Chapter 11 Identifying and Ranking Community Risk Factors

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11.0 Introduction

As introduced in Chapter 10, there are a number of environmental risk factors that may exist in any community. Some risk factors are relatively common (e.g., smoking, chemicals in consumer products, pesticides for house and yard use), while others are found less frequently (e.g., an abandoned hazardous waste site). The number and types of people potentially impacted as well as the type of adverse impacts they may experience from these risk factors also can vary significantly. Likewise, the number, type, and potential importance of community vulnerabilities can also widely vary from place to place.

This chapter provides an introduction to collecting and summarizing information on community risk factors, potential impacts, and vulnerabilities (Step 6). The chapter concludes with a discussion of some of the tools and techniques commonly used to evaluate and rank these identified concerns and how to select priority issues for community action from the list of ranked concerns (Step 7). This set of community priority issues of concern will be carried forward to the next step of the process (described in Chapter 12) in which risk reduction options are evaluated and specific risk reduction projects selected, implemented, and evaluated over time.

Note that there will be uncertainties associated with both the data the partnership team collects about the risk factors, potential impacts, and vulnerabilities in the community as well as assessing what those data may mean. A discussion of some ways to assess uncertainty inherent in the assessment process is provided below and some ways to fill important data gaps is provided in Chapter 12.

11.1 STEP 6 - Collect and Summarize Available Information and Identify Information Gaps

STEP 6
Collect & Summarize Available Information - Identify Data Gaps

In this step of the process, the partnership will gather and evaluate existing information on the risk factors, potential impacts, and vulnerabilities identified during Steps 2 and 3. This information will be used in the next step (Step 7) to help identify the risk factors that may have the greatest potential to affect the health of the community or its environment.

To estimate the magnitude of each of the identified environmental, health, and socioeconomic issues, the partnership should collect all available information on risk factors, observed impacts, potential risks posed by the risk factors, and vulnerabilities. Some sources of information include:

- Members of the partnership, especially those directly affected by a risk factor;
- Databases with information on the amounts and sources of releases of pollutants to the community's environment;
- Information on levels of chemicals measured in the environment;
- Formal studies of risk in the community, if they are available;
- Studies done to estimate the risk for similar communities;
- Studies done to estimate the health and vulnerability of the community; and
- National studies of risk.

Residents of the community, local businesses, and local doctors and public health staff can help locate and collect available information. Government and university staffs can identify any existing studies of the community and of similar communities. The partnership will require the participation of all of its members to complete this part of the process. Further information on collecting and summarizing this type of information is discussed below.

If there is not enough information available to estimate the level of concern resulting from a risk factor, the partnership may either use its best judgement to evaluate a risk factor or it could highlight the risk factor as an item needing additional data. (Keep in mind that using judgment in lieu of actual data will usually increase the uncertainty of the overall assessment's conclusions.) For example, if there are a significant number of older homes in the community (a potential source of lead exposure from lead-containing paint), the partnership team might go ahead and identify the potential concern from lead paint as relatively high based on very limited data. Their rationale might be that:

- Lead paint in older homes is a known environmental threat (see http://www.epa.gov/lead);
- The community is primarily made up of older homes (thus, there is the potential for a large number of people exposed to lead); and
- It is believed that many of these homes are occupied by children who are likely to have inadequate access to quality healthcare, including routine screening for lead exposure (a vulnerability).

In contrast, they might decide to identify this risk factor as a data gap that needs more information (e.g., number and age of homes potentially affected, number of children in the homes, results of community blood lead testing) before a decision can be made about potential action (see Step 9 - filling information gaps).

Indeed, partnership teams are likely to identify several areas of concern where they will not have the needed information to adequately evaluate the risk factors, the potential impacts, or the presence and influence of vulnerabilities. In such cases, identifying the information gaps and developing a plan to fill them is an essential part of the overall process. Depending on the circumstances, these data gaps may even be identified as a high priority for taking action (i.e., to fill the gaps as quickly as possible).

The CARE Resource Guide
Understanding the Risks in Your Community

As introduced in Chapter 10 of this volume, the Community Action for a Renewed Environment (CARE) program (http://www.epa.gov/care/) has developed a Resource Guide to help communities go through the multi-step process of assessing and addressing risk factors in their community.

Part II of the Resource Guide (Understanding the Risks in Your Community) is particularly helpful for identifying information on the various types of risk factors, potential impacts, and vulnerabilities that may be present in the community.

11.1.1 What Existing Data Are Available on Community Risk Factors, Potential Impacts, and Vulnerabilities?

In order to evaluate the importance of the various risk factors, potential impacts, and the role of community vulnerabilities, the partnership team will first need to collect all relevant and readily available information on all of these issues. This will include information from members of the partnership team and information from the larger community, especially those directly potentially affected by a given risk factor. Information on risk factors, potential impacts, and vulnerabilities could come from existing studies done in the community, studies done in other similar communities, national studies, or a wide array of other data sources.

When researching information about community risk factors, potential impacts, and vulnerabilities, the stakeholder group will benefit from engaging both average citizens and organizations with expertise in the area of environmental and public health assessment and management. Government agencies such as the local health department, local and state environmental agencies, and EPA Regional offices are particularly helpful resources for identifying and evaluating existing information since they work with these issues on a day-to-day basis and are also the institutions who collect and maintain much of the important data on the community. Other groups, such as universities and environmental non-profit organizations may also be able to help identify important data.

"Environmental Media" What Does That Mean?

In its simplest sense, an "environmental medium" is a naturally occurring material such as soil, sediment, air, surface water, or ground water. When human activities result in the release of a pollutant to the environment, the resulting mixture of environmental medium plus pollutant is commonly referred to as a "contaminated environmental medium" or simply a contaminated medium.

As the partnership team goes about collecting information, it will commonly find (particularly when the data come from government agencies such as EPA) that data can be located according to the structure of the agency. For example, environmental information is often organized by *environmental medium* (see adjacent text box) with the different offices within an environmental agency overseeing (and maintaining) the data for each medium (e.g., data about contaminated air will generally be collected and maintained by an environmental agency's "Air Program," data on water contamination will be maintained by an agency's "Water Program," etc.).

Finding Information on Community Risk Factors, Impacts, and Vulnerabilities

Many of the websites and other resources presented in Section 11.1.1 provide access to information about community environmental risk factors and their potential impacts. For example, many EPA Offices provide citizen-oriented information on their websites about common risk factors found in and around the home. The National Library of Medicine's Tox Town (Exhibit 11-1) allows users to navigate around a typical town to see the common types of chemical hazards communities face. Potential impacts are also usually straightforward to find. For example, the Census Bureau provides access to information on the number and types of people living in specific geographic area. However, gathering information on community vulnerabilities (e.g., poverty, crime, access to health care) may be a more difficult task, and in some cases, the data may not be available for a specific community.

