NIEHS
National Institute of
Environmental Health Sciences

Partnerships for Environmental Public Health

Evaluation Metrics Manual

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National Institute of Environmental Health Sciences
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Partnerships for Environmental Public Health Evaluation Metrics Manual
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Acknowledgments

Developing the National Institutes of Environmental Health Sciences (NIEHS) Partnerships for Environmental Public Health (PEPH) Evaluation Metrics Manual has been a truly collaborative process. For more than 3 years, we have worked with NIEHS program and evaluation staff, grantees, contractors, and other interested parties to develop, review and revise the manual.

In particular, both academic and community-based grantees provided critical input. They have spoken with us informally at meetings, explained how they define program success, participated in PEPH workshops, tested the proposed approaches, supplied metrics, and provided many suggestions for improvement. Most importantly, the vast body of work produced by current and former grantees that are part of the PEPH network provided the real-world examples highlighted throughout the manual as *Metrics in Action*. It is these sections that allow readers to connect the proposed approaches to realistic and familiar situations. We are very grateful to have benefited from such a high level of grantee engagement in the development of the Manual.

NIEHS staff in the Division of Extramural Research and Training and contractors with the Science and Technology Policy Institute, MDB Inc., and Image Associates have all provided a wealth of program knowledge, evaluation expertise, and communication skills. We owe a deep debt of gratitude to our entire production team, especially Ashley T. Brenner, Susannah V. Howieson, Cara M. O'Donnell and Stephanie S. Shipp.

During the comment period, we reached out to more than 30 federal and state environmental health agencies, NIH Institutes and Centers, grant programs, and academic meetings. More than 300 individuals participated in these discussions and provided constructive comments about the structure and content of the chapters, as well as specific examples of metrics. Any success of this manual is the direct result of these valuable contributions.

While we have taken great pains to check the facts and appropriately represent projects and metrics throughout the manual, any errors are purely our own.

Thanks again to all who have contributed.

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Partnerships for Environmental Public Health
Evaluation Metrics Manual

Chapter 1:
Introduction

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Partnerships for Environmental Public Health Evaluation Metrics Manual

Purpose of the Manual

The Partnerships for Environmental Public Health (PEPH) Evaluation Metrics Manual (Manual) provides examples of tangible metrics that PEPH grantees and program staff can use for program planning, implementation and evaluation. The Manual is designed to show grantees how to use a systematic, strategic analysis of program activities, outputs and impacts to identify meaningful metrics that can be used to document program achievements. The Manual also serves to establish a common language around evaluation activities. In creating this Manual, we hope to make evaluation more accessible to PEPH grantees and others working to address environmental public health issues.

The strategies and metrics described in the Manual are ***examples*** that grantees might use to evaluate their programs, but they should not be considered a prescriptive set of actions, rules or measures that must be followed. The Manual is intended to generate discussion and build capacity among grantees to document and demonstrate their achievements in environmental public health.

This brief introductory chapter:

- Describes the target audience and why we created the Manual
- Provides an overview of the PEPH program
- Defines program evaluation and metrics
- Explains how to use this Manual

Legend

Lightbulb: Ideas for using this information

Warning: Proceed with caution

Link: Links to an external website

Text Link: References to other information in this manual

Checkbox: Key points

Intended Users

The primary intended audiences for this Manual are PEPH grantees and program staff. However, we hope that other groups and organizations will also find it useful, particularly those interested in measuring environmental public health activities.

Why Was This Manual Created?

In July 2008, NIEHS met with grantees so they could provide input on the development of the PEPH program. During this workshop, grantees reported challenges in evaluating and documenting achievements related to building community partnerships and to other translation and outreach components of their programs. Because researchers do not usually report on these types of projects in journal articles, the PEPH Evaluation Metrics Manual provides ideas about how grantees can measure their success, other than through analysis of peer-reviewed literature.

Subsequent chapters provide possible metrics for common program areas addressed by PEPH grantees, including:

- Partnerships
- Leveraging
- Products and Dissemination
- Education and Training
- Capacity Building

A final chapter on Principles of Evaluation provides more details on program evaluation, for those interested in a more in-depth discussion of key evaluation concepts.

PEPH Program Description

> Environmental public health is defined as the science of conducting research and translating it into action to address environmental exposures and health risks of concern to the public.

In 2008, the National Institute of Environmental Health Sciences (NIEHS) created PEPH as a network to promote greater interaction among grantees with a common focus on environmental public health. For the purposes of this program, environmental public health is defined as the science of conducting research and translating it into action to address environmental exposures and health risks of concern to the public. NIEHS uses different funding mechanisms to advance projects responsive to community needs and environmental health concerns; however, over the past 15 years, these programs and projects have not always interacted with one another to share their common approaches, methods and materials. The PEPH program provides a coordinating framework to break down programmatic silos. It also brings together scientists, community members, educators, health care providers, public health officials and policy makers in the shared goal of enhancing the impact of environmental public health research at local, state, regional, tribal, national and global levels. By fostering these multi-level partnerships, vital information about the linkages between environmental exposures and disease can be discovered and used to promote health and reduce the risk of disease across the populations at highest risk.

Goals of the program include:[1]

- Strategically coordinating and integrating new and existing initiatives that involve communities and scientists working together on contemporary issues in Environmental Public Health research
- Actively engaging communities in research, community engagement and education activities
- Developing evaluation tools for grantees and program staff to measure the effectiveness of partnerships and the impact of research on public health at local, regional and national levels
- Creating and providing materials to increase awareness and literacy about environmental health risks
- Evaluating program contributions to the advancement of environmental public health

[1] National Institute of Environmental Health Sciences (NIEHS). 2010. About: Partnerships for Environmental Public Health (PEPH). Available: *http://www.niehs.nih.gov/research/supported/programs/peph/about/index.cfm* [accessed 16 December 2011].

PEPH Programs

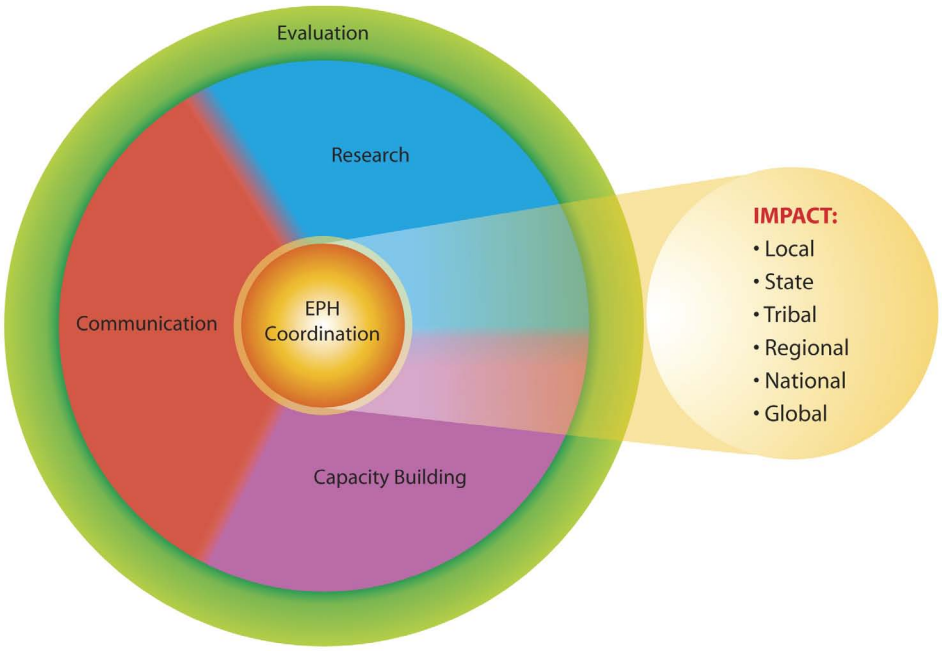
- Breast Cancer and the Environment Research Program
- Centers for Children's Environmental Health and Disease Prevention Research
- Centers for Population Health and Health Disparities
- Environmental Health Sciences Core Centers: Community Outreach and Engagement Program
- Environmental Justice: Partnerships for Communication Program
- Obesity and the Built Environment
- Research to Action
- Superfund Research Program
- Worker Education and Training Program
- American Reinvestment and Recovery Act (ARRA): Science, Technology, Engineering, and Mathematics (STEM) Education
- ARRA: Capacity Building
- ARRA: Building Sustainable Community-Linked Infrastructure to Enable Health Science Research
- Ethical, Legal, and Social Implications of Genomic Research
- NIH Partners in Research Program
- Community Participation Research Targeting the Medically Underserved
- Community Participation in Research
- Understanding and Promoting Health Literacy

Based on feedback provided through the participatory process of developing the PEPH Program,[2] NIEHS program staff developed a model of PEPH (Figure 1.1) that categorizes activities into five primary areas: research, communication, capacity building, evaluation, and coordination.[3] Through its coordinated efforts, PEPH seeks to have a greater impact at the local, state, regional, tribal, national and global levels. These primary areas are seen as blending into one another – that is, they are not mutually exclusive. Ideally, projects that are a part of the PEPH program will address two or more of these areas.

[2] NIEHS. 2007. PEPH Request for Information. Available: *http://www.niehs.nih.gov/research/supported/programs/peph/about/rfi.cfm* [accessed 16 December 2011]; NIEHS. 2008. PEPH Workshop. Available: *http://www.niehs.nih.gov/research/supported/programs/peph/about/workshop.cfm* [accessed 16 December 2011]

[3] For more detail on these five primary areas of PEPH, visit NIEHS. 2010. About: Partnerships for Environmental Public Health. Available: *http://www.niehs.nih.gov/research/supported/programs/peph/about/ index.cfm* [accessed 16 December 2011].

Figure 1.1 PEPH Program Model



Evaluation Concepts

Below we highlight a few key evaluation concepts that will help you think about how you can take the examples provided in this Manual and adapt them to meet the needs and context of your project.

For a more detailed discussion of evaluation concepts, check out **Chapter 7: Principles of Evaluation**.

Defining Program Evaluation

Many of us use evaluation in our daily lives, reviewing our children's grades or deciding which appliance or car to purchase, for example. Evaluation at its most basic level is the use of information to make decisions.[4] Program evaluation is therefore simply the use of information to make decisions about a program – such as whether to continue it, adjust it or expand it to different communities. Typically, program evaluations are used to answer questions about whether a program is working as intended, and to explain why or why not.[5]

Remember to involve your partners in designing your program evaluation. Partners can include community members, decision-makers, policy-makers, clinical professionals and academic researchers.

[4] Patton MQ. 1982. Practical Evaluation. Beverly Hills, CA: Sage Publications, Inc. 15.

[5] Grembowski D. 2001. The Practice of Health Program Evaluation. Thousand Oaks, CA: Sage Publications, Inc.

Benefits of Evaluation

Many PEPH grantees see their job as building relationships and implementing programs that address environmental public health issues. Conducting evaluations might be seen as taking valuable time and resources that could be used to deliver more services. So why evaluate? Because evaluations can help you:[6]

- Identify highlights and program successes
- Determine if a project worked and why (or why not)
- Identify areas for program improvement and increased efficiency
- Describe expenditures and justify a need for additional funding
- Recognize and respond to public needs and wants
- Identify new audiences and applications for projects
- Prioritize research and plan for the future
- Find allies in other agencies, services or sectors

Connecting Program Activities and Goals

In order to evaluate a program, it is helpful to understand the expected goals and the activities that will move us toward those goals. Developing program logic models is one way to illustrate systematically how the parts of a program interact to achieve program goals or impacts.[7,8,9,10] While there is no standard format for a logic model, there are some common components that tend to be included. The sample logic model (Figure 1.2) includes many of the components that programs could consider in developing their own logic models.

Inputs are resources that support a program, such as staff time, materials, money, equipment, facilities and volunteer time. Note that we do not include resources in the logic models provided in the Manual because the resources available to a project tend to be standard across projects. However, each program should assess and identify the specific resources available to its individual projects.

Activities are actions that use available inputs to create and maintain partnerships.

Outputs are the direct products of partnership activities.

[6] Drew CD, van Duivenboden J, Bonnefoy X. 2000. Environmental health services in Europe 5: Guidelines for evaluation of environmental health services. European Series, No. 90. Copenhagen, DM: World Health Organization Regional Publications. Available: *http://www.euro.who.int/__data/assets/pdf_file/0003/98292/E71502.pdf* [accessed 16 December 2011].

[7] W.K. Kellogg Foundation. 2004. Logic Model Development Guide. Available: *http://www.wkkf.org/knowledge-center/resources/2006/02/WK-Kellogg-Foundation-Logic-Model-Development-Guide.aspx* [accessed 23 February 2012].

[8] Engel-Cox JA, Van Houten B, Phelps J, Rose SW. 2008. Conceptual model of comprehensive research metrics for improved human health and environment. *Environ Health Perspect* 116(5). Available: *http://www.ehponline.org/ambra-doi-resolver/10.1289/ehp.10925* [accessed 16 December 2011].

[9] Liebow E, Phelps J, Van Houten B, Rose S, Orians C, Cohen J, et al. 2009. Toward the assessment of scientific and public health impacts of the National Institute of Environmental Health Sciences Extramural Asthma Research Program using available data. *Environ Health Perspect* 117(7). Available: *http://www.ehponline.org/ambra-doi-resolver/10.1289/ehp.0800476* [accessed 23 February 2012].

[10] Orians CE, Abed J, Drew CH, Rose SW, Cohen JH, Phelps J. 2009. Scientific and public health impacts of the NIEHS Extramural Asthma Research Program: insights from primary data. Res Evaluat 18(5): 375-385.

Impacts (sometimes called outcomes) are benefits or changes resulting from the activities and outputs. Impacts or outcomes may be intended and/or unintended, positive and negative, and can occur in the short-term, intermediate and long-term time frames.

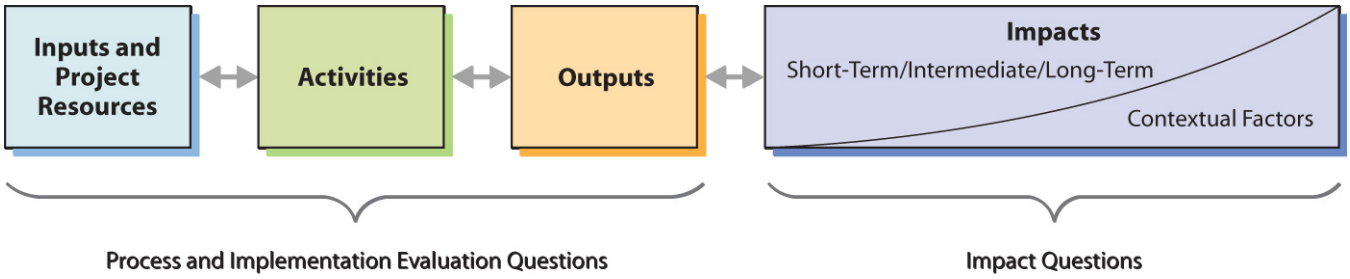
Context is how the program functions within the economic, social and political environment of its community. Each program should consider the context in which it plans, conducts and evaluates its programs. This context-driven approach will help grantees identify evaluation questions that are appropriate to their programs, experience and communities. Contextual factors that programs might consider include:

- The target audience and other stakeholders
- Experience of the grantee organization
- The political climate
- The funding environment

Two-Way Arrows indicate that relationships among the various elements are bidirectional. In theory, relationships can exist between any boxes in the diagram because any action can lead to any output and result in any impact. These arrows also help remind program staff that logic models are iterative and that findings from evaluations should help inform future activities, outputs and impacts.

Process and implementation evaluations tend to ask questions related to the activities and outputs of a program. The questions concern what things were done and how they were done. Outcome or impact evaluations ask questions related to broader changes that occurred as a result of the program. Process and implementation evaluation questions tend to be easier to answer because they are under the control of the program and they can be measured within a short time frame. The role and influence of contextual factors increase as you get further away from inputs (Figure 1.2). Because contextual factors are typically outside the control of the grantee or organization, and because impacts can take longer to achieve than outputs, outcome and impact evaluation questions may be more challenging to answer.

Figure 1.2 Sample Logic Model



Adapted from TBS, Guide for the Development of Results-based Management and Accountability Frameworks, 2001.

Selecting Metrics

Once the relationship between goals and activities has been clarified, metrics can be identified to help document progress. Metrics are the measures (such as size, capacity, quantity, duration or frequency) of a characteristic or aspect of the program. Metrics provide a reportable and more systematic means for describing how a program has performed and the extent to which it has achieved its stated goals.

It may be helpful to apply the SMART principle in creating metrics. SMART stands for specific, measurable, attainable, relevant and timely. Using SMART metrics will ensure that appropriate data are collected and analyzed in order to make decisions about programs. Below is a description of each characteristic.

> Metrics are the measures (such as size, capacity, description, quality, quantity, duration, or frequency) of a characteristic or aspect of the program.

Specific – detail the milestones to be achieved, who will achieve them and how. If the program is addressing exposure to pesticides, a specific measure provides details about what types of pesticides, ho the target is, what level of reduction in exposure is expected and how that level of reduction will be reached.

