision to narrow their focus, however, the plan-

Table 1. Questions to Facilitate Reducing the Number of Alternative Interventions

Is there an identifiable subpopulation to whom the intervention should be addressed?
Does your target population (whether a subpopulation or the entire population) have greater unmet needs for some interventions than for others?
Are any of the unmet needs of greater importance because they reflect needs for services that are generally considered essential?
Are there some types of interventions that correspond to the priorities of funding agencies and others that are unlikely to receive financial support?
Do some of the interventions correspond better than others with strengths, interests, and priorities of the target population and/or its community?
Is it important to show an immediate effect? If so, are some interventions likely to have more immediate effects than others?
Which of the remaining interventions were identified as unmet needs from more than one perspective (or measure) in your health services needs assessment?
After considering all of the above issues, are there some interventions that were neither clearly eliminated nor clearly identified as good possibilities?

Table 2. Disposition of Each Unmet Need, and Corresponding Rationale

Unmet Need for Service[1]	Disposition[2]	Rationale[3]
Interventions that do not exist in the community at all (based on standards)		
Family life and sex education in K–12	E	Q6
Vouchers for public transportation	E	Q4
Home visits by nurses or lay home visitors	R	Q2, Q4, Q5, Q7
Outreach to identify early pregnancies and follow-up missed appointments	R	Q4, Q7
Drug treatment programs for pregnant women	E	Q4
Interventions that exist in the community but need to be modified to meet standards completely		
Age-appropriate pre-conceptional care and counseling	R	Q4, Q5
Education regarding behavioral risks in prenatal care programs of HMOs and Employer 1	E	Q8
Behavior modification programs in schools, the health department, and Employer 1	R	Q4
Risk-appropriate prenatal care in HMOs and Employer 2	E	Q3
Formal linkages between HMOs and other services	E	Q8
Incentives to use prenatal care	R	Q2
Follow-up of missed appointments by the primary care center	E	Q8
Shorter waiting times for an appointment in HMO 2, the health department and the primary care center	E	Q8
Interventions for people who cannot or do not utilize services		
Health education about prenatal care in high school for 9th and 10th graders	R	Q2, Q4, Q7
Incentives to use pre-conceptional care and counseling in the high schools	R	Q2, Q4, Q5
Environment that encourages young adolescents to use pregnancy testing services if they need them	R	Q4
Interventions that equalize the level of services across population groups and geographic areas		
Prenatal home visiting	R	Q2, Q4, Q7
Outreach to identify new pregnancies	R	Q4, Q7
Drug treatment programs for pregnant women	E	Q4
Improved use of all services by adolescents	R	Q1, Q5
Interventions that address perceived needs for services		
More services specifically targeted to adolescents	R	Q1, Q5
Educational initiative to promote acceptance of the value of preventive health care		
Smoking cessation (behavior modification) programs	E	Q4

[1] *Unmet needs for services were derived from the York County low birthweight examples in* Health Services Needs Assessment*, page 25.*
[2] *Disposition: E = eliminate R = retain for further consideration*
[3] *Rationale: Rationales are stated in the York County discussions on the following pages.*

ners reviewed basic prevalence data which documented that while births to women under 18 constituted 13.4% of all live births in the county, this group made up 30% of the low birthweight deliveries.

Question 2: Does your target group (whether a subpopulation or the entire population) have greater unmet needs for some interventions than for others?

Greater unmet needs would include services with limited or no availability or utilization in your target group. You will have all the information you need to answer this question for your total population from the health services needs assessment. If you are targeting a subpopulation, however, you may need to collect some additional information.

In York County, the planners conducted several focus groups and a survey to better understand the unmet needs of adolescents. They found that pregnant teenagers often:

- Saw prenatal care as an explicit acknowledgement of a pregnancy they preferred to deny as long as possible;
- Had little experience with obstetric examinations and procedures, and were afraid of them;
- Did not know why it was important to seek early prenatal care, or to continue with care once they started it;
- Had little access to transportation to get to prenatal clinics;
- Had difficulty paying for prenatal care; and
- Were often single and without emotional support from families.

These findings suggested that unmet needs for education, transportation, and various forms of social support were especially important among teenagers.

Question 3: Are any of the unmet needs of greater importance because they reflect needs for services that are generally considered essential?

Obviously, services that are generally considered essential should be available. If they are not available, they assume a position of high priority.

With regard to our example, prenatal care that is tailored to meet individual needs (*i.e.*, risk-appropriate) is considered an essential service, but it is not available from all providers in York County, specifically HMOs and one major employer. This would ordinarily make it a high priority. Since the target group is adolescents, however, the more relevant question is whether the essential services are deficient for them. In York County, most adolescents are not employed, and those who seek prenatal care tend to go to the health department rather than HMOs, so this unmet need was not considered highly relevant for them.

Question 4: Are there some types of interventions that correspond to the priorities of funding agencies and others that are unlikely to receive financial support?