EPA has created the Environmental Justice Graphic Assessment Tool (see text below) to help map out a variety of these types of community related data (e.g., number and location of people living below the poverty line). However, this tool may not provide a full picture about all the potential issues in a given place. Particularly with respect to community vulnerability, other information sources such as the local public health departments, local land use planning organizations, and community surveys may need to be relied on to help identify and quantify potential community vulnerabilities.

While the concept is straightforward, the nuances of organizational structure and data management can be complex and accessing data specific to a community can take some time and effort (particularly since some data are not readily accessible through the internet). This is one of the reasons why the partnership team will benefit from the participation of environmental and health professionals who understand the structure of key agencies and how/where those agencies maintain their data.

To help partnership teams navigate the wide variety of available information sources, the following sections provide basic information on some of the key federal, state, and local organizations which may have information relevant to the community-based risk reduction effort.

11.1.1.1 The Overall Federal Information Gateway - FirstGov

A useful starting point for finding information maintained by the federal government on a given community is the FirstGov internet site (http://www.USA.gov/). FirstGov is the official U.S. gateway to government information that transcends the traditional boundaries of separate government agencies. Specifically, FirstGov has a powerful search engine and ever-growing collection of topical and customer-focused links that can connect citizens to millions of web pages from the federal government, state, tribal, and local governments, and foreign nations.

11.1.1.2 U.S. Environmental Protection Agency

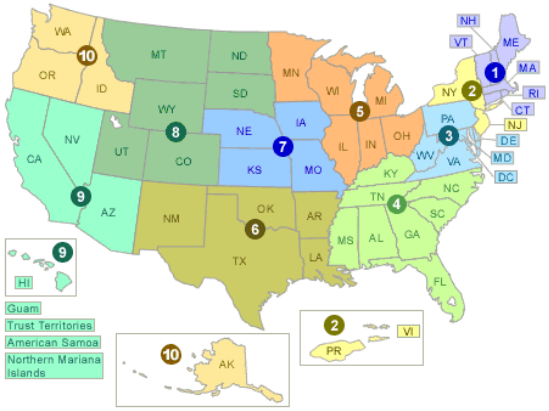
The U.S. EPA (http://www.epa.gov/) is one of the main federal agencies tasked with protecting the environment. The Agency does this by implementing a number of federal laws such as the Clean Air Act, the Clean Water Act, and the Superfund and waste management laws. EPA is also involved in a number of voluntary efforts to help communities achieve a healthy and sustainable environment. EPA will generally be one of the key information sources that the partnership team will use to identify information about risk factors in their air, water, land, and waste.

EPA maintains a vast array of data and tools that can be used in a community-based risk reduction program. In order to help citizens access and use this information effectively and efficiently, the Agency has developed several internet-based gateways and other tools to help in the navigation of EPA resources. Several important internet-based tools include:

How Do I Contact EPA?

EPA is a large organization that oversees a variety of laws, programs, and research. Partnership teams that want to work with EPA are encouraged to begin by contacting the EPA Regional Office that includes their state.

Information on how EPA is organized can be found at http://www.epa.gov/epahome/aboutepa.htm. The location, organization, and contact information for EPA Regional offices can be found at http://www.epa.gov/epahome/locate2.htm.



- **EnivroFacts** (http://www.epa.gov/enviro/)
  This website provides access to several EPA databases that provide information about environmental activities that may affect air, water, and land anywhere in the United States. Partnership teams can also use EnviroFacts to generate maps of environmental information.

- **EnviroMapper** (http://www.epa.gov/enviro/html/em/)
  EnviroMapper is a powerful tool used to map various types of environmental information, including air releases, drinking water, toxic releases, hazardous wastes, water discharge permits, and Superfund sites. Users can select a geographic area within EnviroMapper and view the different facilities that are present within that area. EnviroMapper can be used to create maps at the national, state, and county levels, and link them to environmental text reports. Users can even insert dynamically created maps in their own webpages.

- **Window to My Environment** (http://www.epa.gov/enviro/wme/)
  Window To My Environment (WME) is a powerful web-based tool that provides a wide range of federal, state, and local information about environmental conditions and features in a specific area. This internet tool is provided by EPA in partnership with federal, state and local government and other organizations.

- **The CARE Resource Guide**
  (http://www.epa.gov/care/)
  As noted in Chapter 10, the CARE program has developed this resource guide to help anyone interested in working with communities to evaluate and reduce environmental risk. The Resource Guide enables stakeholder groups to find on-line resources that can help their community through every step of the risk evaluation and risk reduction process.

- **Environmental Justice (EJ) Graphic Assessment Tool** (http://www.epa.gov/enviro/ej/)
  EPA's EJ Graphic Assessment Tool can be used to map EPA environmental data in relation to available demographic data (e.g., population density, percent minority population).

For partnership teams new to EPA databases and tools, the gateways and tools listed above are a good place to start to find general information. As needs increase for more in-depth information, access to the databases and tools that underlie these gateways and tools will be important.

For example, the gateway resources use data from a number of environmental databases managed by EPA, such as the National Contaminant Occurrence Database (NCOD), which contains information about contaminants in drinking water supplies, and the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), which contains information about Superfund sites. If the data provided through the gateway is not at the level of detail necessary, internet users can usually access more in-depth data directly from the individual databases. A list of many of EPA's databases and software is available at http://www.epa.gov/epahome/data.html.

11.1.1.3 The Agency for Toxic Substances and Disease Registry (ATSDR)

ATSDR (http://www.atsdr.cdc.gov/about.html) is an agency of the U.S. Department of Health and Human Services. Its mission is to serve the public by taking public health actions and providing health information to prevent harmful exposures and disease related to toxic substances. ATSDR is directed by Congressional mandate to perform specific functions concerning the effect on public health of hazardous substances in the environment. These functions include public health assessments of waste sites, health consultations concerning specific hazardous substances, health surveillance and registries, response to emergency releases of hazardous substances, applied research in support of public health assessments, information development and dissemination, and education and training concerning hazardous substances.

ATSDR also has published more than 250 draft or final toxicological profiles for hazardous substances found at Superfund sites. Toxicological profiles provide chemical-specific information on health effects, physical and chemical properties, production, use, and disposal. Toxicological profiles generally summarize available information about the levels of a substance monitored or estimated in the environment, general population and occupational exposure, and populations with potentially high exposure. (The Toxicological Profiles can be accessed at http://www.atsdr.cdc.gov/toxpro2.html.)

ATSDR has published numerous studies on various public health risk factors, including exposure to lead, asbestos, radon gas, and others. These publications include national-level exposure studies, as well as local or regional exposure assessments and case studies. Partnership

teams may be able to use this information to obtain data or methods useful for assessing risk in their particular community.

For example, ATSDR is required by the Superfund law to conduct public health assessments (PHAs) of all Superfund sites. ATSDR's PHAs evaluate information on the release of hazardous substances into the environment in order to assess the impact on public health, to develop health advisories or other recommendations, and to identify studies or actions needed to evaluate and mitigate or prevent human health effects. PHAs evaluate three primary types of information: environmental data, community health concerns, and health outcome data (See ATRA Volume 1, Chapter 30). If a health assessment has already been done in the community, this might provide excellent background information for the community risk reduction effort (for a list of PHAs, see http://www.atsdr.cdc.gov/HAC/PHA/). More information on ATSDR's community support activities and resources is available at http://www.atsdr.cdc.gov/COM/commhome.html.