Measurable – define exactly what level of change is expected. For example, rather than say that relationships among partners will improve, a measurable statement might propose that partners will participate in four discussions per year, during which they will identify two areas of conflict or potential conflict and map out at least one strategy for dealing with the conflict.

Attainable – create a metric that the group or organization can actually achieve. Rather than working towards a goal of eliminating all environmental health risks in a community, an attainable goal might be working with partners and community members to identify one environmental health risk and to make the community aware of steps it can take to reduce risk.

Relevant – ensure that the metric is connected to the goal. If the goal is to improve air quality around schools' bus areas, then a relevant metric might measure partnership activities with schools and school-bus companies, school-bus idling times or air quality. A metric related to the number of school-bus drivers with CPR training is not relevant because it does not relate to air quality.

Timely – limit metrics to those measures that can reasonably be collected within the time frame of the project. If the project deals with reducing blood lead levels in young children, measures might include data collection at six months, one year and two years post intervention. Although measures of blood lead levels ten years from the intervention might be interesting, it is not likely that a project would be able to follow participants that long.

> Readers may notice that the example metrics we provide throughout the Manual do not use the SMART principle. This is because they represent general ideas about what programs might want to measure. We encourage you to apply the SMART principles in adapting the metrics for specific programs.

Evaluation Data

Collecting evaluation data from the program outset is important. The earlier a program team decides on its metrics, the earlier it can begin developing processes and protocols to collect the information needed to answer evaluation questions.

Types of Data

Data can be categorized as either qualitative or quantitative. Qualitative data are descriptions of the characteristics of that which is being analyzed. Grantees often collect qualitative data through open ended questions, feedback surveys, field or program notes or summary reports. Qualitative data provide valuable and insightful data but can be difficult to compare, reproduce and generalize. Quantitative data are numerical or statistical values used to express the quantities of a variable. This type of data is relatively easy to store and manage and can be generalized and reproduced, but it usually fails to provide a complete picture of a program. A mixed-methods approach that combines quantitative and qualitative data provides a robust combination of statistical and descriptive data.

Several factors may dictate whether qualitative or quantitative data or a mix of the two, should be collected. Available resources, the type of question asked and access to respondents all influence the type of data collected. Throughout the Manual we provide examples of both quantitative and qualitative metrics that can be used to document specific activities, outputs or impacts.

Sources of Data

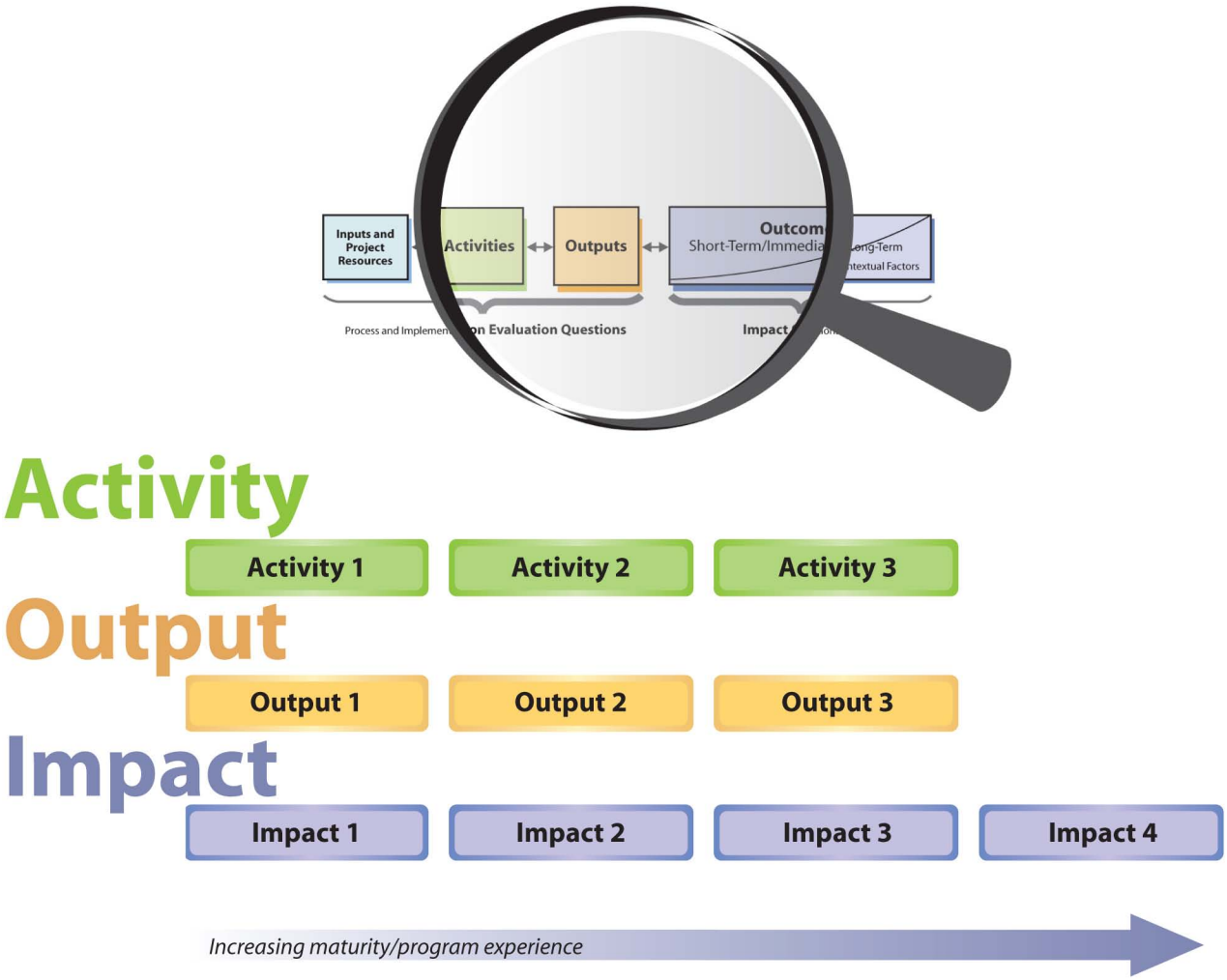
Grantees may find the following sources of data to be helpful in tracking achievements:

- Activity logs
- Contact logs
- Participant lists
- Feedback forms
- Publication and material development lists
- Meeting agendas
- Telephone logs
- Communication strategies and plans
- Budgets
- Group discussions
- Surveys
- Interviews
- Meeting notes
- Email exchanges
- Internet web logs

Logic Models in the PEPH Evaluation Metrics Manual

To identify potential metrics for PEPH programs, we use a logic model approach to clarify program activities, outputs and impacts. Because this Manual is not intended to be a primer on logic model development, we encourage readers to explore the logic model resources provided in Chapter 7 and Appendix 4. For the sake of simplicity, this Manual will focus on three logic model components: activities, outputs and impacts. Although traditional logic models typically show activities, outputs and impacts as columns and include arrows to show interactions, we present them as rows to emphasize our focus on the specific components of the models, rather than the construction of the models. Figure 1.3 illustrates the basic framework of the logic model used in this Manual.

Figure 1.3 Sample Logic Model



Every component identified in a logic model can be measured. Using this Manual, grantees can get ideas about potential metrics they can use to measure activities, outputs and impacts common to PEPH programs.

Logic models are presented in this Manual as linear frameworks, but in practice, PEPH programs are far from linear. Programs often cycle through a variety of activities, outputs and impacts as resources and partners are available, and as windows of opportunity present themselves. Products developed as part of one activity may be used to conduct another activity. And once a program achieves a specific impact, it may change its approach for conducting future activities and outputs.

We developed the logic models in this Manual recognizing that grantees reflect a wide range of experience and capacity. Some PEPH program grantees have been working in this area for more than 20 years, while others are just getting started. In general, the logic models show an increasing level of maturity from left to right and from top to bottom. For example, a new program might be able to implement and measure only a few of the activities or outputs to the left of the model. Another more mature program might be able to conduct a wider range of activities to the right of the model and may be able to show how activities have produced several outputs and have led to measurable impacts.

Our use of logic models and specific metrics in this Manual are not intended to be prescriptive. We do not believe that there is a single logic model that could be applied to all partnerships, education and training programs, leveraging, etc. Our intent is to provide an example of a logic model in each chapter that contains elements that are recognizable to the NIEHS PEPH grantee community. The purpose of this Manual is to provide realistic examples of approaches and metrics that could be used to evaluate the programs as a starting point for discussion, not as a comprehensive prescription. Thus, many reasonable and laudable program elements might not appear in the logic model components. We welcome comments from readers about other metrics that grantees and evaluators use to acknowledge and measure program activities, outputs and impacts.

Project specific examples provided in this Manual are not meant to be prescriptive, but rather to illustrate activities, outputs and impacts that might take place. By presenting a range of possibilities, we hope that partners will use logic models to create metrics that are meaningful for their projects.

Organization of the Manual

We gathered information for this manual by reviewing grantee materials and websites together with PEPH program documents, and published literature. We also conducted interviews with grantees and consulted program staff and other experts in the field of evaluation and environmental public health. Through these activities we identified five cross-cutting program areas and dedicated one chapter to each area:

- Partnerships (Chapter 2)
- Leveraging (Chapter 3)
- Products and Dissemination (Chapter 4)
- Education and Training (Chapter 5)
- Capacity Building (Chapter 6)

Each chapter also includes examples of Metrics in Action that illustrate real-world PEPH programs. These examples include sample metrics that grantees could use to demonstrate program success. In cases where grantees had evaluation data available, we used specific data. However, where the metrics are hypothetical, we have included an X to indicate where grantees would specify the quantity.

You may notice that some metrics are repeated throughout the Manual. Metrics can be used to demonstrate progress in more than one area. For example, the number of partners participating may be a metric for partnering, leveraging, dissemination or capacity-building activities. For those who want to know more about evaluation, we provide **Chapter 7: Principles of Evaluation**.

Many PEPH grantees use bibliometric analyses to evaluate their publication activities. Because there are many existing resources that describe methods and strategies for analyzing peer-reviewed literature, we do not discuss these strategies in this Manual. We have provided some bibliometric resources in **Appendix 4**.

Chapter 2:
Partnerships

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Chapter 2: Partnerships

Introduction

This chapter focuses on the PEPH program area of partnerships. As discussed in Chapter 1, we use a logic model approach to illustrate the program components and to guide readers through the identification of potential metrics that can be used to document achievements related to partnerships. This information should serve as a source of ideas and examples for grantees, not as a prescriptive approach for building partnerships.

We provide examples throughout the chapter to show how grantees have applied the metrics in PEPH projects. We encourage readers to think of other metrics or to adapt these metrics to fit their project or partnership.

Characteristics of successful partnerships:

- Trust, openness and mutual concern
- Patience, flexibility and adaptability
- Understanding and respect for the mission of each partner agency
- Recognition of and respect for what each partner does well
- Respect for each partner's need for autonomy
- Willingness to share resources for the benefit of all
- Willingness to make decisions about adding or removing

Partnerships Logic Model

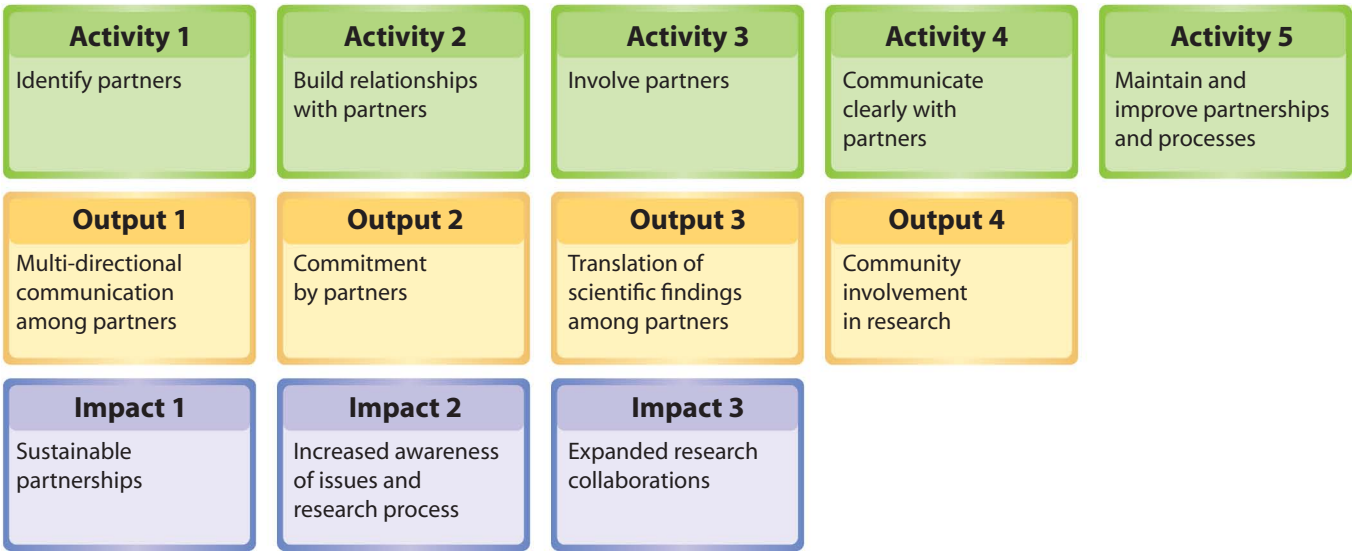
Through our review of PEPH programs and relevant research on partnerships, we have identified activities, outputs and impacts that are common among PEPH programs. Figure 2.1 illustrates a variety of activities, outputs and impacts that might be associated with the creation and maintenance of partnerships within PEPH programs. This model is not comprehensive. Many other activities, outputs and impacts are possible, but not shown.

This model contains three major components:

- **Activities** are actions that are based on available inputs to create and maintain partnerships.
- **Outputs** are the direct products of partnership activities.
- **Impacts** are benefits or changes resulting from the activities and outputs.

In general, the logic models used in this Manual show an increasing level of maturity from left to right and from top to bottom. This design should ensure that all grantees, regardless of experience or capacity, can find activities, outputs or impacts relevant to their program. Grantees should also keep in mind that the actual implementation of a project may be more iterative than is shown in these logic models. For example, impacts achieved early in a project may affect the implementation of activities that occur later in the project. The elements of the model are numbered in Figure 2.1 to provide reference for discussion of this chapter.

Figure 2.1 Partnership Logic Model



Selecting Data and Metrics

In Chapter 1 we discussed potential sources of data. Grantees may find the following records to be helpful sources of data in tracking achievements related to partnership building:

- Activity logs
- Contact logs
- Participant lists
- Feedback forms
- Publication and material development lists
- Meeting agendas
- Group discussions
- Surveys
- Interviews
- Meeting notes
- Internet web logs
- Email exchanges
- Telephone logs
- Budgets

For a more comprehensive list of data sources, see **Chapter 7: Principles of Evaluation**.

Records describe what happened and how. Records often take the form of an activity log or a journal that catalogues decisions, event attendees and other critical information.

Consider whether you can collect data for your metrics in a realistic time frame.

When selecting metrics, remember that it will be easier to measure activities and outputs. Documenting impacts is important, but it may be challenging because of the length of time it might take to achieve the impacts, as well as the contextual factors that are likely to influence your ability to achieve these impacts.

The rest of this chapter provides ideas about activities, outputs and impacts related to partnerships as well as potential metrics to measure them.

Although we have numbered the components in the logic model to facilitate the discussion in this chapter, it is important to remember that the logic model is not linear. Projects will conduct activities, produce outputs and work to achieve impacts that are appropriate to their communities.

Activities

In this section we discuss five activities that PEPH grantees may conduct in their efforts to build partnerships. Activities are actions that use available inputs to create and maintain partnerships.

Activity 1: Identify partners
Activity 2: Build relationships with partners
Activity 3: Involve partners
Activity 4: Communicate clearly with partners
Activity 5: Maintain and improve partnerships and processes

Activity 1: Identify partners

Activity 1	Activity 2	Activity 3	Activity 4	Activity 5
Identify partners	Build relationships with partners	Involve partners	Communicate clearly with partners	Maintain and improve partnerships and processes

Whether forming a new partnership or adding members to an existing partnership, a key step is to identify potential partner organizations and connect with leaders of the organization. For example, public health officials are often the first point of contact for community members with an environmental health concern.

Grantees may want to select partners who can play key roles in activities such as monitoring and surveillance, gathering input from the community and sharing information among partner organizations. Individuals who serve as an initial point of contact within organizations can also become a source of additional contacts from other organizations.