Selecting an intervention for which no financial support is likely is wishful thinking. Sometimes, a program planning effort is conducted with the understanding that financial support for the resulting program will be assumed by pre-identified agencies. For example, a health department may plan a program that is intended to be supported by its operating budget. More often, however, outside funding is required to launch a new program. When this is the case, planners need to know which public agencies and private foundations support programs in their service area, which types of programs are on these agencies' priority lists, and what criteria those programs must meet to compete successfully for funding.

In the case of York County, outside funding was considered essential for any new program. The planners knew that three of the unmet needs in *Table 2* were unlikely to be funded as free-standing programs. Transportation programs had not been on any funder's priority list for several years. Treatment programs for substance abuse and cigarette smoking were fundable, if they served larger populations than the female adolescents in the target group, although including behavior-change interventions as part of a multi-dimensional program for adolescents would be well-received by some potential funders. Interventions that were likely to be funded at the time were ones than involved outreach, home visiting, and preconceptional education and care.

Question 5: Do some of the interventions correspond better than others with strengths, interests, and priorities of the target population and/or its community?

Every target group and community has unique strengths, interests, and priorities. Building interventions on those characteristics encourages local support and enhances the probability of success.

In York County, a coalition of public agencies and private businesses was developed three years ago to focus community efforts to prevent adolescent pregnancy, and to assure healthy environments for the infants of teenage parents. The coalition understands the need for interventions at many levels, but it has specified that its target groups are young adolescents who are not yet sexually active, and adolescent parents. The coalition has a great deal of enthusiasm and local influence, but it does not have an independent source of funding. It would be willing to enter into a partnership in support of programs for its target groups.

Question 6: Is it important to show an immediate effect? If so, are some interventions likely to have more immediate effects than others?

Our approach to understanding health problems and service needs is comprehensive, thus producing a wide-ranging set of unmet needs for interventions, some of which are expected to have direct effects on the problem while others trigger complex chains of events that should affect the problem but may take a

considerably longer period of time. Often interventions that address secondary or tertiary precursors will take longer to affect the problem, but are preferable because they influence several precursors. But funding agencies are frequently looking for evidence that their investments have had an effect within specified periods of time, usually 3-5 years. If outside funding is essential, then, planners must narrow their options to interventions that are likely to demonstrate a measurable effect on the problem within funders' time frames.

For the York County situation, such far-reaching efforts as *family life and sex education in grades K–12* and an *educational initiative to promote acceptance of the value of preventive care* were considered unlikely to affect preterm birth or fetal growth restriction within five years. Since any new program in York County required outside funding, and the potential funders were known to require evidence of effects within five years, these two alternatives were dropped from consideration.

Question 7: Which of the remaining interventions were identified as unmet needs from more than one perspective (or measure) in your health services needs assessment?

When specific interventions emerge more than once in a multifaceted needs assessment, this strengthens the argument that they are needed and suggests that they may be well-received.

In York County, home visiting, outreach, and education/counseling on various topics were identified as unmet needs from more than one perspective.

Question 8: After considering all of the above issues, are there some interventions that were neither clearly eliminated nor clearly identified as good possibilities?

By answering questions like the above, some interventions can be eliminated from further consideration while others are elevated to a high priority status for further development. Often, a few remain in a middle range, neither eliminated nor elevated. These should be reviewed to determine whether they should be reconsidered for any reason. If not, they too can be eliminated.

In York County, the interventions that were neither eliminated nor clearly retained were ones that existed in the community but needed to be modified to meet standards for services completely. All of them involved adjustments in delivery of services that are not specific to adolescents. These adjustments could be made through administrative decisions and would not necessarily require any new programming or funding. As a result, the York County task force decided to notify the services' directors of these shortcomings in their services, leaving any remediation up to them. These interventions were then dropped from further consideration.

By answering the questions above, most of the unmet needs in *Table 2* were removed from further consideration. Within the remaining options, two ambiguous

entries were identified. The first was *incentives to use preconceptional care and prenatal care*. Any number of enticements might be considered incentives. The planning team decided that education and behavior modification were interventions that could generate incentives for using care. Other incentives, like direct payments or rewards for using care, were not considered appropriate in York County. As a result, *incentives* was deleted from the list of options. The other ambiguous intervention was *home visits*. Home visiting is a mode for delivery of outreach, clinical care, education, and various forms of social support. Social support, however, was not mentioned explicitly in the list of unmet needs, but all agreed that it was integral to their understanding of the use of home visits to promote prenatal care and other healthy behaviors. When these clarifications were made, the York County planners had the following “short list:”

- Outreach to identify early pregnancies and to follow-up missed appointments
- Social support
- Age appropriate preconceptional care and counseling
- Behavior modification for substance use
- Education about the importance of preconceptional and prenatal care

Beginning to form programs

Programs may involve a single intervention targeting a single precursor of a health problem. More often, however, they include a few interventions that are logically connected to each other and address several different precursors of the problem. Grouping interventions is often done by proposing various combinations and then discussing whether or not they might be feasible. In principle, interventions can be combined according to mode of delivery (*e.g.* individual clinic encounter, home visit, mass media event), administrative responsibility (*e.g.* the agency or organization that would be responsible for delivering the services), or target group. In practice, some of these groupings may not be feasible:

- A target group may not be receptive;
- A potential administrative agency may not have the authority to implement certain types of programs;
- The planners may not be in a position to recommend programming to agencies outside their own; or
- It may not be possible to implement a certain mode of intervention, like changing local ordinances about smoking in restaurants.