11.1.1.4 National Center for Environmental Health (NCEH)

The National Center for Environmental Health (NCEH) is part of the Centers for Disease Control and Prevention (http://www.cdc.gov/nceh/). NCEH plans, directs, and coordinates a national program to maintain and improve the health of the American people by promoting a healthy environment and by preventing premature death and avoidable illness and disability caused by non-infectious, non-occupational environmental and related factors. For example, NCEH provides data on:

- Air pollution;
- Healthy places;
- Asthma;
- Cancer clusters;
- Weather (extreme cold and heat, hurricanes, tornados, floods);
- Harmful algal blooms;
- Lead poisoning;
- Mold;
- Noise; and
- Tracking environmental public health.

11.1.1.5 National Institute of Environmental Health Sciences (NIEHS)

The mission of the National Institute of Environmental Health Sciences (NIEHS; http://www.niehs.nih.gov/external/welcome.htm) is to reduce the burden of human illness and dysfunction from environmental causes by understanding each of these elements and how they interrelate. The NIEHS achieves its mission through multidisciplinary biomedical research programs, prevention and intervention efforts, and communication strategies that encompass training, education, technology transfer, and community outreach.

NIEHS also publishes the peer-reviewed journal Environmental Health Perspectives (EHP), an important vehicle for the dissemination of environmental health information and research findings. EHP's mission is to serve as a forum for the discussion of the interrelationships between the environment and human health by publishing in a balanced and objective manner the best peer-reviewed research and most current and credible news of the field. This journal,

which is available for free online (http://ehp.niehs.nih.gov/), may be of interest to those conducting community-scale assessments.

11.1.1.6 United States Geological Survey (USGS)

The U.S. Geological Survey (USGS; www.usgs.gov) is the nation's largest water, earth, and biological science and civilian mapping agency. USGS collects, monitors, analyzes, and provides scientific understanding about natural resource conditions, issues, and problems. The diversity of their scientific expertise enables the Survey to carry out large-scale, multi-disciplinary investigations and provide impartial scientific information to resource managers, planners, and other customers. Some of their many products include:

- **USGS Library.** Access to over 300,000 book, map, and serial records in the U.S. Geological Survey Library online catalog. Includes information on library borrowing policies, locations, and a link to ASK-A-LIBRARIAN, an electronic reference service.

- **USGS Store.** Purchase USGS published products (including maps, books, and general interest publications), as well as products of other agencies that are available from the USGS.

- **Publications Warehouse.** Search 60,000 bibliographic citations and obtain USGS series publications. Availability of content ranges from USGS Store purchase, to full text, to bibliographic citation only.

- **Biological Information on the Web – The National Biological Information Infrastructure.** The National Biological Information Infrastructure (NBII) is an electronic gateway to biological data and information developed and maintained by the USGS and other NBII partners and contributors in government agencies, academic institutions, non-government organizations, and private industry.

- **Geologic Information.** National Clearinghouse for geologic maps, datasets, and related geoscience information. Includes links to major USGS geoscience databases and programs as well as resources for creating digital geologic maps.

- **National Water Data – NWISWeb.** NWISWeb provides a comprehensive gateway to water-resources data collected at approximately 1.5 million sites in all 50 states, the District of Columbia, and Puerto Rico.

- **The National Map.** The Nation's Topographic Map for the 21st Century – Access to high-quality, geospatial data and information from the USGS as well as federal, state, and local partners.

- **National Atlas of the United States.®** Explore or download a comprehensive collection of small scale geospatial data from federal agencies.

- **Geodata.gov – Geospatial-One-Stop.** Web-based portal for one-stop access to maps, data, and other geospatial services from across all levels of government, including the USGS. Geodata.gov is a component of the National Spatial Data Infrastructure.

Other offerings from the Survey include:

- **Research.** Researchers can also locate, view, download, or order scientific and technical articles and reports as well as general interest publications such as booklets, fact sheets, pamphlets, and posters resulting from the research performed by USGS scientists and partners.

- **Map Information.** Learn about, locate, view, download, or order topographic, geologic, and other special purpose maps and charts in a variety of printed and digital formats.

- **General Aerial Photograph Information.** Locate, view, download, or order photographs showing such features as landforms, vegetation cover, and other natural and man-made features and phenomena.

- **Digital Satellite Data.** Locate, view, download, or order global land remote sensing data derived from a variety of air- and satellite-borne sensors, including Landsat satellite imagery and data from the Advanced Very High Resolution Radiometer carried aboard National Oceanic Atmospheric Administration's polar orbiting weather satellites.

- **Digital Data Sets.** Locate and download or order a vast array of biologic, geographic, geologic, and hydrologic scientific data collected or created by USGS scientists and partners.

- **Scientific Software.** Public-domain software developed by USGS scientists and partners to support a wide variety of natural science research and mapping activities.

- **Real-Time Monitoring and Data.** Measurements of natural phenomena such as earthquakes and floods collected, distributed, and displayed for immediate analysis following their occurrence as well as “live” scientific monitoring via video technology.

- **Graphics, Photograph, and Video Collections.** Collections of photographs and other visual media, most copyright-free, derived from the work of USGS scientists and partners.

11.1.1.7 United States Census Bureau

The Census Bureau (www.census.gov) is the main source of information on demographics in the United States. The Bureau also provides a range of economic information. The data and tools provided by the Bureau are particularly useful for communities trying to understand the relationship between risk factors and the people who live and work in an area. Some of the many community-relevant tools provided by the Bureau include:

- **The American FactFinder** - This interactive application supports the Economic Census, the American Community Survey, the 1990 Census, Census 2000 and the latest Population Estimates;

- **Censtats** - Applications available include: Census Tract Street Locator, County Business Patterns, Zip Business Patterns, International Trade Data, and more;

- **QuickFacts** - State and County QuickFacts provides frequently requested Census Bureau information at the national, state, county, and city level;

- **Online Mapping Tools** - Using TIGER and the American FactFinder;

- **US Gazetteer** - Place name and ZIP code search engine; and

- **DataFerrett** is a tool and data librarian that searches and retrieves data across federal, state, and local surveys, executes customized variable recoding, creates complex tabulations and business graphics. Current Population Survey, Survey of Income and Program Participation, American Community Survey, American Housing Survey, Small Area Income Poverty Estimates, Population Estimates, Economic Census Areawide Statistics, National Center for Health Statistics data, Centers for Disease Control data, and more.

11.1.1.8 State, Local, and Tribal (SLT) Agency Data

SLT government agencies may be able to provide public health, environmental quality, or other data that go beyond what is available from EPA and other federal agencies and it is usually a good idea to evaluate both federal government and more locally developed data sources to help capture all relevant information. For example, a SLT may collect one level of required information for transmission to the federal government, while at the same time developing more in-depth information for its own purposes. In addition, local government agencies (usually at the county or city level) are often a source of information about community concerns that may not be required by state or federal governments (e.g., odors, noise). In addition, local authorities usually have unique knowledge about the community that cannot be found in any organization's database of information.

