

# CHAPTER III

## CONDUCTING A FORMAL PROBLEM ANALYSIS AND IDENTIFYING EFFECTIVE INTERVENTIONS

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Once a planning group has set priorities, it should turn its attention to conducting a formal problem analysis to understand the causes, contributors to and consequences of the priority problems. This is a critical step before going on to identify effective interventions. From this base of understanding developed during the problem analysis, a planning group can then wisely choose the most effective interventions to achieve desired results. This is why it is important to conduct as thorough a problem analysis as possible within a planning group's resource limitations.

This chapter uses a systematic approach to moving from assessment data to problem analysis, to identification of causal pathways and potential interventions that target these pathways. The chapter can act as a guide for a successful problem analysis process. The chapter:

- Provides the underlying conceptual framework for this model
- Describes the process of performing a problem analysis
- Describes the six components of a problem analysis
- Provides definitions of problem analysis terms
- Illustrates the use of a problem analysis diagram
- Provides a problem analysis case study

## PROBLEM ANALYSIS: A SOCIO-ECOLOGICAL FRAMEWORK FOR ADDRESSING PUBLIC HEALTH ISSUES

**The Healthy People 2020 Objectives** have as part of their mission to increase public awareness and understanding of the determinants of health, disease, and disability and the opportunities for progress and to engage multiple sectors to take actions to strengthen policies and improve practices. The overarching objectives are: to create social and physical environments that promote good health for all and to promote quality of life, healthy development and healthy behaviors across all life stages. Taken together, these statements represent a paradigm shift in how we look at health issues in this country. First, they imply recognition that there are many social and environmental determinants of health that are outside the conventional purview of the health care system and the realm of individual (personal) characteristics, and there is ample justification for this shift<sup>1,2</sup>. Second, they recognize the impact of these factors on individuals over the course of their lives<sup>3</sup>.

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<sup>1</sup> Braveman PA, Cubbin C, Egerter S, Williams DR, Pamuk E. Socioeconomic Disparities in Health in the United States: What the Patterns Tell Us. *Am J Public Health*. 2010 Feb 10. [Epub ahead of print]

<sup>2</sup> Barger SD, Donoho CJ, Wayment HA The relative contributions of race/ethnicity, socioeconomic status, health, and social relationships to life satisfaction in the United States. *Qual Life Res*. 2009 Mar;18(2):179-89. Epub 2008 Dec 12.

<sup>3</sup> Lu, MC, Halfon, N. Racial and Ethnic Disparities in Birth Outcomes: A life-course perspective. *Maternal and Child Health Journal* 2003; 7(1):13-30.

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The problem analysis model incorporates this broader view of health determinants in a way that allows users to explore the pathways by which social determinants interact with each other and impact communities and individuals at all life stages. It allows groups to identify and determine the validity of these causal pathways through the development of interventions that target upstream causes and evaluate their impact. It also encourages the broadening of the planning process to include stakeholders whose expertise and interest lies in a broader definition of health and well-being that includes income, education, housing, etc.

### PERFORMING A PROBLEM ANALYSIS

Every problem has multiple determinants or precursors, including both direct causes and risk factors. A formal problem analysis will identify the basic epidemiology (what, who, when, where) of a problem as well as help to identify determinants and possible causal pathways that lead to a particular desirable or undesirable health outcome or condition, and illustrate the consequences or impact of that outcome or condition. It is essential to think about a health issue in terms of these determinants because it will help clarify complex interactions and assist in identifying potential points of intervention to alleviate a problem or promote healthy outcomes. (For a more thorough discussion of the definitions of health determinants and risk or protective factors, refer to component 5 on page \*\*.)

#### *Example*

If a group has prioritized inadequate immunization rates as a problem it wants to address, it may identify multiple possible intervention activities at multiple levels such as: increasing health insurance coverage for poor children, establishing a central registry, having schools administer vaccines, sending patient reminders, educating providers on missed opportunities for administering vaccines, doing a media campaign targeting parents or giving shots at health fairs.

In order to select the most effective intervention(s), your group must understand the underlying causes of the problem in the target community and identify intervention strategies that have been shown to be effective given the particular circumstances of the target community.

Intervention strategies will then be identified to affect specific events along the causal pathways.

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A formal approach to problem analysis promotes awareness of the range of health determinants and supports the rational allocation of resources where these resources can be most effective. It also avoids allocation in response to “impressions”, anecdotal evidence, or political pressure.

Ideally a problem analysis should be conducted by a multi-disciplinary, interagency planning group or collaborative with the assistance of trained staff. In circumstances where this is not feasible, the analysis can be conducted by staff and then presented to stakeholders. The goal should be to have broad input into the process and buy-in to the outcome.

This collaborative approach can be successful in four ways:

1. By encouraging the identification of upstream determinants that have more far-reaching impact
2. By supporting the building of a broad, multi-sector partnership to solve community problems
3. By drawing upon the insights and wisdom of community-based organizations and community members
4. By identifying interventions that are based on a logical and systematic analysis.

Although collaboration may be more time-consuming than an internal organizational analysis, it can be done efficiently and can result in maximum buy-in, shared objectives, and the sharing of resources and expertise among collaboration members when a facilitated group process is used. We would like to emphasize the importance of the use of a broad based, inclusive approach.