Potential Partners:

- Public Health Officials
- Educators
- Community Organizers
- Faith-based Organizations
- Tribes
- Federal and State
- Agencies
- Media Representatives

Some activities and approaches for identifying partners:

- Consider the need for a partner and the qualities and characteristics desired in such a partner
- Identify groups, individuals or institutions for a partnership that have a stake or role in the issue at hand
- Address any historical or significant trust issues before creating a new partnership
- Identify program goals and values of the partner organizations
- Identify areas of duplication and potential gaps
- Assess compatibility with potential partners
- Analyze what your program and the potential partners can gain through this partnership
- Identify specific resources that these potential partners will contribute to the outcomes or products expected from the partnership and compare them with available resources
- Conduct an initial survey to identify partners of interest, including nontraditional partners that might be helpful in a new partnership
- Assess previous and existing partnership experiences

Example Metrics for Activity 1: Identify partners

- Number of partners identified
- Number of additional identified partners that could be added in the future
- Number of contacts made with potential partners
- Number of potential partners who express interest in the project
- Number and description of needs of each partner
- Number and description of resources that each partner can contribute
- Description of benefits each partner may receive
- Description of project goals as related to partnerships
- Description of potential or perceived benefits of the partnership to each partner (e.g., increased visibility, increased access to priority populations, increased networking opportunities, technical assistance, connections to key partners, funding, improved image)
- Description of historical trust concerns between partners and how these concerns will be addressed

Metrics in Action 2.1: Researchers at the **University of Cincinnati (UC)** sought to better understand the effect of anti-idling policies on the health of school children. UC researchers had talked with potential partners at Cincinnati Public Schools (CPS) and the Cincinnati Health Department (CHD) to explore opportunities to work together and to begin to lay the foundation for a strong partnership by understanding the resources each partner might bring to a project. When a funding opportunity arose, the partners were able to mobilize quickly and apply for an NIEHS grant that enabled them to address childhood asthma. The partners are now working on a project to gather more data about the health risks associated with school-bus idling and to develop strategies to reduce school children's exposure to air pollution.

The efforts of local, state and national organizations have been crucial to the success of the project. For example, UC, CPS and CHD staff and school nurses helped identify and recruit students with asthma and also conducted health assessments of these students. UC staff helped prepare materials for the project, including handouts, assessment tools and poster boards to be used for community-wide outreach events. UC and CPS staff and students worked together with assistance from the Alliance for Leadership and Interconnection (ALI) to create an Anti-Idling Campaign training video. The video features students providing facts about the problems created by engine idling and highlighting ways to help improve air quality while protecting the environment in a cost-conscious manner. A CPS student also composed an anti-idling-themed song, fulfilling the need for an engaging and age-appropriate outreach method to be used in the schools.

Other partners included Roxanne Qualls, a veteran Cincinnati city councilwoman, who developed a public service announcement endorsing the anti-idling campaign and challenging viewers to action. The CHD also educated and trained more than 600 bus drivers to support to the anti-idling campaign. Finally, the Hamilton County Department of Environmental Services provided information on air quality to staff and students of the CPS during school assemblies.

Metrics for identifying partners:

- Number of partners identified: *At least five organizations participated in this project, including CPS, CHD, ALI, Councilwoman Qualls and the Hamilton County Department of Environmental Services.*
- Number and description of resources that each partner can contribute: *CPS provides access to students and schools in the district, CHD provides nursing services, Councilwoman Qualls provided credibility and the ability to attract attention to the project, and the Hamilton County Department of Environmental Services provided training and information to CPS staff and students.*

For more information about the UC, CPS and CHD partnership, visit:
http://www.niehs.nih.gov/research/supported/programs/peph/prog/rta/ryan/index.cfm.

Activity 2: Build relationships with partners

Activity 1	**Activity 2**	Activity 3	Activity 4	Activity 5
Identify partners	Build relationships with partners	Involve partners	Communicate clearly with partners	Maintain and improve partnerships and processes

Facilitating open and organized communication among partners in a way that builds confidence and trust is often the best starting point for a project and a necessary constant throughout. Examples of activities that may help enhance communication to build relationships with partners include:

- Actively involving partners through participation on an advisory board, science advisory board, and/or policy advisory board
- Clarifying expectations through a formal agreement[11] that might include:
  - Names of partner agencies, organizations, and individuals
  - Statement of purpose
  - Participation requirements
  - Opportunities or plans for exiting the partnership
  - Expectations for meeting frequency, duration, etc.
  - Expectations or goals for the project as a whole and for each partner
  - Description of allocation of resources
  - Approach to addressing cultural competency
  - Data sharing and ownership agreements
  - Publication and authorship guidelines
  - Signatures of agencies and organizations committed to accomplishing the goals

Many PEPH partnerships spend time identifying a process for reaching a consensus and for resolving conflict. Professional facilitators can be helpful in important decision-making meetings. It is important that partners not ignore contentious issues but address them directly to encourage effective decisions and strong partnerships.[12]

Many frameworks exist that describe key concepts related to partnering. Grantees may find it useful to create checklists or metrics based on these frameworks. We provide a list of sources in **Appendix 4**.

[11] A sample memorandum of understanding (MOU) is included in Appendix 8 as an example of a formal agreement.

- Using formal governance procedures to organize partnership activities
- Revisiting mission, goals and formal agreements regularly (e.g., bi-monthly, annually, biannually)
- Providing opportunities for regular communication among partners through emails, listservs, and participation in meetings
- Providing opportunities for input on and access to meeting agendas
- Providing incentives (financial and non-financial) to encourage partners to fully participate in the program or project
- Planning meetings and other activities to increase interaction, communication and exposure to one another as well as to build collaboration and cooperation (e.g., community meetings, classes, workshops). Ensure that meetings are scheduled at times that are convenient to all partners.
- Addressing cultural differences by working to understand the culture, values and beliefs of new partners and by developing ways to address differences in education, language, preparation, culture, etc.
- Vocalizing and discussing expectations from each partner in a group setting until an agreement is reached and engaging professional facilitators to manage conflict when needed
- Interviewing partners to assess which aspects of the partnership work or do not work.

Example Metrics for Activity 2: Build relationships with partners

- Description of formal partnership agreement, including provisions and requirements
- Number of partners who signed agreement
- Re-evaluation of goals and mission
- Description of how barriers to communication (e.g., cultural, language, educational) between partners were addressed
- Description of how aspects of the relationship have changed over time
- Lists of outreach and collaboration partnership activities, including number of partners involved, date, time and place of activity, who identified the issue, and approach and purpose of activity
- Satisfaction level of grantees with partnership (quantitative or descriptive)
- List of partners and advisory board members

[12] See also, Susskind L, McKearnan S, Thomas-Larmer J. 1999. The Consensus Building Handbook: A Comprehensive Guide to Reaching Agreement. Thousand Oaks, CA: Sage Publications, Inc.

Metrics in Action 2.2 Alaska Community Action on Toxics: Because of Alaska's vast geography and severe weather, organizations there face unique challenges in building partnerships. These challenges require that organizations find creative ways to communicate and facilitate participation in research projects and other activities. The Alaska Community Action on Toxics (ACAT) has addressed these challenges to partnership building by establishing a volunteer board that meets using teleconference technology to supplement face-to-face meetings. The board comprises representatives from across the state: three members from Anchorage and five members from communities throughout Alaska. During the meetings, board members discuss challenges, resolve conflicts and work together to develop ACAT strategy. Board members keep the community partners involved by regularly reporting back to the communities. Twice a year ACAT also holds community meetings to discuss project progress and research findings, as well as to consider new ideas for research.

Metrics for building relationships with partners:

- Number of partners who signed formal partnership agreement: *X* partners signed a formal partnership agreement and regularly participate in board activities*.
- Satisfaction level of grantees with partnership: *According to a survey of ACAT board members, XX% are very satisfied with the use of teleconferences as a way to conduct board meetings*.

For more information about ACAT, visit: http://www.akaction.org.

**Where actual metrics were not available we have used an X to indicate hypotherical numbers.*

Activity 3: Involve partners

Activity 1	Activity 2	**Activity 3**	Activity 4	Activity 5
Identify partners	Build relationships with partners	Involve partners	Communicate clearly with partners	Maintain and improve partnerships and processes

Engaging partners allows them to develop a sense of project ownership, rather than a feeling of being the object of the study. Community partners in particular are more likely to commit to and participate in projects if they have a voice in framing the research questions and conducting the research. Recognizing inherent challenges to engaging community groups in this fashion, PEPH grantees frequently provide training to community members on the research process.

Partners can be involved with almost every aspect of research projects, including:

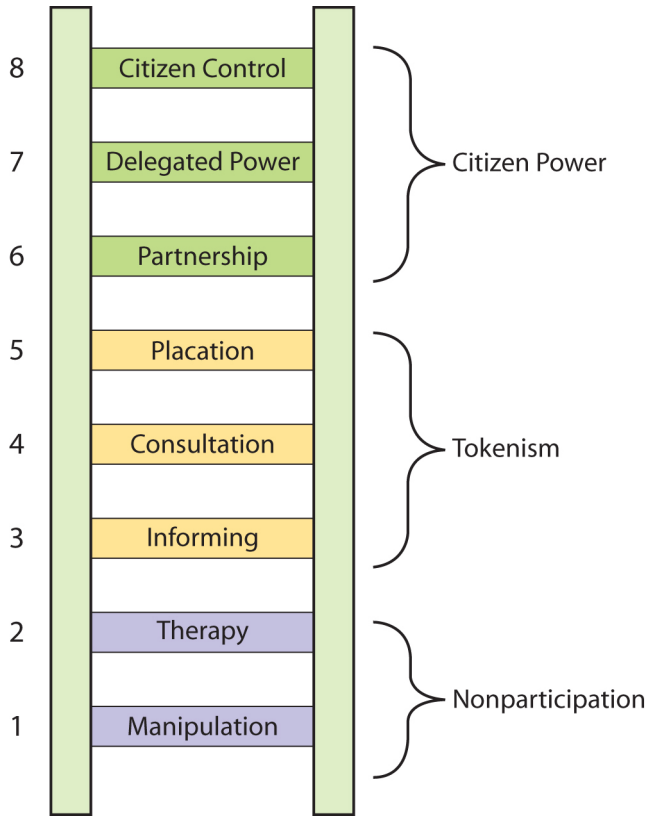
- Framing research questions
- Designing the research projects
- Collecting and analyzing data
- Interpreting and translating findings
- Communicating findings to others
- Evaluating what worked and designing next steps

Involving partners in the research process may help to:

- Familiarize partners with research language to ensure successful communication
- Familiarize researchers with language used by the community
- Enable partners to advocate for their communities

For another perspective on active partner involvement, consider about Sherry Arnstein's ladder of citizen participation, in which she describes the various levels at which partners may be involved with a project.[13] Figure 2.2 illustrates Arnstein's levels of involvement using the rungs of a ladder and shows how community empowerment begins to happen when community members and other partners are actively engaged in a partnership.

Figure 2.2 Arnstein's Ladder of Citizen Participation



[13] Arnstein, SR. 1969. A ladder of citizen participation. J Am I Planners 35(4):216-224.

Using the Ladder of Participation in a Project

In 2003, the **University of Kentucky** formed the **Kentucky Research Consortium for Energy and Environment (KRCEE)**. The Consortium's mission is to provide technical support to the U.S. Department of Energy, the U.S. Environmental Protection Agency and the Kentucky Division of Waste Management for clean-up efforts at the Paducah Gaseous Diffusion Plant (PGDP), a National Priority List Superfund site. In 2009, the Department of Energy asked KRCEE to develop a community-based future vision for the site and create a PGDP End State Report that identifies the range of community perspectives and preferences for the site's future after the Department of Energy closes the facility. The project team utilized the Community-Based Participatory Communication process. To assess the level of public participation in previous efforts to engage the community as well as the perceived ideal levels of public involvement, KRCEE used Sherry Arnstein's "Ladder of Citizen Participation." Respondents assessed the performance of the Consortium using the rungs of the ladder as the rating scale.

Paducah participants felt that the target level of public engagement as depicted on the Arnstein Ladder was *partnership*, but they felt that the actual experienced level of public engagement lay between *informing* and *placation*. KRCEE developed an evaluation tool based on these partnership levels and used the findings to move the group towards the desired level of involvement. To use the scale as a metric, projects could track the changes in responses in each category over time.

Example Metrics for Activity 3: Involve partners

- Number and description of partners who contributed to identifying or framing research questions
- Description of partners' contributions to research
- Number and description of concerns voiced by partners
- Description of how concerns were addressed by partnership
- Description of how resources were shared among partners
- Number of hours partners participated in research
- Description of partner involvement in research
- Satisfaction level of grantees with involvement in research process (quantitative or narrative)
- Number and description of interactions with partners
- Number of partners in research project leadership roles

Metrics in Action 2.3 Marine Resources for Future Generations (MRFFG): The Washington Department of Fish and Wildlife (WDFW) wanted to work with the Asian and Pacific Islander (API) community members to address illegal shellfish harvesting issues. They identified the Korean Women's Association (KWA) and the Indochinese Cultural and Service Center (ICSC) as two partners who also had an interest in promoting environmental public health issues among the API community. These partners have a history of working in the API community and helped WDFW gain access to API community members. The partners worked with the community to educate them about the hazards of consuming shellfish from closed and contaminated beaches. Once the community understood the dangers associated with contaminated seafood, they realized they did not have the information they needed to make changes in their own behavior. The local markets where API communities buy shellfish did not advertise the source of the shellfish. To address this problem, the partners created the MRFFG program, which worked with local markets to identify and display the source of shellfish. The MRFFG program successfully involved relevant partners in the process of framing and prioritizing the project's research questions to address local concerns and help reduce local health risks.

Metrics for involving partners:

- Number and description of partners who contributed to identifying or framing research questions: *Three partners worked to identify and frame research questions: a state agency and two community service organizations with ties to the API community.*
- Number of hours partners participated in research:
  Washington Department of Fish and Wildlife, XX hours
  The Korean Women's Association, XX hours
  Indochinese Cultural and Service Center, XX hours

For more information about this project, see: Judd NL, Drew CH, Acharya C, Mitchell TA, Donatuto JL, Burns GW, et al. 2005. Framing scientific analyses for risk management of environmental hazards by communities: Case studies with seafood safety issues, *Environ Health Perspect* 113(11).

Available: http://www.ehp.niehs.nih.gov/members/2005/7655/7655.html

Activity 4: Communicate clearly with partners

Activity 1	Activity 2	Activity 3	Activity 4	Activity 5
Identify partners	Build relationships with partners	Involve partners	Communicate clearly with partners	Maintain and improve partnerships and processes

Strong partnerships are the result of effective communication among partners. Partners are more likely to engage in environmental public health activities if they understand the purpose, expectations and benefits of participation. Strategies for communicating clearly and effectively with partners include:

- Providing opportunities for regular communication through email, listservs, meetings, etc.
- Creating messages and materials in partnership with the target audience
- Developing culturally-appropriate communication strategies and messages in partnership with the intended audience
- Testing communication materials for readability
- Creating opportunities to listen to community members

Example Metrics for Activity 4: Communicate clearly with partners

- Number and description of messages disseminated
- Number and description of media channels used to disseminate messages (radio, television, websites, brochures, live performances, etc.)
- Description of efforts to ensure bidirectional communication
- Number of people who received messages (website hits, brochures taken, radio or television audience estimates, meeting participants)
- Level of awareness of messages
- Level of comprehension of messages
- Description of efforts to ensure culturally-appropriate messages

Metrics in Action 2.4 The Silent Spring Institute: The Institute has a core mission of identifying the links between the environment and women's health, particularly breast cancer. The Institute collaborates with Communities for a Better Environment (an environmental justice organization) and researchers at Brown University and the University of California, Berkeley, to study household exposures to pollutants. One of the Institute's primary strategies for communicating with its target audience is to report back to study participants on the chemicals detected in their home. The feedback is tailored to the unique exposures identified and includes actions that can be taken to reduce or eliminate these exposures. Reports put results in the context of what scientists know and what is still uncertain about links between these exposures and health. The Institute has found that households are motivated to adopt environmentally healthy practices when they receive tailored information about specific environmental exposures in their homes.

Metrics for communicating clearly with partners:

- Number and description of messages: *All messages to homeowners are personalized to provide specific actions that can be taken to mitigate environmental health hazards.*
- Number and description of media channels used to disseminate messages: *The Institute provides feedback in person to provide opportunities for questions and discussion.*

For more information about The Silent Spring Institute, visit: http://www.silentspring.org.

Activity 5: Maintain and improve partnerships and processes

Activity 1	Activity 2	Activity 3	Activity 4	Activity 5
Identify partners	Build relationships with partners	Involve partners	Communicate clearly with partners	Maintain and improve partnerships and processes

Once grantees have established partnerships they still need to work to maintain the relationships. Many of the strategies conducted to build partnerships in the first place are also applicable to maintaining and improving these relationships.

Specific strategies for sustaining partnerships include:

- Communicating on a regular basis
- Revisiting and reframing the vision and goals of the project
- Revisiting decisions made early in the project, including governance agreements, rules for meetings and verbal agreements about the importance of trust, communications and respect for other members of the partnership
- Revisiting and reframing research questions
- Assessing the number and diversity of partner organizations
- Assessing potential threats to the partnership
- Adding partners or giving partners the opportunity to exit the partnership
- Gathering additional input and opinions from partners
- Summarizing outcomes of the partnership to communicate its value

As a project progresses and new needs emerge, it might be useful to consider whether or not partners need to cycle in and out of active participation.[14] In order to facilitate this process, it may be helpful to provide structured opportunities to renew partnership commitments.