Depending on the circumstances, the agency with responsibility for a particular issue (e.g., hazardous waste) may reside with the state or tribe's environmental agency or some other institution such as a health department. FirstGov (www.USA.gov - see Section 11.2.1 above) provides convenient links to state government internet sites. In addition, EPA provides links to state environmental agencies (http://www.epa.gov/epahome/state.htm).

11.1.1.9 Epidemiological and Other Medical Studies

Health information may be available from cancer or other disease registries, public health assessments, or other public health, medical, or epidemiological surveys or studies of the local community. Sources of such data include the local public health department, federal government agencies, state health departments, Indian Health Service, academic researchers, or the medical community, such as local hospitals. (See Section 11.1.1.3 above for examples this type of information collected by ATSDR.)

11.1.1.10 The National Library of Medicine

The National Library of Medicine (NLM; http://www.nlm.nih.gov/), on the campus of the National Institutes of Health (NIH) in Bethesda, Maryland, is the world's largest medical library. The Library collects materials in all areas of biomedicine and health care, as well as works on biomedical aspects of technology, the humanities, and the physical, life, and social sciences.

The collections stand at more than 7 million items – books, journals, technical reports, manuscripts, microfilms, photographs and images. For partnership teams, the library has a wealth of relevant information that can be accessed easily through the internet. A particularly useful tool is called "ToxTown" which provides users with an interactive town or city with links to the types of hazards they might find there (see Exhibit 11-1). Other example relevant collections include:

- MedlinePlus is the National Library of Medicine's web site for consumer health information (http://medlineplus.gov/). MedlinePlus is also available in Spanish (http://medlineplus.gov/esp/). Information in MedlinePlus includes:

  - Health topics pages link to health information from NIH and other authoritative sources and also include a MEDLINE/PubMed® search, current news items about the topic, and links to related topics;
  - Medical Encyclopedia - an extensive library of medical images as well as 4,000 articles about diseases, tests, symptoms, injuries, and surgeries;
  - Interactive Health Tutorials - programs that use animated graphics and sound to explain conditions and procedures in easy-to-read language;
  - Current Health News - late-breaking stories about medicine and health;
  - Dictionary - spellings and definitions of medical terms;
  - Directories - locations and credentials of doctors, dentists and hospitals; and
  - Other Resources include:

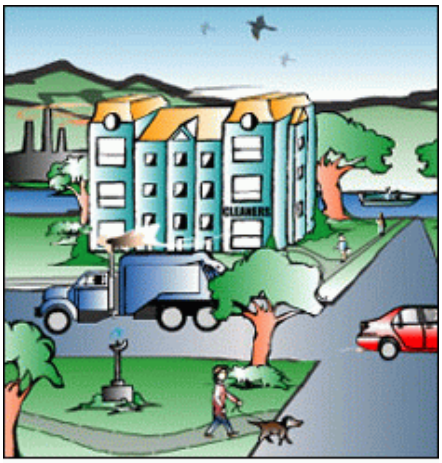
    ✓ Organizations - a collection of organizations providing health information;
    ✓ Libraries - consumer health libraries providing services to local residents; and
    ✓ Databases - resources beyond MedlinePlus covering special topics and collections.

- MEDLINE - access to millions of articles published in biomedical journals, including special collections of easy-to-read materials, low vision resources, and health check tools.

11.1.1.11 Information Provided by the Community

The people who live in the community are often the best source of information. Even though the partnership team will have community representatives, not all community members are likely to be involved in the day-to-day work of the effort. As such, the partnership team may wish to hold informational meetings or use other techniques to solicit concerns and information from citizens and other local stakeholders. In addition to obtaining important information, this will also help to build trust in the process and buy-in to the selected risk reduction efforts.

Exhibit 11-1. The NLM's Tox Town



The National Library's **Tox Town** (http://toxtown.nlm.nih.gov/index_content.html#) is designed to give you information on:

- Everyday locations where you might find toxic chemicals;
- Non-technical descriptions of chemicals;
- Links to selected, authoritative chemical information on the internet;
- How the environment can impact human health; and
- Internet resources on environmental health topics.

Tox Town uses color, graphics, sounds and animation to add interest to learning about connections between chemicals, the environment, and the public's health. Tox Town's target audience is students above elementary-school level, educators, and the general public. It is a companion to the extensive information in the TOXNET (http://toxnet.nlm.nih.gov/) collection of databases that are typically used by toxicologists and health professionals.

Users can explore Tox Town by selecting Neighborhoods, Location links or Chemical links (Chemicals are described in non-technical language supplemented with internet links about a chemical and its possible impact on human health). The City, the Town, or the US-Mexico Border neighborhoods give an overview of environmental health concerns in those settings. The website gives selected internet resources about a location's environment and possible effects on human health. Toxic chemicals that might be found in a location are also listed. Some buildings display an interior view.

Tox Town also offers some resources in Spanish (http://toxtown.nlm.nih.gov/espanol/), and has a text version (http://toxtown.nlm.nih.gov/text_version/index.html).

11.1.2 Summarizing the Information Collected in Step 6

During Step 6, the partnership team has collected information about the community's identified risk factors, potentially impacted people and environmental resources, the potential adverse outcomes of exposure to the risk factors, and vulnerabilities that may further influence how the community may respond to the exposures. At this point it is a good idea to summarize all this information in a table, along with any other relevant information that has been developed during the information development process. (This is an expansion and refinement of the initial risk factor table shown in Exhibit 10-7.)

For example, consider the following summary table (Exhibit 11-2) in which the partnership team identified four community risk factors along with information about the potential number of people exposed to the risk factors, the types of adverse outcomes (some health, some quality of life) that may occur because of the exposure, and the key information sources where they got this information. They also noted some of the data gaps that they found along the way. Providing a summary of what they have found so far will be helpful when they go to the next step of the process – identifying community priorities.

11.2 STEP 7 - Identify Priorities

STEP 7
Identify Priorities

Once the partnership team has identified and summarized existing information on risk factors, potential impacts, community vulnerabilities, and other relevant information (e.g., quantitative estimates of risk), they will need to combine all this information in some way to rank the risk factors from most concern to least concern. If for no other reason, the ranking is necessary since resource considerations will likely constrain the partnership from selecting all identified risk factors as priorities for action.[a]

The discussion in this section provides information on some of the ways that partnership teams can use rank the identified risk factors. The chapter concludes with a discussion about how to select specific risk factors from the ranked list as targets for potential risk reduction projects.

Gathering Information for Identifying Priorities

In conducting analyses on data collected for priority-setting, the team should incorporate a "bias for action" (as described in Chapter 10). As feasible, existing data and the knowledge of the participants should be leveraged so that the analyses can be completed in a short time frame. This will allow a relatively quick identification of priorities that everyone can agree on as well as actions that can be taken to reduce risks and impacts. Once additional information has been gathered, later efforts can be organized to fill any significant gaps and other needs that are identified.