With attention to issues like these and a good dose of common sense, some of the programs formed by grouping interventions according to modes of delivery,

administrative responsibility, and target group will drop out of contention leaving a smaller number for systematic consideration.

In York County, the five interventions on the "short list" (above) were grouped by mode of delivery and possible administrative responsibility, as shown in *Table 3*. A decision to target adolescents had already been made so there was no need to organize the interventions by target group. From the possibilities in *Table 3*, the planners developed two programs that they considered feasible for encouraging adolescents to use prenatal medical care and other essential interventions in the particular environment of York County. The two options and summaries of the issues the planners considered as they developed the programs are on the next page.

Program 1: Prenatal home visiting program administered by the health department to deliver outreach, education, counseling, and social support.

Rationale: By using home visiting as a mode of delivery, four services (*i.e.*, outreach, education, counseling, and social support) can be delivered. Since home visiting is a traditional offering of the health department, the knowledge and ability to manage and supervise a home visiting program exists in that agency. Moreover, the health department has staff with the training to permit a short implementation phase. The health department also delivers preconceptional care. This type of care is not included in this program option because the planners decided that any efforts to boost use of pre-conceptional care should occur in the high school where that service is also offered but clearly underutilized, especially by young adolescents.

Program 2: A program of education and behavior change interventions delivered through small groups, large class presentations, and mass media messages administered by the high school, with the support and collaboration of the Adolescent Pregnancy Coalition.

Rationale: Small group meetings can be organized to deliver three different interventions (*i.e.*, education, social support, and behavior modification). The high school is the best administrative home for these interventions, since it has experi-

Table 3. Interventions Needed in York County Organized by Mode of Delivery and Administrative Responsibility

By Mode of Delivery	By Administrative Responsibility
Home visiting: outreach, education, counseling, social support Clinics: preconceptional risk assessment, intervention, counseling	Health department: home visiting, preconceptional care
Small group meetings: behavior modification for smoking and drug use, education, social support	High school: classroom education, behavior modification, pre-conceptional care
Classroom presentations: education Mass media (TV, radio): education	Adolescent Pregnancy Coalition: education via presentations to classes and production and broadcasting of mass media messages

enced staff and it is where members of the target group are most easily found. Small group sessions can also be used as vehicles to encourage use of preconceptional care, a large portion of which involves education and behavior change. The high school is well-prepared to deliver educational messages to larger groups through classroom presentations. The Adolescent Pregnancy Coalition in York County can augment the educational offerings of the high school by developing and facilitating the broadcast of messages through local television and radio stations. Coalition staff can also provide presentations to classes in the high school. Because the coalition has no administrative home, it would be difficult for it to administer a program. However, it is fully prepared to partner with the high school for a multi-dimensional approach to education and behavior change.

Once a set of program alternatives, each with one or more interventions, modes of delivery, administrative homes, and target groups has been identified, a systematic comparison of program characteristics with decision criteria is made. To take this next step, important criteria must be identified and defined, and a method for decision-making must be selected.

Criteria

To allocate resources so they do the most good, we must have explicit criteria for what constitutes “good.” In planning for public health programs, three criteria—effectiveness, cost, and feasibility—are virtually always used to facilitate decision-making.

Effectiveness

The extent to which the program will reduce the health problem is of critical importance to the decision about which program to implement. While the concept is straightforward, however, estimating levels of expected effectiveness is not. Effectiveness has many faces, some of which are described below.

Efficacy is the intrinsic ability of an intervention to affect a change in the health problem. Efficacy is documented through experiments, in which the effects of outside influences are carefully controlled by random assignment of subjects to intervention and control groups, as well as by other research methods.

Effectiveness in practice is demonstrated by evaluating an intervention in real settings. Here the influences of different administrative arrangements and client groups on the ability of the intervention to be efficacious can be shown. This is especially important in public health where the application of many interventions depends on the behavior of client groups. An example is the use of fluoride tablets to prevent tooth decay in areas where drinking water is not fluoridated. If parents and/or children find these tablets unacceptable and they do not use them, this

efficacious intervention will not be effective in practice. Evidence of effectiveness in practice is found in reports of evaluation research conducted in a variety of administrative settings with different population groups. You would be particularly interested in studies of programs with administrative settings and populations similar to those of the program options you are considering.

Hypothetical effects. Evaluation studies are done fairly infrequently and, of course, they are only conducted on interventions that have been offered in the past. If you are creative and propose programs that have never been tried, clear evidence of neither efficacy nor effectiveness in practice will be available. In such cases, you might be able to use measures of population attributable risk which combine the relative risk of a precursor and its prevalence to produce an estimate of the extent to which the problem could be reduced if the precursor were eliminated. Since each intervention under consideration is linked to one or more precursors of the problem, this is a reasonable approach to estimating effectiveness.