### COMPONENTS OF A PROBLEM ANALYSIS

1. Examine the epidemiologic data.
2. Examine the literature and consult experts about health determinants, including both causal and risk factors, associated with the problem.
3. Determine the extent to which these causal and risk factors are active in the community.
4. Determine the relative contribution of each identified factor to the problem.
5. Identify the interrelationships among factors.
6. Determine key causal pathways and the most potentially effective intervention points in these pathways and identify effective interventions.

#### *The Process*

To minimize the burden on members of the planning group/partnership who are often volunteering their time, the first four components of the problem analysis can be completed by staff and then presented to the planning group for discussion and decisions. However, before staff begins their research, it is a good idea to hold an initial meeting with the group

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to provide members with an overview of the problem analysis concepts, to introduce the problem analysis diagram, and to brainstorm risks and contributing factors. The brainstorming can guide the staff in conducting the research as well as promote the group's understanding and ownership of the analysis.

The last two components are best completed in a representative facilitated group. With the appropriate background work prepared in advance, it is possible to complete the group process for one identified problem in about 6 hours. If there are several prioritized problems, several work groups may be assigned. The components of the process are described below. While they are presented sequentially, some components may actually be conducted simultaneously or may overlap.

### *Component 1. Examine the Epidemiologic Data*

Epidemiology is the study of the pattern of distribution of a problem or condition in the population. The population being studied can be the entire population of a particular geographic area or specified subpopulations within the total population e.g. ethnic or age groups of interest.

#### **Epidemiological questions include:**

- How does the frequency or occurrence (prevalence or incidence rate) of this problem compare to a standard such as Healthy People 2020 or a comparison community?
- Is the problem increasing or decreasing?
- Is a particular group more affected than other groups? Why?
- When does the disease/problem occur?
- Are there geographic areas where counts or rates are higher?
- What causes the problem?

You should begin the process of examining the epidemiologic data by going back to the data collected during the initial community assessment discussed in Chapter 2. Additional data may be needed at this time to further illuminate the problem.

This preliminary analysis will ensure that significant problems within race/ethnic or age subgroups and neighborhoods will not be hidden or masked by looking at county level aggregate data alone.

#### ***Example***

A county may have an overall rate for tuberculosis that is low and level over time, but the newcomer Asian population in this same county may have high and increasing rates; or, the overall county rate may be high, but the increased rate is the result of the much higher rates occurring primarily in two or three neighborhoods.

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To determine trends in the rate of change for a condition, at least 5 years of data should be examined. To do this, specific statistical methods for analyzing trends must be used. This ensures that worsening trends can be identified before a problem reaches a critical level. It also prevents misleading conclusions based on year to year comparisons where random variations of counts can occur that are not significant. Comparisons of indicator data from one year to the next can be useful where either a new intervention has been implemented or a change in health policy or community conditions has occurred. In these cases, we can look at indicators affected directly by outreach, new services or new payment mechanisms that can rapidly result in improvements (e.g. first trimester entry into prenatal care).

When making comparisons, it is critical that those studying the problem not assume that *all* observed differences or changes are significant. For many indicators there are small numbers of individuals affected and, thus, the effect of one or a few occurrences can greatly inflate a rate or percent, yet not represent a statistically significant change. This is especially true when looking at zip code or neighborhood level data. To ensure that observed differences could not be the result of chance, tests of statistical significance should be performed. If your program does not have access to statistical expertise, we provide a simple method of determining significance that can be used to make comparisons. See Appendix III-A for the definition and use of statistical confidence intervals. Those indicators that show a significant negative relationship to comparison data are identified as problem areas and as candidates for intervention activities.

### *Component 2. Examine the Literature and Consult Experts*

The second step of this process is to become educated about the problem, its causes and related influencing factors. This can be done by examining the peer reviewed literature, conducting a search on the Internet, consulting with agencies providing services for this problem, and consulting with individuals in your community who are recognized experts in this area.

The following methods and tools can assist this task, as well as the review of the literature to identify proven and promising interventions, as discussed under *Component 6: "Review existing health and social sciences evaluation literature to identify proven and promising interventions."*

- **Perform a Medline Search.** Collect and summarize key studies. Look for Meta-analyses that synthesize data from many studies or review articles that summarize the findings of many studies.
- **Search the Web.** Focus on those data bases that might be most relevant to the area of interest: e.g., if unintentional injuries are a problem, first look at the state's injury prevention site or the Centers for Disease Control and Prevention (CDC) site.
- **Call Recognized Experts in the Field.** Find out if they know of a literature review or can direct you to the most pertinent articles or refer you to another expert that has

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this information, or invite them to do a presentation to the group summarizing current knowledge as it pertains to your community of interest.

- **Contact Organizations** that compile this type of information and have an interest in this area, e.g., the American Lung Association and the March of Dimes.

### *Example*

If the problem is immunization inadequacy, staff might be assigned to do a literature review on immunizations. A good place to start this review would be the Centers for Disease Control website ([www.cdc.gov](http://www.cdc.gov)). You could also consult with, or include in the meetings about this problem, a representative from the state or local public health agency in charge of immunization programs.