[a] In rare cases, the partnership may be interested in considering the availability, feasibility and acceptability of risk reduction measures for all of the risk factors they have identified.

Exhibit 11-2. Example Summary Data for Identified Community Risk Factors				
Identified Risk Factor	**Location/ Prevalence**	**Potential Adverse Outcomes (e.g., Negative Health Impacts)**	**Vulnerabilities**	**Information Sources (Gaps in Information)**
Breathing on- and off-road diesel particulates (Risk to human health)	Potentially affects all members of community High exposure along truck routes Elderly, children, and asthmatics especially impacted	Impacts respiratory and cardiac function, carcinogenic outcomes	Inadequate access to health care Proximity to pollution sources (Proximity to roadways) Community populations of children and the elderly	Evaluated national studies of similar exposures and resulting health outcomes Number and types of people exposed from Census Bureau Limited survey of community about access to adequate health care (Need more detailed information on local truck traffic)
Drinking contaminated water from community wells (contamination due to abandoned waste site) (Risk to human health)	Potentially affects 50 households on private well water; ~25 children; <5 elderly	Contaminants cause both cancer and noncancer health effects	Inadequate access to health care Proximity to multiple pollution sources (populations potentially exposed to contaminated wells also exposed to adjacent industrial complex emissions) Contaminants cause both cancer and noncancer health effects	Identified this risk factor based on perceived threat to neighbors of a nearby waste site Surveyed these residents about their access to adequate health care (Insufficient monitoring data available on well water)
Exposure of children to lead in water, paint, and soil (Risk to human health)	Potentially affects most households in the community (80% of homes built before 1970)	Causes neurological problems in children	Inadequate access to health care and blood lead screening Neurological effects on fetus, infants, and children	Based on limited childhood blood level data; national studies of similar exposure conditions Number and type of people potentially exposed from census data, local housing authority, and state environmental hazardous sites clean-up program (No household sampling of contaminated media; no blood lead data available)
Odor from wastewater treatment plant (Affects quality of life)	Potentially affects all members of community	Emotional stress Reduced recreational opportunities Reduced property values	Emotional stress	Community complaints No identified information on potential health impacts

But What About Quantitative Information on Risk?

Up to this point, the partnership team has gathered information on the presence of environmental risk factors in its area, the people and ecological systems potentially impacted by the factors, the negative outcomes that can result from contact with the risk factors, and community vulnerabilities. But what about taking this information to the next step by developing quantitative estimates of actual risk posed by the factors? Shouldn't that also be an important piece of information to be included in the overall ranking process?

The answer is yes it can be, but depending on the needs, desires, and resources of the partnership team, it may or may not actually be done (e.g., resource considerations, available data, access to needed expertise, a desire to "move ahead" rather than have "analysis paralysis," etc. may lead the partnership team to base its ranking on readily available information and to avoid the development of quantitative risk estimates).

If the partnership team wants to develop quantitative estimates of risk as a way of further informing the ranking process, it will likely need to seek out experts in the field of risk assessment (EPA, state, tribal, and local public health and environmental agencies, and local universities can usually provide this aid). For example, consider a partnership team that has identified the risk factor "Chemical X in the air we breathe" as a potential problem in the community. From their evaluation of readily available data, they were able to find:

- There is a monitor located in the community, the data from which can be used to estimate the long-term average concentration of the cancer causing Chemical X in the air;
- From the Census Bureau, it is able to estimate how many people are potentially exposed to Chemical X, and;
- There is readily available, peer reviewed data that establishes how toxic (i.e., how potent) Chemical X is in its ability to cause cancer through inhalation.

Using this information, they decide to develop an estimate of the potential for the exposed population to develop cancer over time based on an assumption of continuous (24 hours per day, 7 days a week) inhalation exposure over a lifetime to Chemical X at the monitored concentration. The team does this by using the following equation:

Cancer Risk = [X] ÷ IUR

Where the cancer risk is a statistical probability of developing cancer (because of exposure to Chemical X) over a lifetime of exposure by inhaling the chemical in air, [X] is the concentration of Chemical X in the air at the point of exposure (in micrograms of Chemical X per cubic meter of air or ug/m^3), and IUR is the upper bound estimate of the inhalation unit risk, a number that mathematically represents how potent Chemical X is at causing cancer [IUR is given in units of $(ug/m^3)^{-1}$].

The partnership team may or may not be able to develop such analyses for all the identified risk factors in its community (e.g., it would likely not be able to develop an estimate of the likelihood a person would develop "emotional stress" from a nuisance odor and the ranking for this factor might have to rely more on anecdotal information from community residents). Ultimately, the ranking process will likely have to rely on a variety of different types of data for the different risk factors that are not perfectly matched in either the type or quality (i.e., comparing one risk factor to another is not always an "apples to apples" comparison). A discussion of the various techniques that partnership teams can use to deal with this issue is provided in the next section.

11.2.1 Methods for Evaluating and Ranking Community Concerns

As introduced in Chapter 10, partnership teams will commonly use a *Comparative Risk Assessment* or CRA process to help them compare risk factors to one another and to rank them using a *common scale of concern* (e.g., by putting all risk factors on the same scale such as a numerical 1-10 scale of concern or a high/medium/low scale of concern).

Keep in mind that the data gathered or developed about individual factors in Step 6 may be more or less fact-based whereas the ranking process discussed here will likely rely to a greater degree on the distinctive characteristics of the partnership team. For example, the team may have a strong quantitative analysis of the potential risks posed by a given risk factor, but during the ranking process, the relative level of concern developed for that factor may be influenced by team members' values, feelings, and experience with the factor. As such, the results of a CRA in one community may be different from the results of a CRA in another community for a similar set of circumstances.

What Exactly Are We Ranking in Step 7?

In Step 7, we are ranking the community's identified risk factors from highest concern to lowest concern using a common scale. For example, on a scale of one to ten (with ten being "most concern" and one being "least concern"), pesticide exposure in homes might be scored as a "higher concern" issue than, say, exposure to lead paint in older homes.*

In this approach, the partnership will use all of the information it gathered in Step 6 (information on the risk factors, the potential impacted populations, the potential adverse effects,
community vulnerabilites, quantitative estimates of risk, etc.) to develop the final ranking.

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*The level of concern for an array of risk factors put into a "common scale of concern" can mask important information such as the probability of an individual developing cancer, the number of people living with a certain level of noncancer hazard, or the level of stress experienced by an odor problem. As such, efforts should be made to use the common scale for its intended purpose and, when possible, to retain and communicate other important information to decision makers.

Once the CRA has been completed, the partnership team will have a sense of the relative concern (using the common scale adopted by the community) of the community risk factors. The process may also result in a list of data gaps that may need to be filled for the ranking effort to be completed.