There are also situations in which the data required to produce any of the above estimates of effectiveness are not available. Here, you need to consider what you know about the hypothetical relationships among an intervention, one or more precursors, and the health problem (*e.g.*, relative risk, prevalence of precursors, complexity of the pathway that an intervention must follow from the initial precursor to the problem). By considering these elements, you should be able to estimate whether a given intervention is likely to be more or less effective than another intervention in reducing the extent of the health problem.

In the context of public health practice, as contrasted with research, it is usually preferable to seek out interventions that have been evaluated for effectiveness. In these situations, you can implement a large-scale program if you wish. You will have to monitor program objectives to assure that the program stays on track, but you do not carry a responsibility to generate research evidence of its effects. Alternatively, if you select an intervention that has not been evaluated for effectiveness previously, you should be prepared to implement it as a demonstration project. This usually involves a relatively smaller-scale intervention and a larger commitment (of funds, expertise, and time) to evaluation research.

Effects of multiple interventions in one program. Very often, programs include several interventions that are intended to reduce more than one health problem at the same time. Levels of effectiveness in solving each problem, however, may vary. For example, a program may include interventions to address precursors of both preterm birth and fetal growth restriction. Evidence may suggest that some interventions are highly effective in reducing FGR but only moderately effective at improving the rate of preterm births. If you average effectiveness levels together, the true value of each one is lost. Another consideration with regard to multiple interventions is the extent to which they may enhance each other or, alternatively, one may inhibit the ability of another to improve the health problem.

Temporal issues. Time can influence effectiveness in a couple of ways. First, it may be necessary for a program to be fully operational before it can demonstrate good results. If it takes three years for the program to achieve that operational level and you need to show that the problem is improved within two years, that program would not be effective for you. Similarly, some interventions take a longer period of time, even when fully operational, to have an effect on the problem.

Another criterion that is related to effectiveness but should not be confused with it is **side effects**. Side effects are conditions that arise because of the intervention but are not necessarily intended. They can be positive or negative. Positive side effects include:

- Protection from sexually transmitted infections by using barrier methods of birth control; and
- Influencing the behavior of an entire family by educating a single member about good nutritional practices.

Examples of negative side effects are easy to find. A case in point is that of antibiotics, which eradicated several infectious diseases in the 20th century. Because of overuse, however, some microorganisms were able to adapt, so that new, drug resistant, versions are now emerging. While side effects may be important to consider when making a decision, they should not be confused with the effectiveness of the program in reducing the original health status problem.

Cost

The criterion, cost, refers to expenses that are expected to be incurred in order to deliver a program. Expenses include salaries, fringe benefits, office supplies, intervention supplies (*e.g.*, educational materials, medical supplies), transportation, facility costs, maintenance, insurance, communications (*e.g.*, postage, telephone, computer-based communication links), and any indirect costs that are expected. Initial costs, including one-time-only purchases of equipment (like computers) as well as the costs of operating the program day-to-day over a period of years would be included. The effects of inflation on costs over time should also be considered.

The level of precision in estimating costs depends upon the availability of information. If a program has been implemented for another population, it may be possible to obtain precise information about the costs of that program, perhaps even cost per client served, and apply that information to your proposed program. However, if your interventions have not been implemented anywhere before, you may have to estimate some of the costs.

In addition to the expenses of delivering the program, there are other ways of looking at costs. A program may incur costs to the recipients, perhaps fees for

service, travel expenses or child care, or costs to society, like the environmental costs of toxic waste disposal. Costs like these, if important in your deliberations, should be considered under separate criteria, like costs to recipients or environmental damage. If you don't separate these concepts, the value of each in terms of facilitating the decision-making process could be lost. For example, the costs to an agency for a particular program may be relatively low but costs to the recipients could be high. If both types of costs were averaged together, a medium level would be generated. This moderate cost, in combination with other criteria, may support a decision to implement the program. However, if the success of the program depends on whether or not people can access the service, you would probably want costs to recipients to be a separate category, weighted more heavily than costs to the agency.

Feasibility

At least three aspects of feasibility should be considered: administrative, technical, and political.

Administrative feasibility addresses the issue of whether the administrative framework exists or can be developed to deliver the intervention. If the framework does exist, can the program be absorbed by it easily, or will significant adjustments be required? Will it support additional demands for such tasks as organizing, monitoring, billing, personnel management, and planning? If adjustments are necessary, is it reasonable to expect them to occur? Suppose an agency has had a great deal of difficulty implementing a new information system during the past few years. The system still does not work well. It would not be reasonable under these circumstances for you to assume that a new program based on this data system (*e.g.*, client tracking by the information system) could be implemented, without a careful analysis and correction of the data-base problems from the past. Similarly, if there has been a great deal of turnover in administrative staff or administrative positions left unfilled for long periods of time, this suggests administrative instability that may not be supportive of new demands. Another example involves coordination. Many public health programs require coordination both internally among units within the agency and externally with other agencies. If an agency has a history of coordination problems or failures, this will affect the ability of any new program to coordinate—unless this problem is addressed as part of the program. This may be particularly important if you are considering an option that involves partnerships among agencies or organizations.