Example Metrics for Activity 5: Maintain and improve partnerships and processes

- Number and description of partners added
- Number and description of partners who cycle out of the partnership
- Number and description of partners retained
- Description of new needs
- Description of new resources
- Description of changes to research questions

[14] Trent TR, Davis RM. 2009. Scope, scale, and sustainability: What it takes to create lasting community change. The Foundation Review 1(1): 96-114.

Outputs

This section describes four outputs PEPH grantees may produce as a result of their activities to build partnerships. As a reminder, outputs are the direct products of partnership activities. Identifying and describing outputs enable grantees to see the connection between activities and impacts.

Output 1: Multi-directional communication among partners
Output 2: Commitment by partners
Output 3: Translation of scientific findings among partners
Output 4: Community involvement in research

Output 1: Multi-directional communication among partners

Output 1	Output 2	Output 3	Output 4
Multi-directional communication among partners	Commitment by partners	Translation of scientific findings among partners	Community involvement in research

A direct output of building strong partnerships is the opportunity for multi-directional communication among partners, in which all partners listen as often as they talk. Partners involved in multi-directional communication have equal opportunities to take part in discussions, set the agenda and decide on research priorities. Partnerships that encourage multi-directional communication encourage transparency, sustain effective communication and promote sustainable partnerships. To determine if a partnership is generating opportunities for multi-directional communication, grantees can answer the following questions:

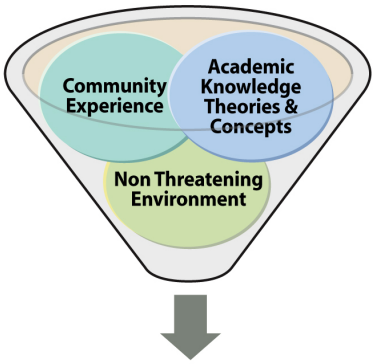
- Who initiates the communication?
- Who designs the type of interaction or communication?
- Who decides on the language and content?
- Who is the target audience?

Example Metrics for Output 1: Multi-directional communication among partners

- Number and types of partners participating in communication activities (e.g., ethnic, cultural and geographic diversity)
- Number and description of opportunities for partners to voice their opinions and needs
- Description of contributions from partners
- Description of exchanges that occur
- Description of any adaptations made to communication styles or messages to reflect cultural appropriateness

Metrics in Action 2.5 The Deep South Center for Environmental Justice (DSCEJ): Located in New Orleans, DSCEJ was founded in 1992 as a collaboration of regional community environmental groups and universities dedicated to addressing environmental justice issues. The DSCEJ has developed and embraced a model for community partnership called "communiversity," which emphasizes a collaborative relationship between universities and communities.

Communiversity Model



Effective Research and Policy

This "communiversity" approach was developed in direct response to past inequalities in communication, where problem-solving attempts often consisted of researchers controlling the dynamics of interaction. The new model helps equalize partner interactions and input and facilitates reciprocal communication between community members, researchers and students. The DSCEJ community and university partnership provides opportunities for communities, scientific researchers and policy-makers to collaborate on programs and projects to minimize environmental health risks and consequences.

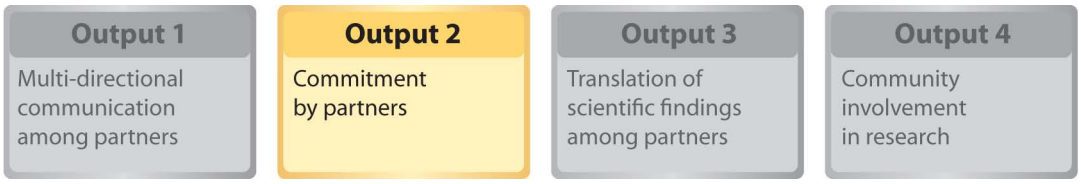
To advance the "communiversity" model, DSCEJ formed the Mississippi River Avatar Community Advisory Board (CAB), which provides a venue for multi-directional communication among representatives from grassroots organizations and leaders of affected communities in the river corridor. The results of these partnerships include environmental public health initiatives such as A Safe Way Back Home and toolkits for Hurricane Katrina survivors.

Metrics for multi-directional communication among partners:

- Number and description of opportunities for partners to voice their opinions and needs: *The Mississippi River Avatar Community Action Board meets X times per year. XX people attend the meetings and actively participate in discussions.*
- Number of times each partner contributes to meetings: *Each partner has helped lead at least X meetings and all partners have provided input at least once per meeting.*

For more information about the DSCEJ, visit: www.dscej.org.

Output 2: Commitment by partners



Increased commitment by partners to both the project mission and the partnership itself is an output of successful partnerships. Evidence of commitment serves as an indicator that relevant partners care about the project underway and are actively engaged in the partnership. This evidence could include tangible investments, such as contributions of money or meeting space. Evidence can also include less tangible elements, such as time donated, partner interactions and outreach. For example, academic partners can demonstrate commitment to the project by training and employing members of the community:[15]

- In New Orleans, the "Lead Busters" project trained and employed community residents to conduct interventions.
- In Detroit, residents partnered with researchers, as leaders and active participants, to conduct asthma interventions in the community for the Community Action Against Asthma project.

Example Metrics for Output 2: Commitment by partners

- Number of active diverse partners who represent research and community needs (e.g., funders, faith-based organizations, governmental and nongovernmental organizations, universities, etc.)
- Number of community partners participating in a grant application process
- Description of resource sharing among partners
- Level of funding committed by partners
- Description and count of other resources committed by partners (staff, volunteers, supplies, meeting space)
- Number of community partners participating in the research effort
- Description of community support (e.g., letters of support, invitations to organizational events, funding contributions)
- Description of partner feedback
- Number of partners signing memorandums of understanding or other commitment documents
- Number of community partners willing to take on leadership roles (or number in leadership roles)
- Number of hours volunteers contributed

[15] Jones L. 2000. Healthy African American Families. In: Successful Models of Community-Based Participatory Research, 29-31 March 2000: Final Report, Washington, DC. 38. (O'Fallon LR, Tyson FL, Dearry A, eds). Available: *http://www.hud.gov/offices/lead/library/hhts/NIEHS_Successful_Models.pdf* [accessed 16 December 2011].

Output 3: Translation of scientific findings among partners

Output 1	Output 2	**Output 3**	Output 4
Multi-directional communication among partners	Commitment by partners	Translation of scientific findings among partners	Community involvement in research

Research produces scientific findings about community based environmental health interventions, activities or products. By interpreting or translating these findings for specific audiences, researchers and community partners can work together to apply the science in ways that affect the daily lives of community members. When research information is appropriately translated and discussed, partners are more likely to adopt measures that are recommended for reducing environmental health risks.

Example Metrics for Output 3: Translation of scientific findings among partners

- Number and description of materials that translate findings (see also Chapter 4: Products and Dissemination)
- Lists of co-authorship on materials that demonstrate a mix of partners
- Description of subsequent funding for translation efforts
- Description of support provided by target audience for translation efforts
- Number of publications that report on translation activities
- Description and counts of how partners are using findings in other settings
- Number of requests for translated information by partners
- Description of requests for materials by others
- Anecdotal evidence indicating successful translation of scientific findings to new audiences
- Number and description of materials or products produced by partners that include research findings

Metrics in Action 2.6: The goal of the **Superfund Research Translation Core (Core)** at the **University of California (UC)**, Berkeley, is to translate research findings and scientific knowledge for a wide range of audiences. The audiences include federal and state agencies, state legislators and their aides, non-governmental organizations (NGOs), community-based organizations (CBOs), relevant business interests and others involved in the remediation of Superfund sites or engaged in efforts to protect public health. The Core involves community groups in workshops to explore the relationship between research findings and policy in order to identify translation projects that will address community concerns. For these workshops, the Core works with partners to identify and select topics, formulate agendas and select speakers. Engaging the communities in the selection of topics for translation results in a richer product and a more inclusive roster of participants, reflecting both science and policy expertise. Previous workshop topics include:

- Use of biomonitoring data in environmental public health surveillance and policy
- Implications of research related to susceptibility to environmental exposures
- Use of findings in public policy

Following the selection of topics, researchers work with community partners to translate scientific findings in ways that allow conceptual access to the research. UC Berkeley also ensures that the final materials are available in locations frequented by the target population.

Metrics for translation of scientific findings among partners:

- Description of support provided by target audience for translation efforts: *UC Berkeley involves the community partners by educating them about the research findings and gathering ideas from them about how this information could be applied in their communities. Community partners provide input on early messages and products and provide feedback on drafts of initial materials. Community partners also provide guidance about the most effective ways to distribute the material.*
- Description of requests for materials by others: *X organizations requested XX copies of the (name of publication), (name of newspaper) ran an article on the issue, and (name of organization) has requested XX copies to distribute to (whom?)*

For more information about the UC Berkeley Core, visit: *http://superfund.berkeley.edu/*.

For more information on products and dissemination, see **Chapter 4**.

Output 4: Community involvement in research

PEPH programs include teams of researchers and community members who work together to develop research questions, conduct the research, translate research findings and produce products for dissemination. This type of community involvement in research is a direct product of a successful partnership.

Example Metrics for Output 4: Community involvement in research

- Number of partners who participate in collecting data
- Number of partners who participate in analyzing data
- Number of partners who participate in developing messages to summarize results
- Description of community involvement in research process
- Number of partners who co-author papers
- Number of new organizations who become involved in research and outreach
- Number of partners who provide input to websites
- Number of engaged students from communities
- Number of theses, posters, doctoral dissertations, etc., related to the research
- Description of feedback from the target community that demonstrates effective communication strategies tailored to partner audiences, including consideration of language and cultural differences
- Number and description of partners participating in seminars on campus and in the community, including number of contact hours
- Frequency of invitations for partners to attend events of other partners

Metrics in Action 2.7: The partners of the community-based, participatory research project called **Together for Agricultural Safety Project (TASP)** worked as a team to develop interventions to reduce the adverse health effects of pesticide exposure among farmworkers. The collaborators included health researchers from the University of Florida (UF), the Farmworker Association of Florida (FWAF) and Best Start, Inc. (BSI), a social marketing research firm. The team first conducted focus groups with farmworkers to assess their knowledge, attitudes and behaviors about workplace pesticide exposure as well as to understand how best to communicate these environmental public health messages to them. The project employed bilingual FWAF community members to recruit group participants and moderate information sessions. Researchers also developed and conducted a survey with 382 workers to determine the best ways to reduce harmful pesticide exposure. Based on the input of the farmworkers, the partners designed and built portable hand-washing tanks for the field, and developed an accompanying educational campaign about the importance of field sanitation practices for workplace supervisors and employees. All three partners also contributed to an article summarizing the process by which the project was implemented.

Metrics for community involvement in research:

- Number of partners who participated in collecting data: *Members of the FWAF helped develop and lead focus groups and provided input into the survey development. Researchers from UF and BSI also collected data, while 382 farmworkers provided data.*
- Number of partners who co-author papers: *All three partners contributed to an article summarizing the process by which the project was implemented.*

For more information about TASP, visit:
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240566/pdf/ehp109s-000461.pdf.

Impacts

Impacts are benefits or changes resulting from activities and outputs. This section provides metrics for three impacts that grantees might expect to achieve as a result of building and maintaining partnerships.

Impact 1: Sustainable partnerships

Impact 2: Increased awareness of issues and research process

Impact 3: Expanded research collaborations

Impacts are more difficult to measure than activities and outputs in part because it often takes several years for substantive changes to occur. When thinking about the impacts a project might be able to achieve and how to measure those impacts, it can be helpful to think in terms of short-term and long-term impacts. Short-term impacts are typically those changes that would be expected in the first few years of a project. Long-term impacts might not be seen for 5 or more years. Even when impacts are expected to occur beyond the life of a program, it can be helpful to identify impacts that grantees can document and measure.

Grantees may also be hesitant to claim credit for impacts because other organizations or other contextual factors may have contributed to the changes. While grantees may not be able to claim sole credit for these impacts, it is important to be able to track these broader changes and to document the contributions made by the project to achieving these impacts.

Although there are challenges associated with measuring impacts, tracking progress towards these goals helps grantees stay on track, demonstrate success and identify areas for improvement. What is most important is that the ultimate goal of partnerships is to produce outcomes and impacts that lead to improvements in health through a reduction in environmental health hazards.[16]

For additional information on long-term impacts, see **Chapter 7: Principles of Evaluation**.

[16] See also, Silka L. 2000. Evaluation as a strategy for documenting the strengths of community-based participatory research in: Successful Models of Community-Based Participatory Research, 29-31 March 2000: Final Report, Washington, DC. 49-54. (O'Fallon LR, Tyson FL, Dearry A, eds). Available: *http://www.hud.gov/offices/lead/library/hhts/NIEHS_Successful_Models.pdf* [accessed 16 December 2011].

Impact 1: Sustainable partnerships

Impact 1	Impact 2	Impact 3
Sustainable partnerships	Increased awareness of issues and research process	Expanded research collaborations

A sustainable partnership is able to maintain long-term success after dedicated funding sources have ended.[17] Key factors necessary for sustainability include institutionalization (partnerships embedded in formal structures or relationships), financing and capacity.[18] A significant impact of PEPH projects is the existence of sustainable partnerships. Sustainable partnerships increase the amount and extent of community engagement in research. Such partnerships are especially beneficial to communities affected by a disproportionate burden of environmental health risk.

For additional information on leveraging, see **Chapter 3**, and for more information on capacity building, see **Chapter 6**.

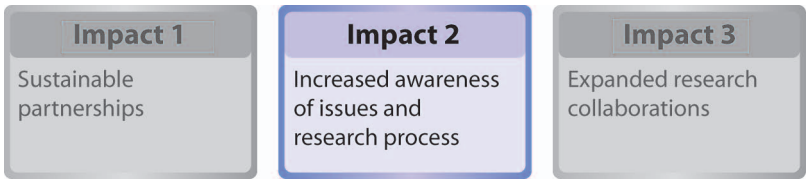
Example Metrics for Impact 1: Sustainable partnerships

- Number of years the project or program has existed
- Length of time partners remain involved with the partnership
- Degree to which partners' organizations reflect a concern for environmental public health
- Timeline of key milestones in partnership's history
- Description of mutual influence
- Description of long-term plans and benefits to each partner
- Description of strategies for sharing power among partners
- Description of challenges identified by partners and how they are addressed
- Description of the body of knowledge acquired while developing and sustaining new and existing partnerships
- Number of organizations that have formal policies requiring participation in the partnership
- Description of continued relevance of the project to partners

[17] Center for Substance Abuse Treatment. 2008. Sustaining Grassroots Community-Based Programs: A Toolkit for Community- and Faith-Based Service Providers. HHS Publication No. (SMA) 08-4340. Rockville, MD: Substance Abuse and Mental Health Services Administration, U.S. Department of Health and Human Services.

[18] Trent TR, Davis RM. 2009. Scope, scale, and sustainability: What it takes to create lasting community change. The Foundation Review 1(1): 96-114.

Impact 2: Increased awareness of issues and research process



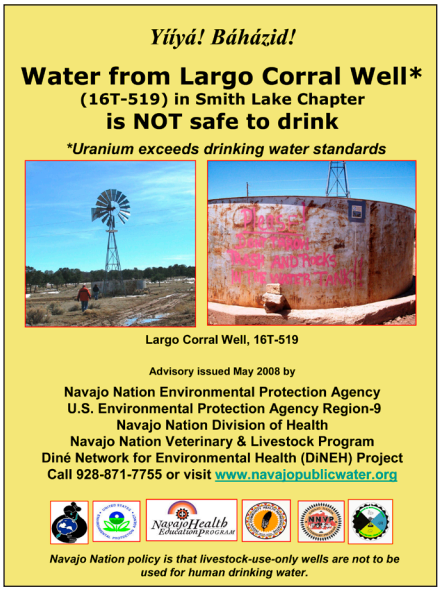
Increased awareness of environmental health issues is another important impact of partnership activities. Engagement of community partners in identifying research questions, participating in the research and disseminating the findings provides the underpinnings for a community to fully understand environmental health issues and make informed decisions that affect them. By working together, community partners are able to improve awareness and understanding among their constituents of environmental public health issues and their sources, as well as the research process. Community input also helps improve the research and findings. Grantees can use community input to ensure that research questions address community concerns. Grantees can also use community input to ensure that materials and publications are relevant to the community and therefore more likely to be read and applied within the community.

Example Metrics for Impact 2: Increased awareness of issues and research process

- Trends in depth of understanding of community partners on environmental public health issues
- Number of community partners who report increased awareness of environmental public health issues
- Description of research findings reported in partners' materials, websites and messages
- Description of community mobilization around other environmental public health issues
- Description of research findings reported in materials intended to change behaviors, policies or regulations
- Description of how public health departments changed materials based on research findings
- Description of how schools have changed materials or curricula based on research findings
- Number and description of new programs that have been added to address research findings
- Number and description of new dissemination materials that have been added to address research findings
- Description of how partners have applied knowledge of the research process to other issues

Metrics in Action 2.8: The University of New Mexico Community Outreach and Engagement Program (UNM COEP) has invested the time to successfully communicate and engage with partners in order to increase awareness of environmental public health issues and the research process. The program communicates with several tribal populations about water quality, air quality and social/environmental justice issues through multimedia tools developed with communities such as photos and pamphlets that individuals can take home and share with their families. They also use radio to broadcast messages, ranging from 30-second public service announcements to one-hour talk shows. The researchers produce almost all of their materials in English and native languages where appropriate.