There might be a local pediatrician active in the community or in the local chapter of the American Academy of Pediatrics who would be willing to participate in the discussion of this problem. There may be local advocacy groups concerned with the issue that could participate and bring useful information from the community. You could also include community members from the groups experiencing the problem.

This investigation should result in the identification of factors that are significantly related to low levels of immunization among similar populations. These may include risk factors; ecological or environmental influences; public policies impacting health status, health services or health care systems; or direct causal factors. Protective factors—those factors positively associated with increased immunization rates—should also be identified.

This investigation could provide information from epidemiological analyses and intervention effectiveness studies such as data on the percent of unvaccinated children in a community that has an automated reminder system versus the percent of unvaccinated children in a community that does not have an automated system. The review could tell you the percent of unvaccinated children having an identified primary care provider versus the percent of unvaccinated children without a primary care provider. Additionally, it would be important to know whether these findings were statistically significant.

When possible have someone who has the expertise in statistical and research methods review the results of the literature search.

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### *Component 3. Determine the Extent to which the Causal and Risk Factors Found in the Literature or Identified by Experts are Present in the Community*

Building on the findings of the review of the literature and expert information about the causes and effects of the problem, staff should now identify those factors that they know are present in the target community. They should examine the strength of the association between each influencing (causal, risk, or other) factor and the identified health problem. This can be accomplished by consulting with your epidemiologist to identify studies or results of surveys of the target community identifying factors related to the problem. Local employers and institutions also may have data on the populations with whom they work.

#### *Example*

If the problem is high rates of hospital admissions for children with asthma and the peer reviewed literature and experts indicate there is a very strong association between high levels of air pollution and asthma, you will want to check with the health department environmental health section to learn about the level of air pollution in geographic subunits within your community. You might also survey clinicians on their use of appropriate asthma management protocols or survey community members about whether they have talked about and/or have received an asthma management plan from their health care provider.

It will be important for staff to bring this work to the larger group to confirm and add to the rest of the staff's findings.

### *Component 4. Determine the Relative Contribution of Each Identified Factor to the Problem*

Through the problem analysis, you will identify multiple factors that are associated with a particular outcome. Ideally, one would want to plan interventions around those factors that are most strongly associated with the problem and that affect the greatest number of individuals. Thus, it will be important to investigate both the strength of the association between individual factors and the identified problem and the contribution of each factor to the total number of individuals impacted by the problem.

The strength of association between a risk factor and outcome is determined by calculating the ratio of the incidence of the problem among people with the factor in question to the incidence of the problem among people who do not have the risk factor (the rate for one group divided by the rate for another group). This ratio is called a **relative risk**. It is important to identify those factors that have the stronger association with the problem in order to target limited resources to areas where they may have the most impact.

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### *Example*

If you are studying the outcome of low birth weight (LBW) and have found through your research that both smoking and cocaine use are related to LBW, you will want to conduct a relative risk analysis. If your data show that women who smoke are found to be 1.4 times as likely as those with no history of smoking to have a LBW baby and that women who are abusing cocaine are 3 times as likely as women who are not to have a LBW baby, the stronger association with low birth weight is cocaine use.

See Appendix III-B for a technical definition and a detailed example of how relative risk calculations can be done and how they can be useful.

However, even though the relative risk for women who use cocaine may be higher than the relative risk for women who smoke, targeting resources to intervene with pregnant women and mothers using cocaine will not make sense in all communities. Although the relative risk is high for this particular factor, you will also want to consider the number of people in the community affected as compared to the other identified factors. If the number affected is small, even though the relative risk is high, it may be more beneficial to target other risk factors that are affecting a larger number of persons. A useful calculation to use here is that of **population attributable risk percent (PAR %)**, which tells us what percentage of the overall problem can be attributed to a particular causal or risk factor.

### *Example*

If the literature or experts have identified both smoking and cocaine use as risk factors for LBW, what percent of cases can be attributed to one versus the other? If it is found that 30% of women in your community who had LBW babies smoke cigarettes and only 1% of women use cocaine, an intervention aimed at women who smoke will probably have a greater impact on the community's LBW rate than targeting cocaine users. Generally, you will want to target your effort to that causal or risk factor with the greatest potential impact (assuming there is an effective intervention).

For more information on how to calculate population attributable risk, see Appendix III-B.

In making its final decision, the planning group should consider the seriousness of the consequences of the stated problem. In some cases, the consequences of a problem are serious enough to convince the group that, although numbers affected are relatively small, it is important to the community to allocate resources to the problem.

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### *Example*

Although the prevalence of cocaine-using mothers of LBW babies is low in your community, those cocaine-exposed babies may cause significant financial and emotional burden to society because of the costs of caring for LBW babies born prematurely, and those with developmental delay, hyperactivity disorders and learning disabilities. This may provide the group with enough incentive to deem worthwhile an intervention for cocaine-addicted mothers.

In addition, there are sometimes ethical and moral reasons why a group may choose a less prevalent condition. For example, the group may be concerned about a rare but preventable cause of mortality.