Technical feasibility is the criterion that speaks to whether or not the technology required by the program can be delivered to the number of people who need it in order to favorably influence the health problem. Sometimes this is a supply issue: can a batch of immunization materials get to a remote clinic site during very inclement weather? Other times, it refers to human resources: are adequately trained staff available or can they be enticed to the site? In still other situations, it

is a question of coverage: how many people need to receive the intervention in order for its effect on the health problem to be measurable? Is it possible to provide the intervention to that many people? Unfortunately, many good program ideas have withered in the face of such technical obstructions.

Political feasibility weighs the amount of community support or opposition for a program. Of course, interventions with little probability of support have already been eliminated from consideration, but even among a few good alternatives, there is likely to be a range of community support. In situations in which the problem and/or potential solutions are controversial, such as adolescent sexual behavior, some family planning options, and ethical concerns about neonatal care, very careful attention should be given to political feasibility.

Other criteria

Effectiveness, cost and feasibility are always important when selecting a program. In any given situation, however, other criteria may be of equal or even greater importance. Additional criteria that you may want to consider are:

- Financial and geographic accessibility
- Acceptability to potential recipients and to providers
- Public involvement
- Durability of the expected improvement in health status
- Likelihood of producing permanent organizational changes
- Consistency with community interests, or priorities
- Building upon community assets
- Involvement of certain groups (*e.g.*, governor's office, private agencies), and
- Visibility of the effort

Funding agencies always have specific criteria. If you must have outside funding to implement a program, their criteria should be compatible with your criteria.

Using criteria to describe alternative programs

When you reduced your lengthy list of unmet needs to a few alternative programs, you characterized the alternatives by mode of delivery, administrative home, and target group. Now you can round out your understanding of each program by describing it in terms of the criteria you will use to select only one for implementation. Your best possible estimates of effectiveness, cost, feasibility, and status on any other important criteria should be made and organized into succinct

descriptions of each alternative. These written descriptions serve three important purposes:

- By committing descriptions to paper, planning team members have an opportunity to identify, discuss, and resolve any misunderstandings about the nature of the program and its ability to meet the criteria;
- The written descriptions feed directly into the decision-making process, as described below; and
- The descriptions constitute written rationales for selecting one program and not selecting others. These rationales will be helpful when and if you need to defend your proposal.

Exhibits 1 and *2* (on the following pages) are examples of program descriptions, organized according to the criteria used to select a single program for York County.

Applying the criteria to make a decision

The third activity in *development and selection of interventions* is applying the criteria to program alternatives in order to select one for implementation. There are many ways to do this, ranging from highly interactive discussions through highly analytic quantitative procedures (Spiegel and Hyman, 1991). Two important ingredients for a sound decision are a systematic process and participation from many stakeholders. A method that permits decision-making under these conditions is called criteria-weighting (Blum, 1974). This method promotes systematic consideration of each criterion, weighted according to its relative importance. And the process can be structured so that it encourages participation but allows verbal dominance to be controlled.

Criteria-weighting method

The steps of the criteria-weighting method are:

- Select criteria
- Define scores
- Assign weights to the criteria
- Score each program on each criterion
- Multiply the scores by corresponding weights
- Review and compare programs in light of their weighted scores

Select criteria. Selecting criteria is the foundation of criteria-weighting. The criteria discussed above are used frequently for this purpose. Other criteria, though, may hold equal or greater importance in any given situation. To apply them correctly, all members of the planning team must agree on what the criteria are and share common definitions of them.

Define scores. Scores are intended to give an indication of the extent to which a program meets each criterion. A range of scores for each criterion should be determined in advance. The highest score should represent the best level on each criterion. Thus, if *effectiveness* is a criterion, then the highest score (say 5 on a 1–5 scale) would represent the *highest* level of effectiveness. A wide range of scores can help to make fine distinctions among programs. Using negative numbers in the range is acceptable and may have an intuitive appeal in cases in which a program falls very short on a criterion. But a wide range of scores may also introduce a level of refinement that can be unnecessarily cumbersome. If you have only a few programs to select from, a range of 3–5 scores is probably adequate.

Assign weights to the criteria. All the criteria you have selected are important, but some may be more important than others. The principles about assigning weights are similar to the ones listed above for scores; but there is one important difference. The weights reflect the importance of each criterion compared with the other criteria. So, a weight of 5 on a 5 point scale means that this criterion is 5 times as important as a criterion given a weight of 1. The most important criterion should get the highest weight.

Score each program on each criterion. Scoring involves a systematic review of each program for the extent to which it corresponds to each criterion and assigning the corresponding score. This activity can be relatively straightforward if the programs have already been described according to the criteria, as illustrated in *Exhibits 1* and *2*.