Although initial efforts may have had a narrow focus such as raising awareness of drinking water quality, the researchers found that after several years of working with the tribes, the community members who participate in the meetings or call-in shows tend to ask questions about a broad range of environmental public health issues. Through this partnership, the researchers have developed a better understanding of the relationship of these communities to water and landbased resources, as well as of the way in which cultural priorities affect actions.



Example of posters used to raise awareness of water quality issues with Navajo populations.

Metrics for increased awareness of issues and research process:

- Trends in depth of understanding of community partners on environmental public health issues: *The UNM COEP surveys community partners and analyzes the content of questions raised at meetings and in radio call-in shows to track the depth of understanding of focused issues and awareness of other potential environmental hazards over time. The number of questions based on inaccurate assumptions has decreased over the last 10 years, while the level of detail and number of issues have increased over the same time period.*

- Description of how partners have applied knowledge of the research process to other issues: *Communities have used the knowledge they gained about the research process to begin working with other agencies to address environmental health issues related to food safety and access, and to seat belt use as well. The program also tracks the number of times community and agency partners independently use research data to support requests for action and policy change.*

For more information about the UNM COEP, visit:
http://hsc.unm.edu/pharmacy/healthyvoices/about.html
http://www.healthyvoices.org/

Impact 3: Expanded research collaborations

Impact 1	Impact 2	Impact 3
Sustainable partnerships	Increased awareness of issues and research process	Expanded research collaborations

As partnerships mature, one important impact that may result is collaboration on new projects. As partners get comfortable with the research process and learn to trust each other, it is likely that they will be interested in pursuing additional research collaborations. Follow-on projects can be more complex and sophisticated, include multiple components and be more likely to leverage funds from internal and external partners.

See **Chapter 3** for more information on leveraging.

Example Metrics for Impact 3: Expanded research collaborations

- Number and description of partners who express an interest in additional research projects
- Number and description of new research questions proposed by partners
- Number and description of follow-on research projects identified
- Number of early-stage investigators recruited to pursue environmental health careers
- Number of application and awards for additional grants
- Number and description of new partners who join the research project
- Change in number of partners over the life of the project
- Number of publications with new partners
- Number of new partners who contributed to publications
- Description of additional research opportunities generated

Metrics in Action 2.9: The Detroit Community-Academic Urban Research Center (Detroit URC) is a collaborative partnership whose members include the University of Michigan Schools of Public Health, Nursing, and Social Work, the Detroit Department of Health and Wellness Promotion, eight community-based organizations and the Henry Ford Health System. The partnership was founded in 1985 and over the years has developed a strong sense of trust and open lines of communication among partners. When an opportunity to apply for NIEHS/EPA Centers for Excellence in Children's Health funding plan arose, the Detroit URC was able to mobilize its partners to take action. The partners openly discussed research priorities and concerns and identified children's environmental health as one of its priorities. Because of the strong partnership that was already in existence, the Detroit URC was able to expand its research into new priority areas and was able to successfully obtain funding to cover this new research area. The Detroit URC also recruited three additional agencies to participate in these new research projects.

Metrics for expanded research collaborations:

- Description of additional research opportunities generated: *$5 million granted by NIEHS for establishing a Children's Environmental Health Sciences Center (Michigan Center for the Environment and Children's Health), 1998-2005; $2.4 million granted by NIEHS to conduct the Community Organizing Network for Environmental Health, 2000-05; $2.5 million granted by NIEHS for a household intervention to reduce asthma triggers, 2008-13 and another $2.5 million from NIEHS for an epidemiologic project to characterize the effect of roadway associated air pollution on the exacerbation of asthma in children, 2008-13.*
- Change in number of partners over the life of the project: *The partners have stayed the same over the years, with the exception of one new organization that joined to work on environmental public health activities.*

For more information about the Detroit URC, visit: www.detroiturc.org

Metrics in Action… Focus on NIEHS…

NIEHS is interested in having PEPH research be part of research that is funded through regular NIH study sections. This funding would indicate that PEPH research is being incorporated into standard NIEHS research, without NIEHS having to release a special RFA. For this reason, we measure how well grantees do in specific study sections. By tracking this metric over time, we hope to increase the number of applications and awards funded through regular study sections. Grantees may also find it useful to track this information.

Chapter 2 Case Study: The DiNEH Project

Partner identification and relationship building

The Diné Network for Environmental Health (DiNEH) Project is an outgrowth of ongoing collaborations to address the long-term public health and environmental effects of exposure to 1,100 unremediated legacy waste sites from more than 50 years of uranium mining on Navajo Nation lands. **The Community Environmental Health Program of the University of New Mexico (UNM-CEHP)** developed the DiNEH Project at the request of the Eastern Navajo Health Board (ENHB, or "the Health Board"), which had long been concerned about the possible role of environmental agents in the high rates of kidney disease observed in the local population. The DiNEH collaboration, which includes the Southwest Research and Information Center (SRIC) and numerous Navajo research staff and consultants, has continued to evolve over the last decade and now works throughout all 110 chapters of the Navajo Nation. It currently includes three service units of Navajo Area Indian Health Service (NAIHS), two contract (PL-638) health care facilities, several Navajo agencies including the Division of Health and the Navajo Nation EPA, the Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry (CDC/ATSDR) and USEPA Region 9. The focus of the project has expanded from water exposures and kidney health to environmental exposure effects on reproductive outcomes and child development at the request of affected communities. The DiNEH Project is characterized by a mature core of partners that operates as a team and is able to adjust the partnership to respond to community and research needs.

Metrics:

- Number and description of partners: *The DiNEH collaboration includes the Southwest Research and Information Center (SRIC) and numerous Navajo research staff and consultants, and all 110 chapters of the Navajo Nation. It currently includes three service units of Navajo Area Indian Health Service (NAIHS), two contract (PL-638) health care facilities, several Navajo agencies including the Division of Health and the Navajo Nation EPA, the Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry (CDC/ATSDR) and USEPA Region 9.*

Build relationships with partners

The DiNEH team identified new partners based on community needs and cultural norms. For example, Native American communities typically involve medicine men in tribal decision-making, and in response to community requests the partnership seeks support from the medicine men's organizations, provides updates and solicits their advice. The original project also had to facilitate participation by 20 Navajo Chapters (similar to counties) and has worked with them to develop methods for regular communication of results. The UNM-CEHP also identified partners who brought key research skills to the project, such as people involved in clinical chemistry and those researching biomarkers of cardiovascular, kidney and autoimmune disease as well as geochemists, hydrologists and radiation biologists.

Partners worked together to identify the goals of the DiNEH Project.
These goals include:

- Examining the poorly understood interplay between toxicant exposures and behavioral and cultural factors
- Educating community members and leaders about the possible role of water-borne agents in disease causation
- Identifying safe and unsafe water sources
- Increasing community capacity to carry out environmental health studies
- Informing public policies to promote safe drinking water and reduce exposures to waste
- Investigating the effect of uranium exposure on health
- Working with clinicians to understand interactions of exposure with known risk factors for disease
- Communicating environmental health concerns related to uranium wastes

Metrics:

- Descriptions of how barriers to communication (e.g., cultural, language, educational) between partners were addressed: *Native American communities typically involve medicine men in tribal decision-making, and in response to community requests the partnership seeks support from the medicine men's organizations, provides updates and solicits their advice.*

Expanded research collaborations

Partners recently identified a new research question they are beginning to address through the addition of new partners: understanding the effect of uranium exposure on reproductive outcomes and child development.

Metric:

- Number and descriptions of new research questions proposed by partners: *Partners identified one new research question – what is the effect of uranium exposure on reproductive outcomes and child development? The DiNEH team members developed many materials to communicate their findings to a variety of audiences and worked to influence policies for that will protect the health of tribal members.*

For more information about DiNEH, visit: http://hsc.unm.edu/pharmacy/healthyvoices/Dineh_Project.html

Summary of Partnership Metrics

Example Metrics for Activity 1: Identify partners

- Number of partners identified
- Number of additional identified partners that could be added in the future
- Number of contacts made with potential partners
- Number of potential partners who express interest in the project
- Number and description of needs of each partner
- Number and description of resources that each partner can contribute
- Description of benefits each partner may receive
- Description of project goals as related to partnerships
- Description of potential or perceived benefits of the partnership to each partner (e.g., increased visibility, increased access to priority populations, increased networking opportunities, technical assistance, connections to key partners, funding, improved image)
- Description of historical trust concerns between partners and descriptions of how these concerns will be addressed

Example Metrics for Activity 2: Build relationships with partners

- Description of formal partnership agreement, including provisions and requirements
- Number of partners who signed agreement
- Re-evaluation of goals and mission
- Description of how barriers to communication (e.g., cultural, language, educational) between partners were addressed
- Description of how aspects of the relationship have changed over time
- Lists of outreach and collaboration partnership activities, including number of partners involved, date, time and place of activity, who identified the issue, and approach and purpose of activity
- Satisfaction level of grantees with partnership (quantitative or descriptive)
- List of partners and advisory board members

Example Metrics for Activity 3: Involve partners

- Number and description of partners who contributed to identifying or framing research questions
- Description of partners' contributions to research
- Number and descriptions of concerns voiced by partners
- Description of how concerns were addressed by partnership
- Description of how resources were shared among partners
- Number of hours partners participated in research
- Description of partner involvement in research
- Satisfaction level of grantees with involvement in research process (quantitative or narrative)
- Number and descriptions of interactions with partners
- Number of partners in research project leadership roles

Example Metrics for Activity 4: Communicate clearly with partners

- Number and description of messages disseminated
- Number and description of media channels used to disseminate messages (radio, television, websites, brochures, live performances, etc.)
- Description of efforts to ensure bidirectional communication
- Number of people who received messages (website hits, brochures taken, radio or television audience estimates, meeting participants)
- Level of awareness of messages
- Level of comprehension of messages
- Description of efforts to ensure culturally-appropriate messages

Example Metrics for Activity 5: Maintain and improve partnerships and processes

- Number and description of partners added
- Number and description of partners who cycle out of the partnership
- Number and description of partners retained
- Description of new needs
- Description of new resources
- Description of changes to research questions

Example Metrics for Output 1: Multidirectional communication among partners

- Number and types of partners participating in communication activities (e.g., ethnic, cultural and geographic diversity)
- Number and description of opportunities for partners to voice their opinions and needs
- Description of contributions from partners
- Description of exchanges that occur
- Description of any adaptations made to communication styles or messages to reflect cultural appropriateness

Example Metrics for Output 2: Commitment by partners

- Number of active diverse partners who represent research and community needs (e.g., funders, faith-based organizations, governmental and nongovernmental organizations, universities, etc.)
- Number of community partners participating in a grant application process
- Description of resource sharing among partners
- Level of funding committed by partners
- Description and counts of other resources committed by partners (staff, volunteers, supplies, meeting space)
- Number of community partners participating in the research effort
- Description of community support (e.g., letters of support, invitations to organizational events, funding contributions)
- Description of partner feedback
- Number of partners signing memorandums of understanding or other commitment documents
- Number of community partners willing to take on leadership roles (or number in leadership roles)
- Number of hours volunteers contributed

Example Metrics for Output 3: Translation of scientific findings among partners

- Number and descriptions of materials that translate findings (see also Chapter 4: Products and Dissemination)
- Lists of co-authorship on materials that demonstrate a mix of partners
- Description of subsequent funding for translation efforts
- Description of support provided by target audience for translation efforts
- Descriptions and counts of how partners are using findings in other settings
- Number of requests for translated information by partners
- Description of requests for materials by others
- Anecdotal evidence indicating successful translation of scientific findings to new audiences Chapter 1: Introduction Page 61
- Number of publications that report on translation activities
- Number and description of materials or products produced by partners that include research findings

Example Metrics for Output 4: Community involvement in research

- Number of partners who participate in collecting data
- Number of partners who participate in analyzing data
- Number of partners who participate in developing messages to summarize results
- Description of community involvement in research process
- Number of partners who co-author papers
- Number of new organizations who become involved in research and outreach
- Number of partners who provide input to websites
- Number of engaged students from communities
- Number of theses, posters, doctoral dissertations, etc., related to the research
- Description of feedback from the target community that demonstrates effective communication strategies tailored to partner audiences, including consideration of language and cultural differences
- Number and descriptions of partners participating in seminars on campus and in the community, including numbers of contact hours
- Frequency of invitations for partners to attend events of other partners

Example Metrics for Impact 1: Sustainable partnerships

- Number of years the project or program has existed
- Length of time partners remain involved with the partnership
- Degree to which partners' organizations reflect a concern for environmental public health
- Timeline of key milestones in partnership's history
- Description of mutual influence
- Descriptions of long-term plans and benefits to each partner
- Description of strategies for sharing power among partners
- Description of challenges identified by partners and how they are addressed
- Description of the body of knowledge acquired while developing and sustaining new and existing partnerships
- Number of organizations that have formal policies requiring participation in the partnership
- Description of continued relevance of the project to partners

Example Metrics for Impact 2: Increased awareness of issues and research process

- Trends in depth of understanding of community partners on environmental public health issues
- Number of community partners who report increased awareness of environmental public health issues
- Description of research findings reported in partners' materials, websites and messages
- Description of community mobilization around other environmental public health issues
- Description of research findings reported in materials intended to change behaviors, policies or regulations
- Description of how public health departments changed materials based on research findings
- Description of how schools have changed materials or curricula based on research findings
- Number and description of new programs that have been added to address research findings
- Number and description of new dissemination materials that have been added to address research findings
- Description of how partners have applied knowledge of the research process to other issues

Example Metrics for Impact 3: Expanded research collaborations

- Number and description of partners who express an interest in additional research projects
- Number and description of new research questions proposed by partners
- Number and description of follow-on research projects identified
- Number of early-stage investigators recruited to pursue environmental health careers
- Number of applications and awards for additional grants
- Number and description of new partners who join the research project
- Change in number of partners over the life of the project
- Number of publications with new partners
- Number of new partners who contributed to publications
- Description of additional research opportunities generated

Chapter 3:
Leveraging

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Chapter 3: Leveraging

Introduction

Leveraging is the process of amplifying the benefit from an investment or project by using available resources to obtain additional resources, such that the total effect is greater than the sum of the parts. Leveraging can involve making new contacts through networking, growing an existing relationship or obtaining supplemental funding.

Leveraging Logic Model

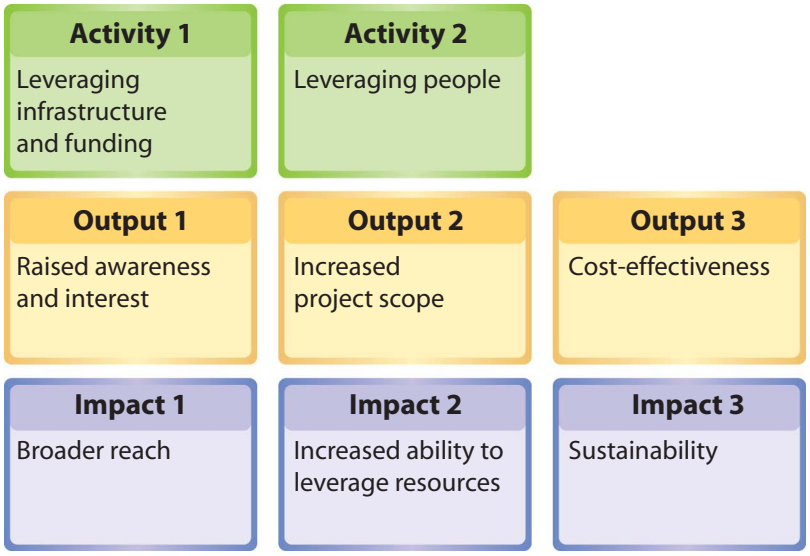
This model identifies potential activities, outputs and impacts of successful leveraging. Grantees should use this chapter to brainstorm other activities, outputs and impacts that are applicable to their specific projects. This model contains three major components:

- **Activities** are actions that are based on available inputs for leveraging.
- **Outputs** are the direct products of leveraging.
- **Impacts** are benefits or changes resulting from the activities and outputs (ultimate or long-term impacts are also examined in Chapter 7: Principles of Evaluation).

We developed the logic models in this Manual recognizing that grantees reflect a wide range of experience and capacity. Some grantees have been funded for more than 20 years, while others are just getting started. In general, the logic models show increasing levels of maturity from left to right and from top to bottom. However, a logic model is not necessarily linear; not every PEPH project will begin with "leverage infrastructure and funding" and proceed through all components to "sustainability." Additionally, projects might not necessarily adhere to or exhibit all of the elements of the model.

Ideally, anyone working to leverage resources will recognize themselves in one or more of the logic model components. The elements of the model are numbered in Figure 3.1 to provide reference for discussion in the text of this chapter.