**Common Problem:** The staff lacks expertise to conduct this level of analysis.

**Responses:** There are three ways to address this problem:

1. Use literature to determine relative and population attributable risk. Often, in your review of the prevention literature you will find calculations of risk and can assume that the relative risk ratios for factors in the community are the same as those found in a similar population studied in the literature.
2. Identify experts who can perform this analysis for you. Is this expertise available within the staff of your health department (e.g., is there an epidemiologist, a planner or other health department staff that can assist in this area of problem analysis?) or among the partners in your collaborative? If you can hire a consultant, have you been explicit about the expertise he or she should have or have access to? Do you have a university in your area or close by? Is the appropriate university staff with expertise or access to expertise in problem analysis represented on your planning collaborative? Are there university students who can help and also benefit by using the work to meet a course requirement?
3. A lack of resources, information, or time may require a modified approach. An understanding and review of the concepts of relative risk (the strength of the association between a risk factor and the outcome) and population attributable risk (how much of the problem can be attributed to the risk factor) can assist the groups in two ways. It would assist the group's less technical review of the demographic,

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incidence and prevalence data and it would assist the group in its decision-making process about which factors are likely to be significant in the community of interest. Although the group will not have the benefit of a technical analysis, the concepts should be kept in mind and considered.

### *Component 5. Identify the Interrelationships among Factors*

This is the first component that requires full participation of the planning group. The group will now make decisions based upon the analysis.

It is necessary that everyone participating in the planning group understands how risks, contributing factors, protective factors and consequences relate to each other in order to identify the most effective points at which to intervene. A commonly used method is a tree diagram. Drawing a diagram will help the group understand the interrelationships among factors and identify possible causal pathways. **Diagram 1** is a generic problem analysis diagram presented to assist understanding of the theoretical construct of the diagram.

If the planning group has been previously oriented to the problem analysis process, members can now refer back to their initial brainstormed list of influencing factors. They should review their initial list within the context of the information subsequently gathered by staff during the first four components of the analysis. These factors, or precursors, can now be placed into the diagram at the appropriate level: social/economic/policy, family/community/institutional or individual.

If the planning group is coming together for the first time, orient the group to the process; ask the group to brainstorm influencing factors; present an easily understood summary of the data, literature findings, expert opinions and analyses compiled by staff during components 1 through 4; answer questions; and then assist the group in completing the diagram. The following definitions will help to clarify terms used in the process of constructing a problem analysis diagram:

#### *Definition*

##### **Precursors**

Aspects of personal behavior, life-style or genetic predisposition; family/household influences; school, job or other local institutional or community factors; environmental conditions; or social determinants that have been shown in the peer reviewed literature to be associated with a poor outcome. Precursors can be categorized and displayed in a number of ways.

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### **Direct Precursors**

Factors that have a direct, cause-and-effect relationship to the outcome. They include factors that are directly related to the pathological processes that lead to the outcome and should be supported by peer reviewed studies. In the model suggested here we categorize as direct precursors those factors that are related to the characteristics or behavior of an individual (biological, medical or behavioral). We would also include personal risk factors closely associated with causal factors in this category.

*Example: If the identified problem is low birth weight, direct precursors would include risk factors such as pre-term birth, maternal substance abuse, poor maternal nutrition, chronic maternal illness or sustained stress.*

### **Indirect Precursors**

Indirect precursors have a significant association with the outcome, but not a clearly defined causal relationship. These usually include socioeconomic and psychological characteristics of the family and may include characteristics of the institutions in which a person receives services, works, studies or lives. They are often, although not always, related to direct factors.

*Example: For childhood obesity indirect precursors could include familial dietary patterns, families' lack of knowledge of what constitutes a healthy diet, or inadequate exercise. They may also include barriers to the families' purchase of healthy foods, lack of culturally appropriate information about the preparation of healthy foods and lack of social support within the extended family and community for "healthy food" preparation.*

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<b>Social Determinants/Public Policy Level</b>	<p>Social, economic, policy or systems issues are those global conditions or policies that have an impact on overall health status as well as particular health issues. They can include poverty, racism, community violence, level of unemployment due to national economic conditions, lack of health insurance for the poor, or a low level of safe and affordable housing.</p> <p><i>Example: For childhood obesity, upstream precursors could include poverty, prevalence and menus of fast chains, school policies favoring academics and limiting physical activity, inadequate or misleading food labeling, companies adding harmful additives to prepared foods</i></p>
<b>Family/local institutions and community factors</b>	<p>Factors that operate in the local neighborhood or community that directly or indirectly affect some or all of the residents of a particular community. They include family/household, school, workplace or community characteristics shown to impact overall health status or particular health problems in that community.</p> <p><i>Example: For childhood obesity, these can include family and cultural eating patterns, unhealthy menus at school cafeterias, absence of local food stores and restaurants selling healthy foods such as fresh fruits and vegetables</i></p>
<b>Individual level factors</b>	<p>Factors specific to individuals that represent causes or risk factors associated with a particular health outcome. These can be genetic, biological, psychological, or behavioral in nature.</p> <p><i>Example: For childhood obesity these can include poor food choices, endocrine abnormalities, sedentary lifestyle.</i></p>
<b>Systems Barriers</b>	<p>Attributes of the health care delivery system, including financial, geographical and cultural accessibility, which have been shown in the literature to be associated with a poor outcome for a variety of health indicators. System barriers can be at either of the top two levels depending on whether they operate solely at the local level or are statewide or national in scope.</p> <p><i>Example: Systems barriers can include lack of affordable health insurance, lack of culturally and linguistically appropriate services, and geographic inaccessibility or poor transportation.</i></p>

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### **Protective Factors/ Community Assets**

Personal characteristics, attributes of the family or culture, or attributes of social systems, the environment or the community in which individuals live that are associated with positive health status or outcomes. These can be direct, indirect or upstream precursors.