Keep the Community Involved

During the process of gathering information on risk factors, potential impacts, and community vulnerabilities, the partnership team will have made efforts to keep the larger community involved. Likewise, residents of the community, local businesses, local doctors and public health staff, and others should also be engaged in the next step of the process – ranking the risk factors. Continued involvement by these stakeholders early on and throughout the process will help ensure success over the long run.

The following section discusses the general approach to using the CRA process to rank community risk factors. Readers should keep in mind that the CRA process is necessarily a flexible approach that will need to be adapted to local circumstances.

What About the Combined Impact of Multiple Risk Factors?

In addition to the information developed for each individual factor, the partnership team may also consider the cumulative level of concern posed by combining information on more than one risk factor together. For example, the combined potential impact from multiple risk factors that all result in the same adverse endpoint (e.g., all emission sources of chemicals that cause irritation of the respiratory tract) would provide useful information for setting priorities.

However, given the limits of science in this area, developing estimates of cumulative risk may be difficult (particularly when issues such as health status and vulnerabilities are folded into the evaluation). That having been said, once the information on known concerns has been collected, the partnership may, nevertheless, be able to develop at least a qualitative sense of the combined concerns affecting the community. One way to do this might be to develop a matrix displaying all the environmental risk factors along with the potentially affected community subgroups, the expected impacts, the health status of those affected, and other relevant vulnerabilities. The matrix would also point out the potential relationship (or lack of relationship) of the various risk factors to one another.

For example, the risk from breathing particulate matter in the air from a local industry may be compounded by particulate matter releases from local traffic as well as particulate matter releases from local use of wood burning fireplaces for heat. If everyone in the study area has the potential for simultaneous exposure to particulate matter from all three of these sources, it would be helpful for the partnership to recognize this potential for cumulative risks. This information can also help in determining the types of steps that will be needed to bring about meaningful change in the community as well as the level of effort and resources that will be needed to bring about that change. Similarly, the partnership should also attempt to look at the cumulative impacts of multiple chemicals being released from the same source. (In contrast, contaminated ground water affecting only a few households in one part of the community would not be considered in the cumulative risk analysis for other parts of the community.) A matrix format for displaying this type of information would essentially be an expanded and refined version of Exhibit 11-2.

As noted above, performing a scientifically sound cumulative analysis of risk (either quantitative estimates or more qualitative evaluations) is technically challenging and the scientific approaches for doing so are still developing. Partnership teams are encouraged to engage people who are knowledgeable in this area to help them as they work to develop an understanding of the potential cumulative risk issues in their community. Understanding issues such as the composition of complex mixtures released to the environment or the potential for different pollutants to result in the same health effect generally require the help of environmental engineers and toxicologists. More information on performing a cumulative risk assessment is provided on EPA's Cumulative Risk Assessment Program webpage (http://www.epa.gov/OSA/spc/2cumrisk.htm).

Comparative Risk Analysis

Comparative risk analysis (CRA) is a methodology to identify and address the issues of greatest environmental risks and provide a framework for prioritizing environmental problems. The results of a CRA can be used to provide a technical basis for targeting activities or managing priorities and resources. EPA's Comparative Risk Analysis Website (http://www.epa.gov/seahome/comprisk.html) contains the history and overall methodology of comparative risk, as well as several case studies and other information. Partnership teams are encouraged to download and run the comparative risk analysis tutorial provided on this webpage to help them further understand how risk ranking efforts are performed.

In addition, EPA's workbook called the *"Guidebook to Comparing Risks and Setting Environmental Priorities"* discusses the major technical and managerial issues inherent in comparative risk projects and explains the mechanics of conducting the risk analysis and risk management phases of a project (the *Guidebook* can be obtained from EPA's National Environmental Publications Information System at http://nepis.epa.gov/).

CRAs may have important limitations. For example, subjectivity is commonly needed to score and rank different kinds of risk. In addition, because the quality of data is likely to vary among risk factors, different risk scores may have varying levels of uncertainty. The initial ranking of risk factors using the CRA process should be performed, inasmuch as possible, without consideration of cost, technical feasibility of correcting the problem, or other non-health and safety issues. The reason for this is that the community will commonly consider that it is entitled to a transparent, health and safety-based ranking of risk factors even though some of those factors may not ultimately be selected for risk reduction projects (e.g., because of cost, technological impediments, or other reasons – see Chapter 12). Without this initial "health and safety-only" analysis, the entire effort may be seen by the community as arbitrary, skewed, or biased towards one or a few stakeholders' needs. This can lead to community apathy and an unwillingness to accept the ranking outcome or participate in the subsequent risk reduction activities.

Estimates of concern developed in the CRA process can be based on information that is quantitative, such as an estimate in the form of a statistical probability (e.g., a "three in one hundred thousand" risk of developing cancer), or qualitative, such as qualitative estimates of concern using a "high-medium-low" scale and this level of detail may influence how the risk factor is viewed within the CRA analysis. For example, a community might consider quantitative estimates cancer risks to be a more important or "weighty" indicator of potential concern than anecdotal data about a low-level odor problem.

11.2.2 What Is the Basic CRA Framework?

When performing a CRA, the partnership team will evaluate and develop a relative ranking of the risk factors it has identified using a common scale of concern. Typically it will use some form of voting, negotiated consensus, or a formula(1) to do this (see below). Regardless of the approach taken, the partnership team may either base its ranking on perceptions, feelings, or direct experience of a factor(b) or it may work to make its analysis more objective by relying on

[b] While this is the easiest and fastest way to perform the analysis, it can also lead to a result that is subject to a high level of uncertainty.

scientific methods and facts.[c] (It should also be noted that when the cost to correct a problem is high, decision makers will commonly require a scientific fact-based analysis to release any funds needed for risk reduction activities.[d])

That having been said, it is best not to think of these two approaches to performing a CRA as the only options. Instead, a comparative risk project may use a series of refinements that begin with a relatively perception/experience-based ranking analysis and proceed to a more scientific fact-based evaluation. In some cases, part of a ranking analysis will have a strong science/fact-based underpinning while other parts of the effort will rely more on perception and experience. Ultimately, these two approaches are best thought of as points along a spectrum of increasing complexity and detail that move from a ranking that is based solely on how people feel about a risk factor to a ranking that is more fact-based. Typically, a ranking effort will be a combination of both types of information.

As noted above, ranking risk factors in the CRA process is normally done in one of three ways:

- By negotiated consensus;
- By voting; or
- By the application of some sort of formula.

These various methods for ranking risk factors progresses from relatively straightforward, simplistic approaches to more complex analytical approaches. Each has it strengths and weaknesses that the stakeholder group should attempt to understand and articulate in its written description of the process. Exhibit 11-3 describes some of the characteristics of these ranking methods.

Using a "Common Scale of Concern"

It may not be immediately obvious whether or how to compare the a quantitative risk estimate of getting cancer (expressed as a statistical probability) from exposure to a nearby air pollution source to the impact on a community's quality of life from a local sewage plant. As noted previously, this problem is resolved by putting all the risk factors "on the same footing" by developing a score for each factor using a common scale of concern (e.g., assigning each factor a score of one to ten – with ten being the most concern – or a score of high, medium, or low concern).