Figure 3.1 A Leveraging Logic Model with Examples of Activities, Outputs, and Impacts



Sources of Data

In Chapter 1, we discussed potential sources of data. Grantees may find the following items to be helpful sources of data in tracking achievements related to leveraging:

- Activity logs
- Contact logs
- Participant lists
- Feedback forms
- Publication and material development lists
- Meeting agendas
- Telephone logs
- Budgets
- Group discussions
- Surveys
- Interviews
- Meeting notes
- Email exchanges
- Internet web logs

For a more comprehensive list of data sources, see **Chapter 7: Principles of Evaluation**.

Records describe what happened and how. Records often take the form of an activity log or a journal that catalogues decisions, event attendees and other critical information.

When selecting metrics, remember that it will be easier to measure activities and outputs. Documenting impacts is important, but it may be challenging because of the length of time it might take to achieve the impacts, as well as the contextual factors that are likely to influence your ability to achieve these impacts.

The rest of this chapter provides ideas about activities, outputs and impacts related to partnerships as well as potential metrics to measure them.

Consider whether you can collect data for your metrics in a realistic time frame.

Inputs

The leveraging logic model example used in this chapter (Figure 3.1) provides a framework for evaluating leveraging resources such as infrastructure, funding and people within PEPH programs. While the logic models we present in this chapter focus on activities, outputs and impacts, we also discuss inputs here because of their inherent connection to leveraging activities.

Partners might need to achieve a certain level of capacity in order to leverage inputs to a greater overall result. For more information on obtaining and expanding resources, see **Chapter 6: Capacity Building**.

Inputs are resources a project can use to achieve an output or result. Inputs include infrastructure, funds, relationships, ideas and knowledge that can be used to achieve more resources, or more outputs from the same resources. Inputs can be included in any logic model, but they are especially important for leveraging activities because inputs define the baseline for leveraging.

Although we have numbered the components in the logic model to facilitate the discussion in this chapter, it is important to remember that the logic model is not linear. Projects will conduct activities, produce outputs and work to achieve impacts that are appropriate to their communities.

Activities

Activities are actions that help maximize leveraging based on available inputs. We identify two leveraging activities that grantees might conduct:

Activity 1: Leveraging infrastructure and funding

Activity 2: Leveraging people: relationships, ideas and knowledge

Activity 1: Leveraging infrastructure and funding

Tangible resources, such as physical or organizational infrastructure and money, are perhaps the simplest inputs to leverage. Examples of tangible resources that can be leveraged:

- Physical space (offices, cubicles, meeting rooms, laboratories, etc.)
- Office or scientific equipment (telephones, Integrated Services Digital Network (ISDN) lines, email address network, Internet access, teleconference or video-conference services/equipment, microscopes, polymerase chain reaction (PCR) imaging machines,[19] etc.)
- Supplies (sticky notes, pens, paperclips, pipettes, microscope slides, etc.)
- Existing products related to the project:
  - Format and content of presentations, newsletters, brochures, websites, etc.
  - Survey questions and protocols
  - Previous grant applications
  - Existing Institutional Review Board (IRB) applications and "approved" consent language
  - Pilot project data
  - Statistical or geographical modeling approaches
  - Biomarkers

[19] The PCR is a scientific technique in molecular biology to amplify a single or a few copies of a piece of DNA across several orders of magnitude, generating thousands to millions of copies of a particular DNA sequence.

- Organizational and administrative resources:
  - Existing administrative relationships such as those needed for payroll and accounts management
  - Resources from "Service" or "Facility Cores" either from the same grant or a different grant. Some large grants, such as P30 Core Centers, P42 Superfund Projects, P01 Children's Environmental Health Centers, etc., have facility and service cores that can provide resources to the other projects in the same grant. Projects can also leverage resources in grants funded by other sources, such as the National Center for Research Resources Clinical and Translational Center Awards (CTSAs)

Examples of additional funding that can be leveraged:

- Reserves from a "Director's Fund" either within an existing grant structure such as the P30 Core Center or from another Institutional resource (such as a Department Chair's or Provost's fund)
- Alignment of activities with those of similar projects to combine resources for a given program activity (for example, if a local community is sponsoring a health fair, different partners could co-fund printed materials to advertise the event, thereby meeting the needs of both groups and potentially resulting in cost efficiencies)
- Additional investment in the project from other sources (foundations, discretionary funds, additional grants, etc.)

Both infrastructure and money can be leveraged to facilitate achievement of any of the outputs or impacts shown in a leveraging logic model.

Some examples of how to measure leveraging of infrastructure and money:

- Developing a catalog of related research projects in the same geographic region
- Identifying resources within those projects that might be available and helpful
- Listing discussions with personnel working on related research projects about potential monetary or "in kind" support

Use of existing products means leveraging resources from other programs or organizations, which can stretch existing resources further to save time and money – for example, adding questions to an existing survey as opposed to creating a new survey from scratch.

Federal funding cannot be awarded to a project that has scientific and/or budgetary overlap with another existing or previously-funded project. Any new research activities, infrastructure or personnel for which new funding is requested must be sufficiently different in scope. If you have questions about potential overlap, please contact your Project Officer to determine if newly requested funds or proposed leveraging of existing funds would be permissible.

Example Metrics for Activity 1: Leveraging infrastructure and funding

- Number and description of physical space obtained or used from other sources
- Number and description of office equipment, supplies or existing products obtained or used from other sources
- Number and description of organizational or technical resources obtained or used from other sources
- Dollar amount obtained from other funding sources
- Number of applications submitted and funded ("spin-off" funding)
- Number and description of contacts made that might be tapped for additional funding

Metrics in Action 3.1: In order to leverage funding and personnel, the **International Chemical Workers Union Council (ICWUC) Center for Worker Health and Safety Education** aligns its activities with those of similar projects. The Center educates workers about Hazardous Waste Operations and Emergency Response (HAZWOPER) standards and many other health and safety topics. The program cooperates with a multi-union consortium to provide on-site educational services targeted to facility workers who handle hazardous substances. In some instances, it targets disadvantaged or under-employed groups, such as the Coalition of Black Trade Unionists (CBTU). The program obtained a $288,000 grant from the Department of Transportation (DOT) by demonstrating its effective use of the $2,210,000 grant NIEHS awarded. The ICWUC used the DOT grant to develop worker trainers from the ICWUC, United Steelworkers, United Auto Workers and the CBTU. ICWUC also has contracts with private companies such that the companies cover the majority of costs to train their workers. The program provides trainees with the credentials to obtain employment in hazardous chemical and remediation, and it leverages the education of past participants by employing them as trainers. Finally, ICWUC leverages temporary participation, such as business contracts and consortium membership, to encourage widespread adoption of its training model.

Metrics for leveraging funding:

- Dollar amount obtained from other funding sources: *$288,000 from DOT*.
- Number and description of contacts made that might be tapped for additional funding: *ICWUC maintains a list of XX partners who can be tapped to provide additional financial or infrastructure resources*.

For more information about the ICWUC, visit: www.hsed.icwuc.org

Activity 2: Leveraging people

Activity 1	Activity 2
Leveraging infrastructure and funding	Leveraging people

Leveraging people involves building or maintaining relationships to enable sharing of ideas and knowledge. This process is sometimes called "human capital" management or development. Leveraging relationships can focus on amplifying productive relationships that have been formed within or outside the project as well as putting these relationships to use in other ways. One goal of leveraging might be to pool the ideas and knowledge of "friends" and partners to brainstorm, combine resources or data sets and form new ideas. Another possibility is to develop a cadre of people that can be contacted for help.

For more information on building and sustaining relationships, see **Chapter 2: Partnerships**.

Leveraging people can involve:

- **Broadening networks:** One approach to leveraging people is through networking. In this context, networking is the cultivation of helpful relationships. For example, partners can research other local projects to find like-minded people. They can also meet other PEPH grantees at annual meetings or through grantee workgroups and use these connections to gain information about projects similar to their own that are being conducted elsewhere. By leveraging these new relationships, project staff can:
  - Learn about available resources (other sources of support or existing instruments)
  - Brainstorm ideas for new projects
  - Learn how others have solved similar problems or overcome obstacles
  - Pool resources to achieve common aims
  - Gather input from other disciplines
  - Expand their sphere of influence
- **Developing a directory of your network:** Knowing whom to call to ask for help with various grant-related questions is often challenging. Creating a database of your contacts and their levels of expertise in various areas can help project staff share their own institutional knowledge with each other.
- **Using online resources:** The Internet has become a powerful leveraging tool for identifying like-minded people and for helping people understand environmental health policy issues, ideas and knowledge. For example, the National Conference of State Legislatures Environmental Health Legislation Database (http://www.ncsl.org/default.aspx?tabid=13230) allows users to research environmental health-related legislation in participating states.

Example Metrics for Activity 2: Leveraging people

- Number and description of networking activities
- Number and description of listings in contacts or network databases
- Number of new people contacted in leveraging efforts
- Number of new people brought into the project
- Number and description of relationships formed or expanded
- Number and description of formal advisory board activities conducted to leverage relationships, ideas and knowledge
- Description of ideas or knowledge resulting from these activities
- Number and description of bartered exchanges
- Number of ad hoc meetings, seminars, poster sessions, etc. that were held

Metrics in Action 3.2: The **West Harlem Environmental Action, Inc. (WE ACT)** is a Northern Manhattan community-based organization whose mission is to build healthy communities. In the summer of 2004, WE ACT leveraged the services of two participants in the Californian Movement Activist Apprenticeship Program (MAAP) and received a "double-dose of organizing power." MAAP, which began in 1985, is a flagship organizer of training programs involving intensive 6-week field placements with grassroots community or labor organizations that focus on issues affecting people of color. The MAAP interns have worked to mobilize WE ACT's community members to take action to prevent greater exposure to diesel exhaust, which was seen as particularly compromising for a community that is already challenged by a variety of environmental health hazards. The aligned missions of WE ACT and MAAP allowed them to leverage people to broaden each organization's networks and to barter services. The interns employed skills learned through the MAAP in WE ACT projects, and they were then able to apply these to the benefit of both organizations.

Metrics for leveraging people:

- Number and description of networking activities: *MAPP interns mobilized community members during (number and description of meetings attended).*
- Number of new people contacted in leveraging efforts: *MAPP interns mobilized XX community members to take action against the Metropolitan Transit Authority.*

For more information about WE ACT, visit: www.weact.org

Outputs

Leveraging activities can enable grantees to use existing resources more strategically and to obtain additional resources. The more resources available to a project, the more likely they will be to achieve improvements in community health. Outputs are the direct products of leveraging activities. Developing metrics for outputs enables grantees to assess the strengths and weaknesses of the program and the partnership.

We identify three possible outputs that can result from leveraging activities:

Output 1: Raised awareness and interest

Output 2: Increased project scope

Output 3: Cost-effectiveness

Output 1: Raised awareness and interest

Output 1	Output 2	Output 3
Raised awareness and interest	Increased project scope	Cost-effectiveness

One of the primary goals of PEPH programs is to raise awareness of and interest in environmental public health issues among community members, potential partners and policy makers. If communities are aware of environmental public health issues, they are more likely to invest in addressing these issues. PEPH grantees can do this by gaining support for and increasing visibility of PEPH projects. To gain support and increase visibility, grantees may work to expand their network of partners, as well as to expand the types of partners who are interested in working with the project. These two activities will ensure that grantees both raise awareness and increase their access to partners with expertise in key areas.

For more information on developing human resources and increasing awareness, see **Chapter 6: Capacity Building**.

Strategies for measuring this output can include:

- Measuring communities' awareness of project activities through surveys or participation in activities
- Tracking the change in the number of partners and community members who know about the project and its goals and activities
- Tracking the expertise that partners bring to the project
- Assessing the level of investment of participants and partners in the projects or programs

Strategies for increasing awareness are also discussed in **Chapter 4: Products and Dissemination**.

Example Metrics for Output 1: Raised awareness and interest

Expanded network

- Number and description of new relationships
- Description of expertise provided by new partners
- Description of communication systems between partners when help or resources are needed
- Change in the number of people who contact your organization for more information.
- Description of new expertise gained through new relationships

Increased volunteers and donations

- Number of new volunteers who get involved with the project following efforts to increase awareness and interest
- Number or amounts of donations following efforts to increase awareness

Increased collaboration

- Number of individuals and organizations who collaborate for the first time to accomplish a common goal (such as planning a town hall meeting)
- Number of repeat collaborations between partners

Partner sharing of resources

- Description of shared meeting space or other meeting resources (such as planning a small meeting during an associated national conference)
- Costs or descriptions of sharing physical resources such as printing costs
- Expenses that were shared between partners

Increased awareness

- Change in number of people who indicate that they know about the project or issue
- Change in the number of people who know what the project does

Metrics in Action 3.3: The **West End Revitalization Association (WERA)** serves residents, homeowners and landowners of five African-American communities in Alamance County and Orange County, North Carolina. It was founded in 1994 as the area's first and only community development corporation and community-based environmental protection (CBEP) organization. Concerned citizens originally founded the organization to address concerns about a particular highway project, but the organization's scope soon began to expand. WERA now addresses environmental health risks associated with unpaved streets, contaminated drinking water and failed backyard septic tanks. WERA raises awareness of community members and policy-makers by conducting community training workshops, protesting discriminatory land-development practices and maintaining a communication campaign that includes an information website, articles in local newspapers and publications in peer-reviewed journals.

WERA leveraged funding from both NIEHS and EPA to obtain additional financial support to conduct research on adverse environmental health impacts in the surrounding communities, including the collection and analysis of drinking and surface water. The evidence of very high levels of *E. coli* and fecal coliforms in the community's water helped WERA further leverage millions of dollars in block grants and matching municipal funds to install sewer systems in over 90 houses, pave dirt streets, remove underground storage tanks and stop housing construction on top of a century-old industrial landfill. WERA was able to achieve these changes because of its work to educate and involve the community members in solving the environmental health problems in their neighborhoods.

Metrics for raised awareness and interest:

- Description of communication systems between partners when help or resources are needed: *WERA hosted workshops to train community members about processes that could be used to address historical environmental justice issues. WERA also obtained coverage in local news to raise awareness of the issues.*
- Number of repeat collaborations: *WERA continues to rely on a core group of 35 volunteers and 9 partnership groups to address the many environmental justice issues in their community.*

For more information about WERA, visit: http://www.wera-nc.org

Output 2: Increased project scope

Output 1	Output 2	Output 3
Raised awareness and interest	Increased project scope	Cost-effectiveness

Leveraging can lead to an increase in the project scope. With research projects, broader goals can include the addition of new questions to be addressed. For community projects, broader goals can include reaching a broader audience or adding new strategies for reaching existing audiences. A project can expand over time by using data or other resources to address additional environmental health issues in a community. Increased project scope can also be a consequence of increased capacity.

Strategies for measuring increased project scope can focus on an analysis of factors that contribute to project scope. For example, partners can assess outreach that encourages more individuals to participate in studies and in other program activities. Partners can also measure whether participants become project partners and otherwise expand their involvement in the project. Analysis of new resources such as equipment or working space that allows for new research or outreach can be performed. And an assessment of productivity within the project itself can include factors such as increasing numbers of volunteers, capacity and more. For example, as a project grows, there might be more volunteers involved, a greater capacity to analyze and collect data samples or new goals added to the project plan.

While increased project scope can be an important impact of leveraging activities, it is important to guard against "scope creep." If an organization starts to expand a project beyond the original intent, grantees may want to weigh the costs and benefits of the additional work and ensure that the resources are available to support the expanded scope.

Example Metrics for Output 2: Increased project scope

- Number of study participants over time
  - Increases in people collecting and analyzing data
  - Increases in individuals sampled or contacted because of larger networks
  - Increases in study size because of pooled cohorts
- Number and types of target audiences the project reaches over time
  - Trends of attendance and contributions at meetings
  - Increases in the number of individuals attending workshops
  - Increases in people expressing interest in program
  - Increases in the number of people or partners taking action to change workplace, school or community processes
- Description of changes in the specific aims of a project as a consequence of leveraging new resources
- Number and description of new connections with other projects (e.g., relationships or resource sharing)
- Description of follow-up and supplementary work or resource development
  - Number of competitive renewals and grants submitted and awarded
  - Description of applications to an Environmental Health Sciences (EHS) Core Center grant for a pilot project
  - Evidence of expansion of roles of individuals, e.g., from being a partner to a principal investigator
- Description of diversification of questions and topic within the project
  - Description of the growing complexity of grant applications as data and resources increase
  - List of potential future research needs agreed upon by partners
  - Description of partnership and communication models applied to the project and results of these efforts in new relationships
  - Number and description of additional projects and partners

Metrics in Action 3.4: The **Somerville Immigrant Worker Health Project (SIWHP)** is a partnership based in Somerville, MA that includes the following organizations:

- Immigrant Service Providers Group/Health (ISPG/H)
- Community Action Agency of Somerville (CAAS)
- Brazilian Women's Group (BWG)
- Haitian Coalition of Somerville
- Massachusetts Coalition for Occupational Safety and Health (MassCOSH)
- Cambridge Health Alliance (CHA)
- Tufts University
  - Department of Civil and Environmental Engineering
  - Department of Public Health and Community Medicine

Somerville, MA has a large and diverse immigrant population. Two perspectives shaped the consideration of immigrant occupational health in this project. First, the number of immigrant residents working and living in Somerville is undercounted because of issues concerning immigrant and legal documentation. Second, the work reported here follows the Environmental Justice model in that SIWHP holds to the premise that the environmental and occupational risks borne by immigrant workers are disproportionally distributed in society. Together, these perspectives led the group to attempt to reach further into the immigrant community in Somerville while bringing significant resources to the immigrant service agencies who were partners on this project.