*Example: Protective factors for various problems include a high rate of literacy among adults, high employment rates, good educational systems, availability of health insurance, the presence of community agencies that assist newcomers by providing translation services for health care visits, the presence of safe after-school and evening recreational facilities for teens and the presence of a neighborhood crime patrol.*

Protective factors exist at all levels of the problem diagram. It is important to determine not only whether there are community assets, but also whether the target population is connected to the protective factors in the community or have other protective factors characteristic of their distinct community.

### **Linkages**

The connections between the problem and the various levels of precursors. The concepts of relative risk and population attributable risk described previously can be useful in identifying and quantifying linkages. The literature can also provide information on how precursors are related. For example, there are well accepted theories of how various factors contribute to certain behaviors that in turn contribute to poor health outcomes.

*Example: Lack of availability of healthy food choices in local communities impacts the diet of people in that community and can result in over consumption of foods high in fat and lead to high serum cholesterol in many individuals. This in turn is associated with increased formation of plaques on the coronary arteries that result in higher rates of myocardial infarction.*

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### **Consequences/ Impacts**

The effects of the problem on individuals, families and society. Identifying and quantifying consequences enables assessment of the significance of the problem.

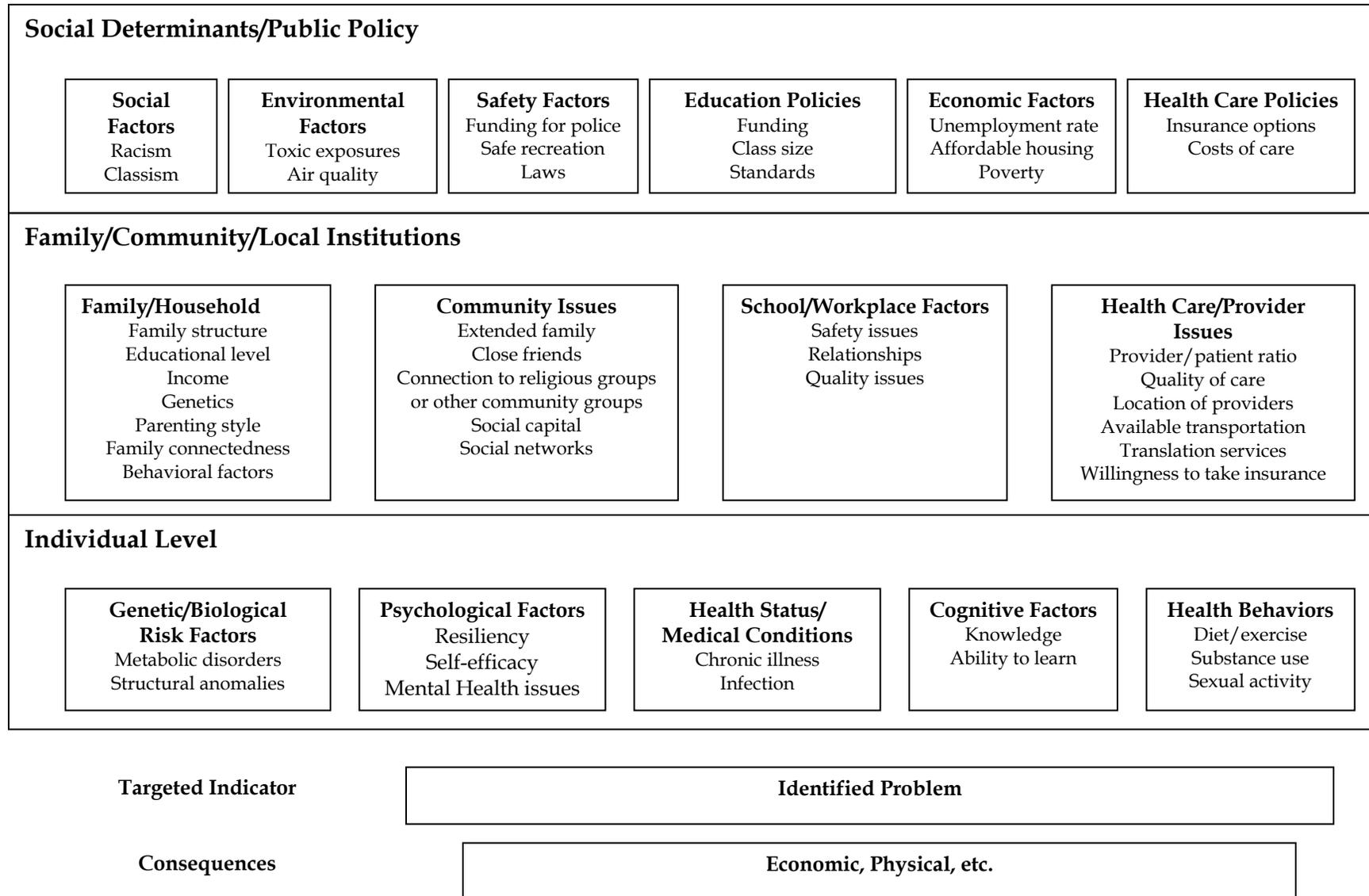
*Example: The consequences of frequent asthma attacks might include immediate costs of medical care, school absences leading to poor school performance and possibly school dropout and the physical, emotional and economic costs of resulting premature death and/or disabilities.*

As can be seen in the example, consequences of one step in the problem cycle can become precursors to another problem. Consequences can also be categorized as direct, indirect or upstream. This categorization is similar in nature to that of the levels of precursors.