Multiply scores by corresponding weights. To weight the scores according to importance, multiply each score by the weight assigned to the corresponding criterion. Then, add the weighted scores for each program to calculate a summary weighted score.

Review and compare programs in light of their weighted scores. The highest score is intended to represent the one that, overall, meets the criteria best. Sometimes the result may surprise you. Whether the result is surprising or not, however, it is important to review the entire process before making a final decision about a program. You may find that a score or weight was assigned incorrectly, leading to a conclusion that may seem illogical. This may occur because some members of the planning group did not understand the score or weight in the same way that others did.

Exhibit 1.

Program 1: Prenatal home visiting program administered by the health department to provide outreach, education, counseling, emotional support, and assistance accessing prenatal services.

Major Characteristics:

- Home visiting program delivered by "Resource Mothers"
- Services specified in clearly outlined protocols (to be developed), which will include:
  - education about prenatal care and healthy behaviors during pregnancy;
  - counseling about consumption of cigarettes, alcohol and other drugs during pregnancy;
  - counseling and assistance with financial issues, transportation to health care, and other barriers to receiving adequate prenatal care;
  - emotional support through visiting, personal warmth and encouragement; and
  - outreach to referred individuals, and those who have missed appointments.
- Schedules for home visits to clients with different needs will be developed and followed
- Clients will be 18 years or younger and attending prenatal care services at the health department, having a positive pregnancy test at the health department, or referred by the school health nurses, teachers, or health care providers in the community

Effectiveness:

- Good evidence of effectiveness on health behaviors, including use of prenatal care (Rogers, *et. al*., 1996; Alexander, *et. al*., 1997; Farrow, *et. al*., 1996)
- Widespread application may lead to diluted services (*e.g*., caseloads too large)
- Effects on PTB and LBW depend on quality and appropriateness of prenatal medical and other specialized care (*e.g*., smoking cessation, nutrition) received. Prenatal care itself is not under the control of this intervention.

Cost:

- Total estimated direct cost for 3 years: $525,000
- Estimated cost/client served throughout pregnancy: $600 (Rogers, *et. al*., 1995)
- Funding for the first 3 years is needed. Sources are available but funding is not currently assured.

Administrative feasibility:

- Health department provides home visiting on a regular basis and it has employed lay health workers in the past
- Will fit easily in existing administrative structure
- Space available for 2 resource mothers in each health station
- Stable administration and clear administrative support for the project
- No undue burden on other health department functions

Technical feasibility:

- Staff available to provide training and supervision
- No resource mother recruitment problems anticipated
- Possible problems getting referrals from private physicians, but caseloads can be filled easily with health department clients alone
- Referrals for transportation could overwhelm capacity

Political feasibility:

- Unlikely to engender opposition
- Community support is expected because resource mothers will be recruited from the communities in which they work

Exhibit 2.

Program 2: A program of education and behavior change interventions delivered through small groups, large class presentations, and mass media messages administered by the high school with the support and collaboration of the Adolescent Pregnancy Coalition.

Major Characteristics:

- Classes on pre-conceptional health and prenatal care given twice each academic year to all high school students as part of their preventive health curriculum
- Behavior modification offered on a continuous basis for smoking cigarettes, drinking alcohol, and using other drugs
- Small support and education groups, facilitated by a school nurse, offered to girls who are sexually active
- Radio and television announcements about the importance of health care before and during pregnancy presented daily between 4 PM and 10 PM on popular stations

Effectiveness:

- Efficacy of the entire program unknown
- Effectiveness of prenatal education programs alone on pregnancy outcomes, like preterm birth and low birthweight, is uncertain due to methodological problems isolating and then evaluating them
- Behavior modification can be effective in reducing consumption of unhealthy substances, but the extent to which improved behaviors of girls who are not pregnant will extend into pregnancies which occur later is not known
- Good potential for positive side effects, such as greater personal responsibility and lower rates of substance abuse in the general population of the school

Cost:

- Total estimated direct cost for 3 years: $300,000. Cost assumes in-kind support from radio and television stations for broadcasts
- Adolescent Pregnancy Coalition has good track record for ascertaining in-kind contributions, but funding is not currently assured

Administrative feasibility:

- No space available currently for coordinator for multifaceted program
- Functions of school health staff will have to be adjusted to accommodate new responsibilities which may produce some instability
- Frequent health staff turnover due to low pay in school system

Technical feasibility:

- Most human resources available and trained
- Staff and coordinator would need training in behavior modification
- Identifying sexually active girls, especially in grades 9 and 10 where they have been reluctant to self-identify, will be difficult

Political feasibility:

- Sensitive content may generate objections from some constituencies, especially for 9th and 10th grade students
- Principal and school board would support the entire program