The project recruited and trained a cohort of bilingual Teen Educators who devised and implemented a survey that produced information from self-identified immigrant workers living or employed in Somerville. The existence of the Teen Educators also provided an opportunity for educating the children of recent immigrants about occupational health and safety concepts and practices. The launch of the Vida Verde Co-Operative (VVCO), an environmentally conscious co-op of Brazilian immigrant women housecleaners, was also accomplished as a result of support from this grant. The VVCO features the use of environmentally friendly ("green") cleaning products and a structure that supports and empowers its members. The successful launch of the Co-Op is an extension of the Collaboration for Better Work Environment for Brazilians (COBWEB) project based at the University of Massachusetts at Lowell and at the Brazilian Immigrant Center in Boston.

Metrics in Action 3.4: Somerville Immigrant Worker Health Project *(continued)*

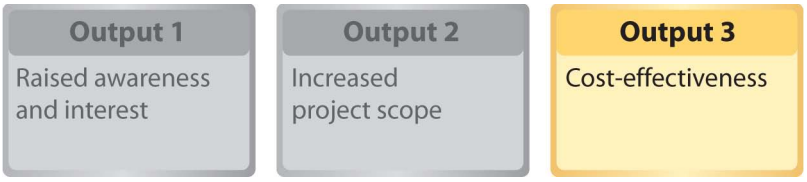
Metrics for increased project scope:

• Number and description of new connections with other projects: *The SIWHP provided the resources necessary for the launch of the "Green Cleaning" VVCO, which after its successful launch addressed its sustainability by successfully raising funds to contract the ICA Group (ICA), a nationally recognized consulting group, to assist them in developing a business plan. The VVCO continues to thrive, and it met the targets for new members and number of houses under contract from 2008 to 2010, based on the business plan. These achievements, together with the health-driven and market-oriented adoption of green cleaning products, generated much media interest in the VVCO in addition to an invitation from the Danish government to share experiences about the roles that non-governmental organizations can play in fostering positive changes in immigrant occupational health.*

• Number and types of target audiences the project reaches over time: *The SIWHP leveraged PEPH environmental justice funding and experience to develop "evidence-based" policy recommendations for representatives of the broader Somerville community (including local and statewide appointed and regulatory officials, local and state elected officials and union representatives) and for a group of immigrant workers at a Community Meeting on October 13, 2010.*

For more information about the SIWHP, please visit:
http://www.niehs.nih.gov/research/supported/programs/justice/grantees/tufts/

Output 3: Cost-effectiveness



Cost-effectiveness is the extent to which an undertaking maximizes the value attained from the resources used. Toward this goal, partners can use funds strategically to take full advantage of the productivity of a project or program. Partners can also strive to get more done with fewer resources while maintaining overall project goals and objectives.

Cost-effectiveness is a common output from leveraging activities because the objective of leveraging is often to stretch existing resources further. For example, partners can be more cost effective if they can add questions or analyses to existing studies or pool their resources for common aims.

Approaches and techniques for measuring cost-effectiveness can include comparing the expected costs of projects operating separately verses the costs of the same projects working together. Partners could obtain anecdotal evidence and survey comments on the coherence, communication and coordination of projects that might result in cost savings. Analyzing the level of duplication among projects in the same area or field is another possible approach.

Example Metrics for Output 3: Cost effectiveness

- Comparison of actual productivity using leveraged resources to estimated productivity without leveraged resources
- Description of duplicate efforts that were minimized
- Description of effectiveness of combined efforts

Impacts

Impacts are benefits or changes resulting from activities and outputs. We identify three potential impacts that grantees might expect as a result of leveraging:

Impact 1: Broader reach

Impact 2: Increased ability to leverage resources

Impact 3: Sustainability

Impacts are more difficult to measure than activities and outputs in part because it often takes several years for substantive changes to occur. When thinking about the impacts a project might be able to achieve and how to measure those impacts, it can be helpful to think in terms of short-term and long-term impacts. Short-term impacts are typically those changes that would be expected to see in the first few years of a project. Long-term impacts might not be seen for 5 or more years. It is helpful for grantees to identify intended impacts so that they can identify measures that will help document their progress in achieving impacts.

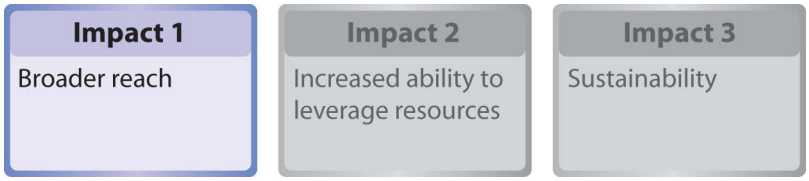
Grantees may also be hesitant to claim credit for impacts because other organizations or other contextual factors may have contributed to the changes. While grantees may not be able to claim sole credit for these impacts, it is important to be able to track these broader changes and to document the contributions made by the project to achieving these impacts.

For additional information on long-term impacts, see **Chapter 7: Principles of Evaluation**.

Although there are challenges associated with measuring impacts, tracking progress towards these goals helps grantees stay on track, demonstrate success and identify areas for improvement. What is most important is that the ultimate goal of leveraging is to produce outcomes and impacts that lead to improvements in health through a reduction in environmental health hazards.[20]

[20] See also, Silka L. 2000. Evaluation as a strategy for documenting the strengths of community-based participatory research in: Successful Models of Community-Based Participatory Research, 29-31 March 2000: Final Report, Washington, DC. 49-54. (O'Fallon LR, Tyson FL, Dearry A, eds). Available: *http://www.hud.gov/offices/lead/library/hhts/NIEHS_Successful_Models.pdf* [accessed 16 December 2011].

Impact 1: Broader reach

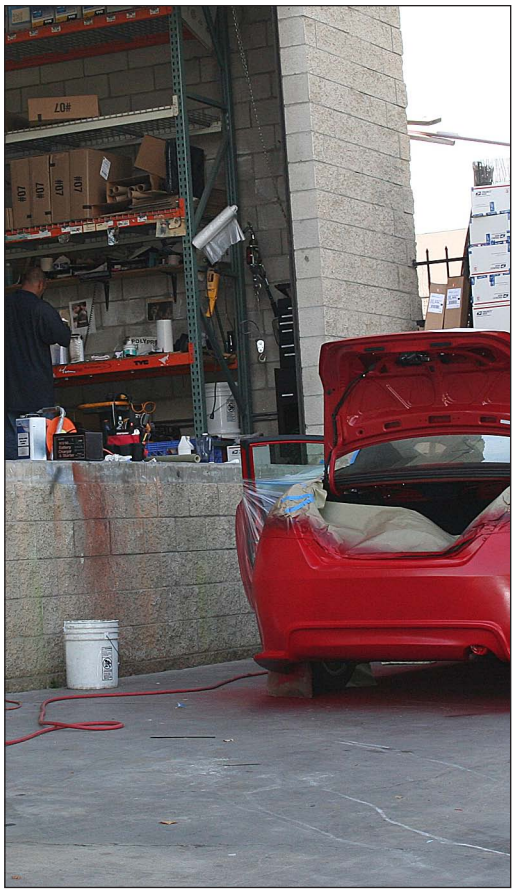


Broader reach is defined as the ability of a project to have a greater effect on the target population or environmental health issue than was originally planned. Grantees with broader reach may see an increase in the number of questions addressed by the project or may reach a broader audience. For example, a project's initial research questions may have focused on contaminated water but then expanded to investigate the causes of a contaminated landscape. Alternatively, the project might have begun by targeting a single local community and expanded to influence national public health efforts.

Grantees may also achieve a broader reach by working to effect policy or regulatory change or to modify clinical practice guidelines. Policy change may take place at the organizational, local, state or national level, and therefore it guarantees a much broader reach than specific, targeted interventions. Alternatively, grantees may achieve broader reach by influencing changes to clinical practice guidelines, whereby physicians change their treatment practices for all patients. For example, a PEPH project may work with a group of physicians to educate them about asthma prevention interventions that focus on healthy home environments. If physicians adopt this practice for all their patients, the project reaches more families than just those who may have been involved in the initial intervention.

Example Metrics for Impact 1: Broader reach

- Number and types of people that are affected by the results
- Number and types of topics that are addressed
- Change in number of target audiences
- Description of target audiences added
- Number and description of additional or expanded research questions
- Number and types of policies or regulations that can be or have been influenced by the project:
  - Environmental health regulations at the local, regional, state and national level
  - Zoning ordinances to decrease exposure to pollutants
  - Clinical practice guidelines



Metrics in Action 3.5: By working to influence local policy through the **Clean Air for Barrio Children's Health (CABCH)** project, **Environmental Health Coalition** staff and National City community residents were able to broaden the reach of their environmental health activities. Rather than working with individual body shops, the group persuaded the City Council in National City, CA to adopt an ordinance that will result in the relocation of auto body shops out of the neighborhoods. This strategy will reduce exposure of residents and students at Kimball Elementary School to emissions of vehicle paints, solvents and metals. In addition, the City Council of San Diego banned commercial vehicles weighing more than five tons from Cesar Chavez Parkway, a major street that runs through the heart of the Barrio Logan community, and from several other Barrio Logan streets. According to the project's report, "an estimated 2,600 trucks per day are re-routed around the community since the ban has been enforced, beginning in January 2006. This action [further] reduces the community's exposure to diesel exhaust and truck safety hazards."

Metrics for broader reach:

- Number and types of people that are affected by the results: *Community members who live in the Barrio Logan and National City areas.*
- Number and types of policies or regulations influenced by the project: *Two policies were implemented as the result of this project: an ordinance that phased out auto body shops from neighborhoods and a city law banning commercial vehicles weighing more than five tons from the Cesar Chavez Parkway.*

For more information about the CABCH project, visit:
http://www.niehs.nih.gov/research/supported/programs/justice/grantees/ehc.cfm

Impact 2: Increased ability to leverage resources

Impact 1	Impact 2	Impact 3
Broader reach	Increased ability to leverage resources	Sustainability

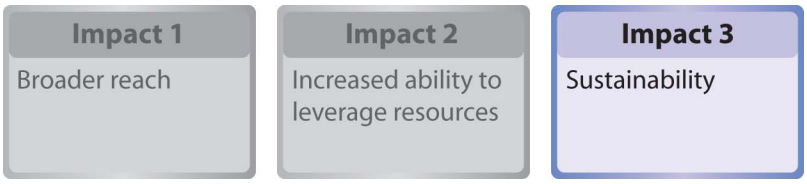
By working to leverage resources to address environmental health issues, grantees also gain the ability to help communities with other issues. Grantees with an ability to leverage resources might have a larger network of partners, more ideas and greater knowledge. The ability to leverage resources also means that grantees and their partners typically have access to more funding opportunities. In addition, stronger organizational structures can result in greater organizational sustainability or longevity (see Impact 3).

For additional information on capacity building, see **Chapter 6.**

Example Metrics for Impact 2: Increased ability to leverage resources

- Number of project staff or volunteers who work to leverage resources
- Number and description of trainings provided to teach project staff and partners about fundraising
- Number of larger grants that were submitted or awarded
- Number of people and partners involved over time
- Number and types of topics covered by project scope that increase with increasing resources
- Number and description of increased connections between groups, e.g., community organizations, researchers, health care professionals and decisionmakers
- Description of larger projects that grew beyond the scope of the original projects

Impact 3: Sustainability



In the long term, leveraging can also contribute to greater project sustainability. Sustainability is the capacity to endure. By leveraging current resources, a project can have a greater and longer-lasting impact. Sustainable activities and partners typically follow when projects can achieve some level of sustainable funding. Some examples of the types of sustainability that can be measured within PEPH projects are:

- Sustainable funding can be achieved by finding other funding sources, coordinating services with other partners, looking for ways to reduce duplicate services and sharing resources and infrastructure with other partners. Sustainable activities and partnerships typically follow when organizations can achieve a level of sustainable funding.
- Sustainable activities are individual actions associated with PEPH projects that can be maintained or utilized over time, such as the creation of a community website where people are allowed to add content, comment on research, and participate in a forum for dialogue.
- Sustainable partnerships are manifested by the continued collaboration of members of various groups that are united by PEPH-related goals, such as collaboration between university and community partners to reduce environmental exposures. For example, partners might be able to maintain a working relationship that extends over the course of several projects, such as a memorandum of understanding, or MOU.
- Sustainable projects leverage existing resources by regularly applying for additional funding and expanding investigations to address concerns of the community.

Example Metrics for Impact 3: Sustainability

- Number of funding streams maintained over time
- Number of financial relationships that extend over the course of several projects
- Survey results or other forms of feedback that shows partners' continued commitment to the project
- Number and description of policies enacted that ensure sustainability of impacts
- Description of new or expanded research questions
- Number of applications for additional funding
- Relevance of information available through sustainable activities
- Continued collaborations over long periods of time

Metrics in Action 3.6: By securing funding from multiple sources and garnering the support of many individuals and institutions at the local, state, tribal and federal level, the **Children's Environmental Health Network (CEHN)** has become a strong voice for children's environmental health research and advocacy in many areas. CEHN has established sustainable activities and partnerships despite its small size because of its excellent leveraging abilities. Although it has a small staff of five, those staff members work to coordinate and manage the activities of a consultant, a Board of Directors, a Policy Advisory Committee and a Science Advisory Committee. This leveraging of staff to coordinate these other volunteer partners ensures that the group has access to a much larger pool of human resources than just the paid staff. With the support of funding from other local, state and federal resources, they stimulate nationwide research, education, awareness and policy formation to produce strategies that protect children from environmental health hazards and promote a healthy environment. CEHN also serves as an information resource for those interested in up-to-date information in pediatric environmental health.

CEHN built a strong national leadership by collaborating at the local level with various groups united by similar goals. The organization holds leadership positions on a few key partner boards as well as with partner health collaboratives and committees in Washington D.C. At the local level, it creates advisory boards involving local child-care providers, child-care licensing staff, health professionals, and representatives from federal agencies (EPA, CDC and NIEHS). The sustainability of this partnership stems from the strength of this network. The network adapts well to current and rapidly changing issues pertaining to childhood health and leads to sustainable partnerships.

Metrics for sustainability:

- Number of funding streams maintained over time: *CEHN has X sources of funding that have remained stable over the course of the organization's history.*
- Number of financial relationships that extend over the course of several projects: *XX organizations have provided funding for more than one CEHN project.*

For more information about the CEHN, visit: http://www.cehn.org.

Chapter 3 Case Study: Environmental Impacts of Large-Scale Goods Movement

Photo credit Andrea Hricko and Port of Los Angeles

The two side-by-side ports of Los Angeles and Long Beach are dubbed Southern California's "economic engine" by economic development advocates. According to the U.S. Department of Transportation, over 40% of all imported goods for the United States enter through this essential port complex of Los Angeles and Long Beach. A national economic impact study of the twin ports reported in March, 2007 that imports coming through the complex generated jobs, income and tax revenue in every state of the United States. Although the economic importance of international trade is recognized, the environmental public health concerns associated with trade are also numerous. The U.S. Environmental Protection Agency (EPA) called the movement of freight into and out of such complexes a "public health concern at the national, regional and community level."[21]

In 2001, only those residents affected directly by their pollution and heavy traffic thought about the human health implications of ports and the transport of goods. It was not until the NIEHS sponsored a town hall meeting on "Healthy Schools," hosted by the **Environmental Health Sciences (EHS) Core Center at the University of Southern California (USC)**, that a community representative expressed concern about the impact of ports and the transport of goods on air quality, particularly from diesel emissions. USC EHS Core Center members responded to the town hall comments by working closely with community residents to understand concerns and begin developing research and outreach on these issues. In response to the town hall meeting, that same year homeowner associations participated in lawsuits that challenged the Port of Los Angeles's environmental review of planned construction for a major shipping terminal, and various collaborations emerged to combine environmental objectives and trade policy.

In February, 2005, USC convened a follow-up town meeting called "Growing Pains: Health and Community Impacts of Goods Movement and the Ports" to discuss the effects of international trade on the Southern California region. Building on the outcomes of that meeting, the USC Center organized an even larger town meeting in 2007 in partnership with other academic and community organizations. The "Moving Forward" conference brought together participants from across the United States to discuss the impacts of goods movement on human health.

[21] Hricko A. 2008. Global trade comes home: Community impacts of goods movement. *Environ Health Perspect* 116: a78-A81; doi:10.1289/ehp.116-a78. Available: *http://ehsehplp03.niehs.nih.gov/article/info%3Adoi%2F10.1289%2Fehp.116-a78* [accessed 16 December 2011].