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Diagram 1. A Generic Framework for Health Problem Analysis \*



## ***Component 6. Determine Causal Pathways and Potentially Effective Intervention Points and Identify Effective Interventions***

### *Determine Causal Pathways and Intervention Points*

After the initial diagram has been completed, the group continues the refinement process as needed, reviewing the information staff has gathered on the relative risk and population attributable risk of particular factors.

#### **Questions to Ask to Guide the Review of the Diagram**

- Is there additional information needed to better understand the relationships among precursors, the problem and its consequences?
- Are there precursors that are especially prevalent in your community of interest?
- Does the literature show or have your technical experts provided analysis that indicates one or several factors are more important (greater relative risk and/or population attributable risk) to address than others?
- Do your data and your community experts (e.g., members of the target population, leaders of the community or other designated representatives) suggest that one or several factors are more important to address than others?

The causal pathways are constructed by linking precursors to each other and to the problem. Theories and research that link precursors to the problem and each other should be identified and discussed by the group. Members of the group, based on this information and contributing their own knowledge of the community, determine the points in the causal pathways that they think have the most intervention potential.

#### ***Example***

A possible causal pathway for overweight links poverty in a community to the lack of safe places to exercise and to the lack of social support for families to congregate and exercise in a community which results in the lack of adequate exercise among children and a high rate of overweight children in an identified community. Thus, a group may identify the lack of safe places to exercise as a potential key intervention point. However, before they confirm that this is, indeed, a key intervention point, they will want to determine whether intervening at the identified point will make sense and be feasible in the target community. A member of the staff or planning group can be asked to provide information to the group on how successful other communities have been in providing a safe neighborhood playground with supervised activities to promote physical fitness and explore whether such programs 1) have been successful in outreaching to families, and 2) have resulted in reducing rates of obesity amongst the children in the surrounding neighborhood.

## *Identify Effective Intervention Strategies*

The planning group's process of determining the most effective intervention points in the causal pathways should include an assessment of possible interventions. This intervention assessment involves:

- An assessment of the adequacy and effectiveness of current programs addressing the problem
- Review of the health and social sciences literature to identify proven and promising interventions
- Consultation with the target community
- Assessment of the feasibility of implementing the identified interventions

Note that the literature review to identify proven and promising interventions may have been started in conjunction with the literature review on the causes, risk factors and contributors to the problem.

### **Assess the Adequacy and Effectiveness of Current Efforts**

When considering the need for an intervention, it is important to identify existing social, economic, health, private and nonprofit advocacy groups and community programs addressing the problem as well as those stakeholders involved in these interventions. For example, if you decide to intervene with one of the upstream precursors that are not in the traditional public health arena, such as housing, environmental pollution, or income support, it is critical to identify key individuals and groups with a focus on the area of interest. If these stakeholders have not been part of your group's planning process, they could be included now. Their inclusion will avoid duplication and engender support and participation in the development of new strategies and assure coordination of efforts.

After these additional key players/informants have been included, the group must inventory existing projects or services and collect information on their type, location, numbers served, socio-demographics of the population served, and results of evaluations that have been done. It could be that there already are effective interventions, but that the agencies providing them do not have the resources to serve all of those in need.

#### ***Inventory Each Existing Community Service for:***

- Type of service/program
- Location
- Number of clients served
- Sociodemographic characteristics of clients
- Evaluation (results)
- Unmet needs identified

Assess whether these services address the precursors that have been identified in your causal pathway(s). Assess the adequacy of these services: have they been

evaluated and shown to result in improved outcomes? Are they culturally appropriate? What proportion of those in need of services is receiving them?

The Resource Matrix in Appendix III-C is a useful way to organize this information.

### **Review Existing Health and Social Sciences Evaluation Literature to Identify Proven and Promising Interventions**

Before the planning group meets to discuss possible interventions, staff, consultants or designated members should gather information on both effective and failed interventions relevant to the problem and population. This information will prepare the planning group with state of the art information about what has been proven or shows promise in similar populations to the community of interest. Where there are no effective interventions, the planning group may wish to test or develop an innovative approach to achieving change. We encourage innovative approaches tailored to community needs. However, generally, building on the proven or promising work identified through a literature search will be efficient and increase the likelihood of intervention success. Although the review of the research literature is presented at this point, it is likely that when the literature review was conducted to identify causes, risks and protective factors, this review was conducted simultaneously. Refer to the previous *Component 2. Examine the Literature and Consult Experts* for methods and tools which can assist the review of proven interventions as well as the review to identify causes, risks and protective factors.