Example of criteria-weighting in action

An example of the criteria-weighting method, based on the York County situation, is shown in *Table 4*. Criteria are listed in the left column of the matrix.Each criterion has been assigned a set of scores ranging from 1 (least consistent with the criterion) to 4 (most consistent). Definitions assigned to the scores within each criterion are given at the bottom of the table. The second column indicates the weight assigned to each criterion. In this case, the weights range from 1 (important) to 3 (most important). Technical feasibility is weighted 1, while both effectiveness and cost have been assigned weights of 3. The next section of the matrix identifies the two programs under consideration in York County, *prenatal home visiting* and *education/behavior change*. There are two columns under each program. The first column shows a score on each criterion. The scores are interpreted according to the corresponding definition at the bottom of the table. For example, the score of "3" on effectiveness of the prenatal home visiting program indicates that there is some documented evidence of the effectiveness of this kind of program. The second column under each program consists of weighted scores; that is, the product of the weight of each criterion and the corresponding score. As *Table 4* shows, when the York County weighted scores were summed, the prenatal home visiting program had the highest score, both weighted and unweighted. In this case, the weights did not make a difference in the conclusion. In other situations, though, a high score on a heavily weighted criterion can have a significant influence on a decision. A review of the York County results indicates that the education/behavior change program received low scores primarily because of feasibility difficulties. Realizing this, the York County planners had further discussion about whether some or all of the feasibility barriers could be removed. They concluded that any immediate progress towards removing these barriers would be modest at best, so they decided to go with the prenatal home visiting program.

Cost-effectiveness analysis

Cost-effectiveness analysis is another method that produces information to aid in selecting from a menu of alternative programs. Cost-effectiveness can be expressed as either the total cost of achieving a given objective (*e.g.*, the cost of reducing the extent of a health problem by a given amount), or the maximum level of effectiveness attainable at a given cost (Barry and DeFriese, 1990). Cost-effectiveness analysis can be very powerful because it generates information that is more useful than either effectiveness or cost estimates alone. For example, a program may be extremely effective, but the cost may be exorbitant when you consider it in light of each unit of effect. Further, there may be another alternative that can reach the same level of effectiveness at a lower cost.

Cost-effectiveness analysis starts with an evaluation research study to determine whether a program has had an effect on a health condition and how much of an effect it has had. Concurrently, the costs associated with the program are

Table 4. Applying the Criteria-Weighting Method to Two Alternative Programs

		Programs			
		Prenatal Home Visiting		Education/Behavior Change	
Criterion[1]	**Weight [2]**	**Score [3]**	**Wtd. Score**	**Score [3]**	**Wtd. Score**
Effectiveness	3	3	9	2	6
Cost	3	2	6	3	9
Administrative feasibility	2	4	8	2	4
Technical feasibility	1	3	3	2	2
Political feasibility	2	4	8	2	4
Total		**16**	**34**	**11**	**25**

[1]**Criteria:**

Effectiveness:

4 = Strong evidence of effectiveness
3 = Some documented evidence of effectiveness
2 = Good chance of improving the problem
1 = 50/50 chance of improving the problem

Cost:

4 = Very inexpensive
3 = Affordable
2 = Expensive but manageable
1 = Very expensive

Administrative feasibility:

4 = Fits easily in existing administrative unit
3 = Minor modifications in administrative unit required
2 = Difficult to manage
1 = Impossible to manage

Technical feasibility:

4 = No problems anticipated in obtaining technology, providers, and coverage
3 = Difficulty obtaining one element
2 = Difficulty obtaining two elements
1 = Difficulty obtaining three elements

Political feasibility:

4 = Acceptable to all constituents
3 = Acceptable to most; little active opposition
2 = Acceptable to some; little active opposition
1 = Unacceptable to most constituents

[2]**Weights**:

3 = Most important
2 = Very important
1 = Important

[3] See *Exhibits 1* and *2* for rationales for assigning scores.

calculated. The costs often go well beyond the direct costs of delivering the program, to include costs to clients and the health system in the past, present, and future. Cost-effectiveness studies are conducted less frequently than evaluations of effectiveness because they require the expertise of highly trained analysts.* To use cost-effectiveness to assist your decision about which program to implement, all of your alternatives would have to be programs that have been offered in the past and evaluated at least for effectiveness in reducing the health problem of concern, but preferably for cost-effectiveness as well. If you only have data on the effects of a program (*e.g.*, the program reduced the rate of low birthweight by 10%), you may be able to develop a rough ratio of cost-effectiveness by estimating how much it would cost to deliver the program to your population, and then dividing that amount by the number of units of effect you would expect. For example, if a 10% reduction in low birthweight would mean that 15 low weight births could be prevented, and if the estimated cost of delivering the program were $300,000, then the rough ratio of direct cost per unit of effect is $20,000 for each low weight birth prevented.

Cost-effectiveness analysis, of course, considers only two criteria. For most public health program decisions, these two are not sufficient. However, if cost-effectiveness studies have been done on the programs under consideration, or if you can combine effectiveness data from the literature with estimated costs of delivering the program to your population and create your own ratios, cost-effectiveness can be used as one of several criteria in the criteria-weighting method.