However, even when the factors are made to be directly comparable by assigning them to the same scale, other issues with the comparison process can arise. For example, Factor A might be labeled "High Concern," but information on which this is based is judged "very uncertain" while the underlying data for Factor B – also labeled "High Concern" – is judged to be "highly certain." While the comparison of Risk Factors A and B is now straightforward on the one hand (they are both "High Risk"), when uncertainties are taken into account, this seemingly easy comparison becomes questionable.

[c] This approach takes the most time and resources, but may provide more certainty about the level of concern posed by a factor and may contradict the community's perception of the most significant risks.

[d] Partnership members may or may not derive detailed, community-specific estimates of risk for each risk factor. When an in-depth risk analysis is not pursued for a given factor, the team will commonly obtain, evaluate, and use existing estimates of risk and other relevant data to allow the comparative analysis of the risk factor to proceed.

Exhibit 11-3. Example Risk Ranking Methods

Negotiation
In this approach, the partnership team negotiates how to rank the various factors. This is the least structured of the risk ranking methods and generally involves the following steps:

- Review the data;
- Take proposals for how to rank the individual factors;
- Discuss/debate any objections and make alterations to the proposals;
- Discuss/debate any objections and rank the remaining factors; and
- Review the results and make remaining alterations as necessary.

Voting
As the name implies, this approach allows one vote for each member of the partnership team. This is the most familiar method of ranking and is the most frequently used. However, there is a temptation in voting to cut off discussion too early which may result in ignoring complex issues, magnifying biases, and overlooking data. There are single vote and multiple voting techniques that can be used to express voter's preferences and each technique has its advantages and disadvantages. One example of how to organize and run a meeting where voting is used as a decision making tool is provided at: http://instruction.bus.wisc.edu/obdemo/readings/ngt.html.

Application of a Formula
This will usually be the least familiar option for the partnership team, but may provide a more objective, science-based approach to ranking risk factors. As an example of this approach, environmental issues could be broken down into component parts, weighted and recombined to provide an overall ranking score. The scores are then listed from highest to lowest. Note that even in this type of approach, value judgements (e.g., selecting the weighting factors) may still cause some uncertainty in the overall ranking. Issues also arise when the risk endpoints differ (e.g., statistical probability of developing cancer vs. probability of exceeding an established public heath criterion).

The following is a simple example of a partnership team that is considering how to rank three identified risk factors in their community:

- Secondhand cigarette smoke;
- Living next to an abandoned industrial site; and
- School buses idling in front of schools.

The team begins the ranking exercise by simply asking each team member to rank the factors based on his or her own experience, feelings, and perceptions about these risk factors using all the data they gathered and summarized in Step 6. When the results of the exercise are reviewed, it was determined that some members of the partnership team rated the abandoned site the factor of most concern while others considered secondhand smoke the more pressing problem. Still others identified school bus emissions as the most important issue. When they discussed how they came to their conclusions, they found that their reasons for their choices differed for a wide variety of reasons, such as:

- Perceived threat of a risk factor based on their personal relationship to the risk factor (e.g., how close a person lived to the abandoned site, whether a team member had children who attend school);

- A focus on community vulnerabilities (e.g., children are especially vulnerable to school bus exhaust and secondhand cigarette smoke and most children in the area are poor); and

- Perceptions about potential impacts (e.g., the abandoned site once used cancer-causing chemicals which influenced how people felt about the issue, most children take the bus to school making the impact of bus emissions a community-wide problem, etc.).

In short, by simply asking individuals to rank the factors using the available information, the outcome may vary from person to person based on individual perceptions and feelings about a given factor. That having been said, some partnership teams may willingly choose this approach as a first step in ranking community concerns (e.g., in order to give maximum consideration of individual team members' personal concerns).

After this "exploratory exercise" in ranking the factors, the team considers its options. At this point, the team could simply vote on how to rank the risk factors. Alternatively, it could negotiate (or "talk it out") to come to consensus about how to rank the factors. In this example, the team decides to move past simplistic voting and negotiating options in order to try to rank the factors by relying more on empirical data and refined analysis methods. Specifically, it hopes to make the analysis more "fact-based" by developing and applying a formula to develop a numerical ranking of the three factors.

This is a particularly useful approach since its first attempt at ranking the factors, had it stopped at that point, would have led to disagreements among team members. By moving to a more fact-based analysis, the team hopes to develop a rationale for its ranking that is based on considerations other than differences of opinion and personal preferences. Hopefully, the outcome will be a more robust analysis on which most of the partnership team can come to agree.

The Interplay of Voting, Negotiating, and Formulas

The CRA process is not an entirely "either/or" process and there may be an interplay of the various CRA approaches (voting, negotiating, and use of formulas) throughout the process. For example, the team may decide to use a "formula" to calculate relative rankings for the risk factors, but in the process of performing this analysis it needs to make decisions about which formula to use and which inputs to include. Making such decisions will commonly require the advice of experts from various scientific and engineering fields, and will commonly include some negotiation and perhaps even some voting.

To develop and apply a formula to rank the three identified risk factors, the partnership members begin by looking at the information they have already developed for each of these three items and, based on that information and in consultation with public health experts, use negotiation skills to place each risk factor into a "High Concern, Medium Concern, or Low Concern" grouping. For example, the team has established, based on existing scientific literature, that breathing secondhand smoke should be ranked as a "High Concern" (secondhand smoke is a known human carcinogen). It also concludes from an evaluation of available literature that children breathing school bus exhaust should also be ranked a "High Concern." For the abandoned site, the state has sampled both soils and groundwater on and around the site and found insignificant contamination. The facility's grounds are fenced and guarded and neighboring residents are all on city water. The partnership team members, therefore, rank the hazard associated with this factor a "Low

Concern" since all the facts point to limited or no exposure to contaminated media by local residents.

At this point, the partnership team members could use a very simple formula to rank the factors, such as:

Formula (1)

Risk Ranking = Initial Concern Grouping
(i.e., High Concern, Medium Concern, or Low Concern)

Using this approach results in the following relative ranking of the various concerns:

INITIAL RANKING

Secondhand smoke = School bus exhaust **= High Risk**

Abandoned Site **= Low Risk**

However, this analysis is based solely on a review of the scientific literature and other general factual information about the hazards generally believed to be posed by the these three risk factors. The potential impacts to the actual surrounding community and the community's existing vulnerabilities have not been taken into account. To better account for these additional variables, the partnership members decide to refine their formula to include information on the potential number of people potentially impacted by each of these three risk factors.

To do this, the partnership team first uses negotiation techniques to select a numerical representation for each of its original concern groups (High Concern, Medium Concern, and Low Concern), with a larger numerical value representing a higher concern (these numerical values are referred to as "weights;" the larger the number, the more "weight" or importance it represents). It then uses negotiation techniques to develop three new groupings to represent the number of people that are potentially impacted by the risk factors (i.e., less than 100, 100 to 1000, and more than 1000 people potentially impacted). As it did with the concern groupings, it then assigns each of these population groups a numerical weighting value (see Exhibit 11-4).