When possible, have someone who has the expertise to evaluate the literature about interventions review the results of this search.

#### ***Example***

A staff person or other group who has an understanding of statistics and evaluation design should analyze the results of the literature search on intervention to see if the evaluation methods are valid and if results are statistically significant. The evaluation studies should be reviewed to identify linkages between interventions and outcomes. Increasingly, for many public health problems, Federal, State or health related associations are conducting reviews and providing information on proven/promising interventions. For example, the CDC has convened a Community Preventive Health task force to identify effective preventive health interventions<sup>4</sup> in many health areas and the Center for Substance Abuse Prevention (CSAP)<sup>5</sup> has, likewise, compiled information on substance abuse interventions.

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<sup>4</sup> Centers for Disease Control and Prevention. The Community Guide <http://www.thecommunityguide.org./index.html> Last accessed 3/25/10.

<sup>5</sup> Center for Substance Abuse Prevention. <http://prevention.samhsa.gov/planning/default.aspx> Last accessed 3/25/10

## Consultation with the Target Community

For many public health problems there is limited data on the efficacy of specific interventions. Thus, it is always important to collect timely qualitative data from the target community or key informants familiar with the target community along with service providers. Although service providers have considerable knowledge about the population and interventions that have or haven't worked in the past it is important to exercise caution in relying too heavily on information provided by them as they may have a bias in favor of the services provided by their agency. These individuals can be asked about contributors to the problem, perceived barriers to successfully addressing the problem, and the protective factors that may be present and could be built upon to achieve positive change. They may also be consulted about the relative importance of the problem to the health of the community as perceived by the community, their ideas on the root causes of the problem and their suggestions for where to target interventions. They can be asked about interventions or services with which they are familiar and about which interventions they think would be effective in a given situation (e.g., would a particular intervention described in the literature be acceptable in the target population?).

The above process should lead to a short list of effective intervention strategies for the planning group to consider.

## Assessment of the Feasibility of Implementing the Identified Intervention Strategies

Decisions about which interventions to implement should be based on the cost-effectiveness of the intervention as determined from the literature review and the program evaluation documents described above. If possible, for each potential intervention, a cost should be assigned for a given unit of service or a given increment in improved outcome.

The group should also consider whether an intervention fits within the community's values and within the potential resources available. The appropriateness of each intervention to the community of interest should be determined. To do so, again review and consider the socio-demographic makeup of the community, the geography of the area, the availability of appropriately skilled personnel, and how acceptable the intervention might be to that community.

### ***For Each Potential Intervention, Identify:***

- Anticipated benefits
- Potential barriers to implementation
- Resources required and available for implementation
- Potential for sustainability in a given community
- Cost/benefit ratio of the program (if possible)

A feasibility assessment should be done that includes a simple accounting of required versus available resources (in both the short and long term), anticipated barriers to implementation and/or program sustainability, anticipated benefits of the program, and likelihood of implementation success and program sustainability.

## **NEXT STEPS**

The Planning Group, or specifically designated work groups, will take the results of the problem analysis and determine which intervention will be implemented and then develop an action plan(s). This process is discussed in Chapter IV.

## **CASE STUDY OF A PROBLEM ANALYSIS<sup>6</sup>**

The MCH Coalition has prioritized the problem of asthma in school-aged children as one of its major community health problems. The following asthma related data was collected during a community needs assessment:

- Asthma was the leading cause of visits to the emergency room (ER) and hospitalizations in the pediatric/adolescent age group of 4-18 years of age and rates doubled in the past 4 years.
- Asthma was the leading health related cause for school absenteeism for the past 2 years. This was particularly true for African American and Hispanic children.
- The community clinic representative, as well as the county public health representative, reported increasing numbers of clinic visits for asthma for the same race/ethnic groups.

The group also learned, through a meeting with hospital-based healthcare providers, that the majority of asthma-related hospitalizations, ER visits and deaths are thought to be preventable and the group subsequently agreed to proceed with a systematic problem analysis.

The Coalition established an Asthma Work Group (AWG) whose mission was to provide the Coalition with a better understanding of asthma in their community. The AWG was directed to further assess the extent to which asthma impacted children with asthma and their families and to identify community-based activities that could improve the quality of life and health outcomes for these children.

One of the MCH health educators and a member of the Coalition co-chaired the AWG. They asked Coalition members for suggestions of community leaders who, and organizations that might be interested in participating, and they

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<sup>6</sup> Adapted from a case study provided by Integrating Medicine in Public Health (IMAP) Program Institute for Health and Aging, University of California, San Francisco, Medicine and Public Health Section, California Department of Public Services.

received eight suggestions. The committee started with 9 members: the two co-chairs, a parent of a child with asthma who was on the PTA, a nurse from the hospital ER, a family practitioner (who, while he gave written material and information to the committee, never made it to one of the meetings), the MCH Director, a health educator from one of the local health plans, a school nurse and a resident of public housing in one of the communities where prevalence rates of asthma were the highest in the county.