Participation in decision-making

Making a decision about which program to implement is one of the most important aspects of the planning process, on a par with defining the problem correctly in the first place. Regardless of the analytic methods used to facilitate decision-making, a great deal of discussion among representatives of all groups with a stake in the decision is imperative. A way to assure participation is to use a modification of the Nominal Group Technique (Delbecq, *et. al*., 1975). For each activity, (*e.g.*, assigning weights to criteria, assigning scores to programs), all planning group members can generate individual values. Those values can be averaged to arrive at a group value or they can be displayed for discussion. Final decisions about the values can be made by verbal consensus or, if appropriate, a vote. This type of process, in conjunction with criteria weighting, allows a wide range of perspectives to be brought to bear within a systematic framework for decision-making. It allows all participants to become aware of the complexity of the issues at hand and it discourages verbal domination by any individual or group.

**A publication of the Centers for Disease Control and Prevention,* Economics of Reproductive and Infant Health: An Annotated Bibliography from 1980 to 1993 *(1995), includes abstracts of many cost-effectiveness studies (among other types of cost and economic analyses) of relevance to Maternal and Child Health.*

A final note

In this manual you have learned:

- How to develop a small number of feasible alternative programs from a lengthy list of unmet needs;
- Criteria that are frequently used to select a single program for implementation; and
- A method for applying the criteria to the alternative programs in order to decide which is the most appropriate choice.

By applying these methods and writing up the results, you have also learned how to document your rationale for selecting a program. The rationale will come in handy as you prepare a proposal for funding or defend your request before an approval board.

Practice

In this manual, we have covered a sequence of activities involved in development and selection of interventions. Some of the activities are big jobs with major headings in the manual. Others are smaller tasks, but these, at times, may be even more crucial than the big jobs. Until you are very familiar with the process of developing and selecting interventions, it is helpful to have a checklist to be certain you are giving adequate attention to each task. It is also expedient to consider *a priori* the types of individuals and positions that should be involved in the intervention development and selection processes. Clearly, this step, like all of the steps in the program planning process, is not a job for a single individual.

This Practice session is intended to help you think through the chronological steps in the process and who should work with you on this task. Respond to the directions below, using the manual as your guide. If it would be helpful to put your work in a context, consider the problem and needs for services you worked on in the Practice sessions for the first two manuals, *Assessment of Health Status Problems* and *Health Services Needs Assessment.*

1. To check your understanding of the key information in this manual and how it fits together, develop a *detailed* chronological checklist of activities you need to undertake to move from a large set of unmet needs to a single intervention or program ready to be fully developed. You should keep a copy of your checklist with this manual for future reference.

2. In light of the activities in your checklist, identify the individuals or positions that might be represented on your planning team, or at least consulted in the process of developing and selecting interventions. Describe how each of these positions would contribute to the process.

Practice Answers

1. Checklist for developing and selecting an intervention. (Items in parentheses refer to the site in the manual where the step is demonstrated and/or discussed.)

Reduce the list of intervention options	
Develop questions or criteria to assist in eliminating options with little or no viability (*Table 1*)	
Review entire list, applying the questions and eliminating options (*Table 2*)	
Form programs	
Group intervention possibilities by mode of delivery, administrative responsibility, target group, or other relevant organizing theme (*Table 3*)	
Reduce the list of programs to 3–5 by recombining components as necessary	
Expand on the programs by identifying key elements of their operations (p.12)	
Select and define criteria to guide selection of final program	
Check intended funding source(s) for their criteria for selection of projects	
Identify criteria important to your planning team and larger constituency for choosing among the 3–5 final options (pp. 14–19)	
Discuss and define criteria (pp. 14–19)	
Create scores for criteria (*Table 4*, p. 24)	
Describe program alternatives according to criteria (*Exhibits 1* & *2*, pp. 21–22)	
Describe major activities of the programs	
Review literature to find evidence of effectiveness, cost-effectiveness, and side effects of these or similar programs	
Decide whether each program would be more appropriate as an ongoing program or a demonstration project	
Consult with experts and the literature to estimate the costs of each program	
Consult with appropriate experts to estimate administrative, technical, and political feasibility	
Select a program (pp. 23–26)	
Assign weights to the criteria	
Apply criteria to each program option (*Table 4*)	
Select final program	

2. Participants or consultants in the process of developing and selecting interventions.

Participants or consultants	**Contributions**
Service providers	Understanding of which services are complementary to each other and of technical feasibility issues. Familiarity with research on effectiveness of interventions
Major decision-makers of units through which services will be delivered	Understanding of administrative and political feasibility
Middle managers of units through which services will be delivered	Understanding of administrative feasibility
Researchers (*e.g.*, epidemiologists, biostatisticians, health services researchers)	Familiarity with relevant ongoing research and literature on effectiveness, cost-effectiveness, and side effects of interventions
Budget experts	Understanding of financial issues that may not be readily apparent
Political representatives	Experience with politically acceptable and unacceptable interventions
Technical experts	Understanding of technical difficulties in delivering services
Representatives of the community	Familiarity with program elements that make an intervention attractive to the target group and acceptable to the community at large

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