Exhibit 11-4. Example Risk Ranking Scheme Using Groupings and Numerical Weights				
Grouping Number	**If the Concern for a risk factor is ranked...**	**...then the weight for the risk factor will be...**	**If the number of potentially impacted persons is...**	**...then the weight for the impacted population will be...**
Group Number 1	HIGH	100	Less than 100	1
Group Number 2	MEDIUM	50	Between 100 and 1,000	50
Group Number 3	LOW	1	Greater than 1,000	100

The next step is to determine the revised "Formula" it will use to perform the re-ranking of the risk factors. So to continue the example, the partnership decides that the revised formula should be:

Formula (2)

Revised Ranking Score = (Weight for a Risk Factor) × (Weight for the number of people potentially impacted)

In the example, the partnership team members reviewed demographic and other relevant information for the community and found that only 50 people live within a half-mile of the abandoned facility, smoking is banned in public places in the community, and there are 1,200 children enrolled in community schools. According to the formula above, the revised ranking score for each risk factor would be:

REVISED RANKING

Second hand smoke = 100 × 1 = 100

School bus exhaust = 100 × 100 = 10,000

Abandoned facility = 1 × 1 = 1

On the face of it, the revised ranking of the risk factors indicates that school bus exhaust ranks higher than secondhand smoke which ranks higher than the abandoned facility.

At this point the team needs to consider where it is in the analysis. Has this revised analysis helped it sort out which risk factors are of most concern? Has it done it in a more factual, scientifically supportable manner? What information has yet to be considered? Are the important uncertainties inherent in the analysis up to this point that should be taken into consideration?

For example, the partnership team factually knew that the local government for the community outlaws smoking in public places, but the partnership team had no data on the number of people who smoke in non-public places such as homes (thus, putting the number of people potentially impacted arbitrarily into the lowest population group in Exhibit 11-4). In other words, there is likely substantial uncertainty in the ranking of the secondhand smoke ranking leading the team to decide to identify this as a data gap that should be clarified before developing the final ranking (see Chapter 12 for information on filling data gaps). Other potential issues that they note at this point include:

- Formula (2) includes a measure of potential hazard and potential impact, but does not explicitly take community vulnerabilities into account. In this example, the partnership team decides to qualitatively include information about community vulnerabilities (by use of a negotiation process) to convert the revised risk rankings developed using formula (2) into a final ranking.

- Other uncertainties in the analysis include whether the assignment of risk factors to a common scale (high/medium/low) was appropriate and whether the selection of the weighting factors is a reliable representation of the relative importance of each weighted element.

This simple example illustrates how the partnership team can use the various options of voting, negotiating, and application of formulas (or more than one of these activities simultaneously) to develop a ranking of risk factors. As the team works to refine its analysis, it may even bring in additional relevant data to further augment the ranking process (e.g., quantitative estimates of risk posed by a given factor).

Throughout all these efforts, partnership teams should strive to use the best information available. Having said that, it is important to realize that it is impossible to eliminate all uncertainty no matter how much time and money you spend. However, using the best information available within a transparent process will give the partnership a framework to inform a real discussion of priorities. This kind of candid and open communication often results in true consensus and a strong and lasting partnership.

The next step of the process – selecting the priority issues for community action – is discussed in the following section.

11.2.3 Selecting Priority Concerns for the Community

As noted above, the partnership team will have, at this point, developed a ranked list of community risk factors (using CRA) and developed a written report of how the analysis was performed along with important uncertainties and outstanding data gaps. The team will now proceed to take this information and identify which of the ranked factors are of most importance and which will be carried forward to the next step of the process (discussed in Chapter 12) – evaluating and selecting risk reduction projects. The partnership team can do this in a variety of ways. For example, it can use methods similar to those used in the CRA process (e.g., voting, negotiation, or a formula) to decide which factors to select from among the ranked list as community priorities.

It is important to keep in mind that a factor which scored high in the Step 7 CRA may not ultimately be selected for a risk reduction project. For example, the uncertainty in the risk ranking of a given factor may be so great that the partnership can only identify it as a data gap that requires more information before a decision can be made. As another example, a factor that ranks high on the list may be slated for imminent regulatory risk reduction that would render community actions superfluous. In addition, it may be very expensive to reduce the risks from the source ranked as the highest in the CRA process. In such instances, the community might be able to get more total risk reduction by reducing the second-, third-, and fourth-highest risk factors for the same money and in less time than pursuing the most risky factor alone.

What Are We Doing at this Point in the Analysis?

Up to this point, we have done several things simultaneously. First we collected information about community risk factors, potential impacts, and vulnerabilities. Next we used a process called Comparative Risk Analysis or CRA to rank the identified risk factors from most concern to least concern using a common scale of concern.

The output of these Steps is a summary of all the collected information about each risk factor, the final ranking, and a written description of how this work was done. Now, we will take all of this information to develop a final priority list of issues that will be the focus of actions to bring about risk reduction in the community.

That having been said, considerations of whether or not something *can be done about a particular issue and how much it will cost* should be set aside at this point. This initial priority setting exercise should be based as strictly as possible on how important the concern is to the health and quality of life of the community and its environment. This is because it is important for a community to know about significant concerns, even if it is not possible to do something about some of those concerns immediately. Considerations of the practicality of doing something about the priorities will be a key part of the next step (Step 8), the development and implementation of an action plan.

Finally, it should be noted that the exercise of selecting community priority risk factors will depend heavily on the community's goals and values, resulting in different communities making unique choices and the overall discussion of choices difficult to quantify. Only good common sense and a clear view of community values will provide a basis for making the judgments necessary to set community priorities. It will also be important, as the discussion proceeds, for members of the partnership team to keep in mind that the goal is to reach agreement on the priorities that best meet community needs and that help build the consensus needed for mobilizing everyone to take action. Remember, it will usually not be possible to respond to all community risk factors at once. However, the partnership team will need to establish a way to deal with those concerns that were not agreed on. If some members of the partnership team identify an issue as a high priority concern and others disagree, the action plan will need to include a process for coming to agreement on these issues.

In summary, at this point in the process, partnership team members will have:

- Identified the risk factors of concern, their potential impacts, community vulnerabilities, and other relevant information;
- Summarized all this data together (e.g., as in Exhibit 11-2);

- Reviewed the data and performed their ranking analysis using voting, negotiation, a formula, or some combination of the three techniques (commonly in an iterative approach);
- Selected priority concerns for possible action; and
- Presented the overall results of the data gathering, ranking analysis, and priority selection process in easy to read table formats along with a thorough description of every step of the process, including discussions about the logic used for decisions, where data came from, how the ranking was performed, how priorities were chosen, and important uncertainties and remaining data gaps in the analysis.

References

1. U.S. Environmental Protection Agency Region 5 and Purdue University. 1995. *Software for Environmental Awareness: Comparative Risk Assessment*. Available at http://www.epa.gov/seahome/comprisk.html.