The AWG met and reviewed the findings from the community assessment and a literature review done by a student interning with the MCH program. The review identified the following risk factors for children who develop asthma or who have frequent asthma attacks:

- A history of exposure to allergens that trigger asthma symptoms such as house dust mites, cockroaches, animal dander, and mold
- A history of exposure to environmental conditions that trigger asthma symptoms such as tobacco smoke, air pollution (ozone, sulfur dioxide and particulate matter), and poor housing conditions
- Have limited or no health insurance
- Are of African American or Hispanic descent
- Live below the poverty line
- Were breastfed less than three months
- Have had few siblings and less pre-school exposure to allergens

Literature revealed that children with an asthma diagnosis without primary care providers were three times as likely to visit the ER with asthma attacks and missed four times the number of school days as those with a primary care provider. The literature review also showed that there was no treatment that would cure asthma; but that the use of national treatment protocols by physicians was associated with a statistically significant decrease in asthma attacks, ER visits and hospitalizations for asthma. However, reports also showed that not many children are treated according to the national guidelines for asthma care. Four of the five parents on the AWG who had children with asthma said that their children did not have written treatment plans – one component of the guidelines.

The AWG had the benefit of staff support. Staff provided an overview of a method for conducting a problem analysis. Agreeing this method would be useful, the group brainstormed the risks, contributors and consequences of the child asthma problem in their community. Using a problem analysis diagram they were able to identify areas where more information was needed as well as to begin their discussion about possible interventions.

To determine which of the factors identified in the literature were present in their community, the AWG asked staff to review emergency room visit and hospital admissions data to characterize the population of children who received asthma-related care at the hospital and local emergency department over the past year. The staff report showed that the majority of these children were African American or Hispanic, lacked health insurance or were insured by Medicaid

(MediCal) and, based on zip code data, many of them were living in an area of the community with crowded and poor housing conditions. A review of a randomly selected subset of these children's medical records revealed that almost 80% of children who had been seen in the ER over the past 6 months had never been given an asthma action plan by their physician, 75% of children were not taking the proper medications at the time of their asthma attack, only 20% had ever been tested for allergens, and half of the Hispanic families had difficulty understanding English. They also noted that a disproportionate number of visits occurred over the weekend.

The AWG decided that they wanted the benefit of additional representation from "stakeholders." They conducted a targeted outreach and invitation to "stakeholders" who represented the clinical, public health, patient/family, and community perspective of asthma in children. This expanded AWG met once in a half-day community forum and participants were sent materials for review and comment during the remainder of the planning process. Participants in the forum included health care providers from the hospital and other health care sites across the community (school nurse, pharmacies, clinics, the home health provider, etc.), nurses and health educators, children/families with asthma, social workers, educators, including two school principals, representatives from ethnic groups, neighborhood groups (active in advocating for positive environmental and housing issues)

The AWG also asked staff to convene several focus groups with parents and community members. The purpose of these focus groups was to further identify and explore the barriers and opportunities related to asthma as perceived by members of the local community. Focus groups were held in an elementary school, a middle school, and a high school; at a meeting of the Chamber of Commerce; at two churches after child-related activities; at the Head Start day care center, and at a local branch library. A focus group meeting at the local health department was considered, but there was no special asthma clinic day, so the meeting was not held..

Focus group participants identified the following barriers related to asthma management:

- A lack of knowledge in case of parents and caretakers regarding the diagnosis and management of asthma
- A lack of access to a consistent source of health care
- Parents of the children seen in the ER whose children did not have insurance or had MediCal had difficulty getting follow - up appointments for the child
- Schools had policy and practical barriers to the use of medicines by students
- Children who used inhalers were teased
- Children did not have written treatment plans
- Parents had a fear of steroids and having their children on steroids
- Many parents lacked the financial resources necessary to improve their living conditions (decreasing exposure to allergens)

The AWG worked to understand the key intervention points and causal pathways. They reviewed their earlier drafts of the problem analysis diagram. One example of such a review is as follows:

It was found that one of the common causal pathways that led to repeat ER visits and hospitalizations was related to children not taking the correct medications to control their asthma. (See the case study **Diagram 2. Causal Pathway: School Aged Children with Asthma.**) In this case, the causal pathway began with the health care provider not adhering to national asthma practice guidelines and, therefore, not giving a proper asthma management plan to the patient. In this situation, the child was not able to take (or be given by his parents) his medications in such a way that he was able to control his asthma symptoms at home.

Many studies have shown that when health care providers comply with the national asthma guidelines (provide the patients with an asthma action plan and proper medical therapy) most children's asthma attacks can be controlled without going to the emergency room.

In determining which pathways to focus on, they relied on the literature to identify the relative contributions of the various precursors. They refined their work and identified what they considered to be the key intervention points and causal pathways in their community.

Based on this analysis, the group decided that they would focus on identifying interventions that improved the education of health care providers related to the diagnosis and management of asthma. Several times a study found in the literature identified a strategy not previously considered. Several members, together with staff, contacted programs in other communities successfully intervening with health care providers and families to reduce child asthma attacks to learn about these successful programs. They used resources and literature to identify effective strategies that addressed intervention points and pathways they had selected for intervention. Staff summarized the thinking of the AWG that through education of providers in the use of treatment plans there would be an increase in the knowledge level of parents and an improvement in the number of children taking appropriate medications resulting in fewer asthma attacks and fewer ER visits (their theory of change).

Diagram 2. Causal Pathway: School-Aged Children with Asthma