During a meeting of the National Environmental Justice Advisory Council (NEJAC), the EPA also cited mounting evidence that local communities adjacent to ports and heavily trafficked goods movement corridors are the most significantly affected by the goods movement system. NEJAC therefore decided to hold a town hall meeting to bring together partners and members of the community to discuss how best to protect the health of community members and workers and to improve the "quality of life" in affected communities.[22]

Figure 3.2 Case Study Logic Model

Below we discuss the activities, outputs and impacts of these town meetings.

Activities

The town meetings brought together a variety of groups to network and share ideas (Activity 1: Leveraging people). Groups included:

- Economists
- Elected officials and government staff
- Health scientists and academic researchers
- Interested residents
- Members of community-based, environmental and environmental justice groups
- News media
- Officials and staff from the logistics industry (ports, railroads, trucking associations)
- Transportation and regional planners
- Labor representatives from the ports, rail, trucking and other goods movement industries

[22] USC Children's Environmental Health Center. Community Outreach. Available: *http://hydra.usc.edu/cehc/conferences.html* [accessed 16 December 2011].

The specific objectives of the town meetings were to:

- Share results from scientific studies on the health effects of air pollution on children, the elderly, workers and others (Activity 3)
- Provide an opportunity for community members and workers to voice environmental health concerns about goods movement and the ports, including concerns about air pollution as well as transportation of hazardous materials (Activity 4)
- Raise interest in and awareness of community environmental health concerns (Activity 4)

Neighborhood Assessment Team members count truck volume and measure ultrafine particles in West Long Beach.
Photo by Andrea Hricko

- Share information on strategies for reducing exposure to diesel exhaust and other air pollutants (Activity 3)
- Leverage communication infrastructure by providing an opportunity to discuss the policy implications of increased international trade and goods movement on community health and worker safety, as well as on air quality, jobs, the economy, traffic and community life (Activity 1)
- Leverage social infrastructure by developing a regional communications network for the latest scientific findings, information on new goods movement infrastructure projects, and environmental health solutions (Activity 2)

Metrics:

- Number and types of topics that are addressed: *The town meetings discussed impacts of trade and goods movement on health and air quality, as well as on traffic, jobs and the economy. This broadened the topic raised in the first meeting (air quality) and increased the potential policies the meetings can influence.*
- Number and description of policies enacted that ensure sustainability of impacts: *The project advocated for several regulatory changes by incorporating health and safety considerations as an integral component of goods movement and transportation decisions.*

Attendees leveraged ideas and knowledge by participating in discussions of:

- Relevant scientific findings on air pollution and health effects
- Impacts of trade and goods movement on health and air quality, as well as on traffic, jobs and the economy
- Local and regional impacts from transporting, warehousing and distributing goods
- Solutions to reduce diesel exhaust and other air pollutants and to prevent hazardous materials spills and other incidents
- Ways to share information in the future

Outputs and Impacts

The town meetings began an information-sharing collaboration that resulted in leveraging ideas and knowledge. As a result, the group identified interim outputs of longer-term project goals and assessed intended outputs and impacts. These interim outputs included:

1) Increased interest and awareness by producing momentum to deal with the environmental health challenges of goods movement (Output 1). The multiple meetings allow one to describe a growing number of new organizations and collaborations. The changing participants in the meetings likely showed increased expertise as new relationships formed based on technical or expertise gaps in the group.

2) Broader reach and ability to leverage resources by sharing local and regional concerns and solutions (Impacts 1, 2). The town meetings discussed impacts of trade and goods movement on health and air quality, as well as on traffic, jobs and the economy. This strategy broadened the topic raised in the first meeting (air quality) and increased the potential policies the meetings can influence.

3) Increased capacity of individuals and organizations to consider community and worker concerns when developing scientific research agendas (Impact 2).

4) Creation of sustainable regulatory changes by incorporating health and safety considerations as an integral component of goods movement and transportation decisions (Impact 3).

Metrics:

- Number and types of topics that are addressed: *The town meetings discussed impacts of trade and goods movement on health and air quality, as well as on traffic, jobs and the economy. This broadened the topic raised in the first meeting (air quality) and increased the potential policies the meetings can influence.*
- Number and description of policies enacted that ensure sustainability of impacts: *The project advocated for several regulatory changes by incorporating health and safety considerations as an integral component of goods movement and transportation decisions.*

Summary of Leveraging Metrics

Example Metrics for Activity 1: Leveraging infrastructure and funding

- Number and description of physical space obtained or used from other sources
- Number and description of office equipment, supplies or existing products obtained or used from other sources
- Number and description of organizational or technical resources obtained or used from other sources
- Dollar amount obtained from other funding sources
- Number of applications submitted and funded ("spin-off" funding)
- Number and description of contacts made that might be tapped for additional funding

Example Metrics for Activity 2: Leveraging people

- Number and description of networking activities
- Number and description of listings in contacts or network databases
- Number of new people contacted in leveraging efforts
- Number of new people brought into the project
- Number and description of relationships formed or expanded
- Number and description of formal advisory board activities conducted to leverage relationships, ideas and knowledge
- Descriptions of ideas or knowledge resulting from these activities
- Number and description of bartered exchanges
- Number of ad hoc meetings, seminars, poster sessions, etc. that were held

Example Metrics for Output 1: Raised awareness and interest

Expanded network

- Number and description of new relationships
- Description of expertise provided by new partners
- Description of communication systems between partners when help or resources are needed
- Change in the number of people who contact your organization for more information.
- Description of new expertise gained through new relationships

Increased Volunteers and Donations

- Number of new volunteers who get involved with the project following efforts to increase awareness and interest
- Number or amounts of donations following efforts to increase awareness

Example Metrics for Output 1: Raised awareness and interest

Increased collaboration

- Number of individuals and organizations who collaborate for the first time to accomplish a common goal (such as planning a town hall meeting)
- Number of repeat collaborations between partners

Partner sharing of resources

- Description of shared meeting space or other meeting resources (such as planning a small meeting during an associated national conference)
- Costs or description of sharing physical resources such as printing costs
- Expenses that were shared between partners

Increased Awareness

- Change in number of people who indicate that they know about the project or issue
- Change in the number of people who know what the project does

Example Metrics for Output 2: Increased project scope

- Number of study participants over time
  - Increases in people collecting and analyzing data
  - Increases in individuals sampled or contacted because of larger networks
  - Increases in study size because of pooled cohorts
- Number and types of target audiences the project reaches over time
  - Trends of attendance and contributions at meetings
  - Increases in the number of individuals attending workshops
  - Increases in people expressing interest in program
  - Increases in the number of people or partners taking action to change workplace, school or community processes
- Description of changes in the specific aims of a project as a consequence of leveraging new resources
- Number and description of new connections with other projects (e.g., relationships or resource sharing)
- Description of follow-up and supplementary work or resource development
  - Number of competitive renewals and grants submitted and awarded
  - Descriptions of applications to an Environmental Health Sciences (EHS) Core Center grant for a pilot project – Evidence of expansion of roles of individuals, e.g., from being a partner to a principal investigator
- Description of diversification of questions and topic within the project
  - Description of the growing complexity of grant applications as data and resources increase
  - List of potential future research needs agreed upon by partners
  - Description of partnership and communication models applied to the project and results of these efforts in new relationships
  - Number and descriptions of additional projects and partners

Example Metrics for Output 3: Cost effectiveness

- Comparison of actual productivity using leveraged resources to estimated productivity without leveraged resources
- Description of duplicate efforts that were minimized
- Description of effectiveness of combined efforts

Example Metrics for Impact 1: Broader reach

- Number and types of people that are affected by the results
- Number and types of topics that are addressed
- Change in number of target audiences
- Description of target audiences added
- Number and description of additional or expanded research questions
- Number and types of policies or regulations influenced by the project:
  - Environmental health regulations at the local, regional, state and national level
  - Zoning ordinances to decrease exposure to pollutants
  - Clinical practice guidelines

Example Metrics for Impact 2: Increased ability to leverage resources

- Number of project staff or volunteers who work to leverage resources
- Number and description of trainings provided to teach project staff and partners about fundraising
- Number of larger grants that were submitted or awarded
- Number of people and partners involved over time
- Number and types of topics covered by project scope that increase with increasing resources
- Number and description of increased connections between groups, e.g., community organizations, researchers, health-care professionals and decisionmakers
- Description of larger projects that grew beyond the scope of the original projects

Example Metrics for Impact 3: Sustainability

- Number of funding streams maintained over time
- Number of financial relationships that extend over the course of several projects
- Survey results or other forms of feedback that show partners' continued commitment to the project
- Number and description of policies enacted that ensure sustainability of impacts
- Description of new or expanded research questions
- Number of applications for additional funding
- Relevance of information available through sustainable activities
- Number and discription of continued collaborations over long periods of time

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Chapter 4:
Products and Dissemination

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Chapter 4: Products and Dissemination

Introduction

The PEPH mission emphasizes engaging partners to work together to communicate scientific findings in a way that is useful to public decision-making, understandable to the public and appropriate to the culture. PEPH communication products are created to convey environmental health research findings and to suggest how these findings might be translated into public health action. This process involves setting up mechanisms that translate research findings into appropriate messages for target audiences, creating products using these messages and disseminating these products in order to decrease environmental health risks in communities.

This chapter focuses on dissemination as it relates to communication activities. See **Chapter 3: Leveraging** for more information on leveraging tools. See **Chapter 5: Training and Education** for information on curricula.

In this chapter, we categorize products into four types:

- **In-person interactions** involve the transfer of knowledge through direct contact in a personal or group setting. Examples include speeches, presentations, educational events, workshops, home health visits, health and science fairs, town hall meetings, community theater productions and environmental health outreach at local community markets. Many of these in-person interactions rely on providing print materials (such as factsheets), presenting audio-visual products (such as a film) or using web-based products (such as showing how to access a list of experts at a nearby university). Additionally, giveaways, such as pencils, key chains and small calculators, can be provided to reinforce the message. These giveaways usually have a short message, reminder or contact information printed prominently on them.
- **Print materials** provide written content via pamphlets, brochures, manuals, newsletters, books, magazine articles, handouts, posters and billboards, among other things.
- **Web-based products** utilize the internet to engage audiences through a variety of technical interfaces, such as email, interactive websites, YouTube videos, interactive discussion boards, chat rooms, podcasts, Facebook and Twitter.
- **Audio-visual products** present information through films, videos, radio programs, television segments, public service advertisements and video conferences. These products can include educational videos and public service announcements.

These categories of products can overlap. For example, a factsheet printed on paper can also be available on a website. The above descriptions are not exhaustive, and the use of innovative products is encouraged. Facebook, Twitter, YouTube[23, 24] and TED[25] presentations are examples of newer methods for conveying information to the general public.

[23] Mai E. 2007. Exercising is Healthy. Available: *http://www.youtube.com/watch?v=pKcL_LY2cel&feature=related* [accessed 16 December 2011].

[24] Shuey K. 2008. Safe Home Cleaning Products. Available: *http://www.youtube.com/watch?v=yY6lKEYqRsE* [accessed 16 December 2011].

[25] TED is an online resource that posts videos of seminars covering a wide range of topics. For example, see TED. 2010. Majora Carter's Tale of Urban Renewal. Available: *http://www.ted.com/talks/lang/eng/majora_carter_s_tale_of_urban_renewal.html* [accessed 16 December 2011].

Dissemination Strategies

Dissemination strategies refer to the directed and managed diffusion or distribution of information. For our purposes in this Manual, dissemination refers to the process of providing information to raise awareness about environmental health issues, with the goal of reducing adverse environmental health exposures.

Grantees can choose from many different dissemination frameworks. The NIH translational research framework, which defines the progression of science from bench to clinic (T1), clinic to public health (T2) and wide communication (T3), is one model for understanding dissemination strategies.[26] This model, however, tends to focus on translating basic science to clinical practices and pharmaceutical products. NIH's framework also supports the emerging area of dissemination science by hosting an annual Conference on the Science of Dissemination and Implementation, which brings together researchers to share strategies for using dissemination to close the gap between research evidence and clinical and public health practice and policy.[27] A British version of a translational framework focuses on translating basic science to public health policy and practices.[28] This framework aims to improve public health through surveillance and identification of modifiable risk factors and reflects the iterative and bidirectional process through which public health research and public health action influence each other.

These frameworks for translating research are helpful in identifying communication pathways for creating and disseminating products. Examples of these pathways include:

- **Researchers to communities:**[29] By engaging community members or leaders through a community advisory board, the research findings of a study can be translated into messages appropriate for the community of interest.
- **Communities to researchers:** Community members who participate in research can inform investigators about areas of research that will meet community members' needs. They can do this by having open discussions with and briefings for investigators.
- **Communities to decision-makers:** Community members who are engaged in an environmental public health program can learn about research findings and take them on as personal concerns. Such concerns might prompt community members to express their opinions to decision-makers in public forums, which can lead to protective regulation or policy.
- **Communities to schools or public health officials:** Community members engaged in PEPH program activities can facilitate changes that can be implemented in schools or in public health programs and projects.

[26] Woolf SH. 2008. The meaning of translational research and why it matters. JAMA 299(2): 211-13.

[27] National Institutes of Health (NIH). 2011. 4th Annual NIH Conference on the Science of Dissemination and Implementation. Available: *http://conferences.thehillgroup.com/obssr/DI2011/index.html* [accessed 16 December 2011]. Click on the Resources tab for copies of conference presentations and materials.

[28] Ogilvie D, Craig P, Griffin S, Mcintyre S, Wareham NJ. 2009. BMC Public Health 9(116); doi: 10.1186 |1471-2458-9-116.

[29] In this Manual, "communities" are defined broadly to include member organizations, faith-based organizations, members of shared geographic locations and those affected by a certain environmental hazard or event.

Products and Dissemination Logic Model

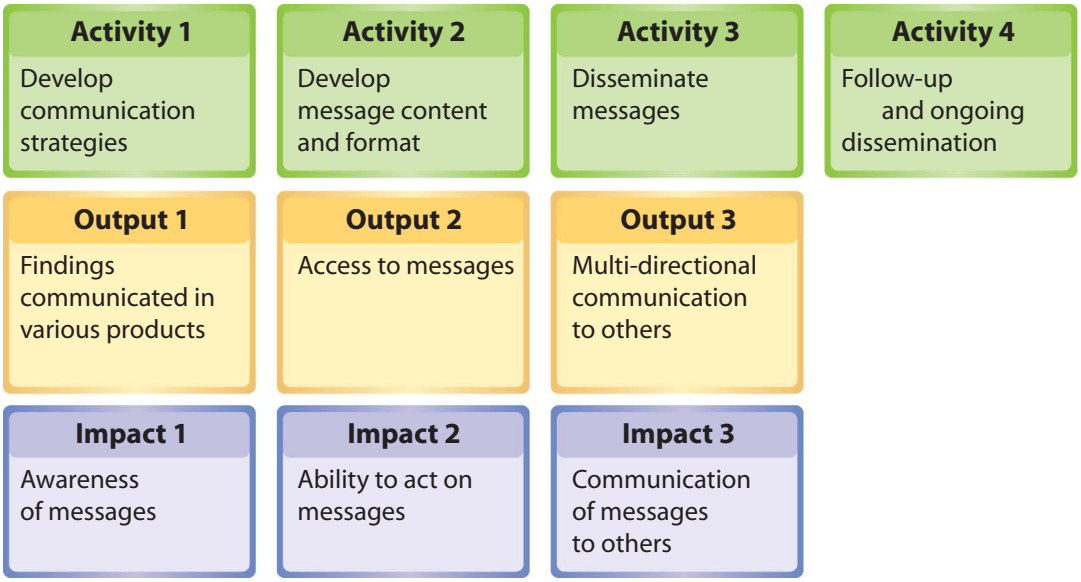
This model identifies potential activities, outputs and impacts of successful product development and dissemination strategies. Grantees should use this chapter to brainstorm other activities, outputs and impacts that are applicable to their specific projects. This model contains three major components:

- **Activities** are actions that are based on available inputs for dissemination strategies.
- **Outputs** are the direct products of dissemination activities.
- **Impacts** are benefits or changes resulting from the activities and outputs (ultimate or long-term impacts are also examined in Chapter 7: Principles of Evaluation).

We developed the logic models in this guide recognizing that grantees reflect a wide range of experience and capacity. Some grantees have been funded for more than 20 years, while others are just getting started. In general, the logic models show increasing levels of maturity from left to right and from top to bottom. However, a logic model is not necessarily linear; not every PEPH project will begin with "developing communication strategies" and proceed through all components to "communicating messages to others." Additionally, projects might not necessarily adhere to or exhibit all of the elements of the model.

Ideally, anyone working to develop products and disseminate materials will recognize themselves in one or more of the logic model components. The elements of the model are numbered in Figure 4.1 to provide reference for discussion in the text of this chapter.

Figure 4.1 Products and Dissemination Logic Model with Examples of Activities, Outputs and Impacts



Sources of Data

Grantees may find the following sources of data to be helpful in tracking achievements related to products and dissemination:

- Activity logs
- Contact logs
- Participant lists
- Feedback forms
- Publication and material development lists
- Meeting agendas
- Telephone logs
- Communication strategies and plans
- Budgets
- Group discussions
- Surveys
- Interviews
- Meeting notes
- Email exchanges
- Internet web logs

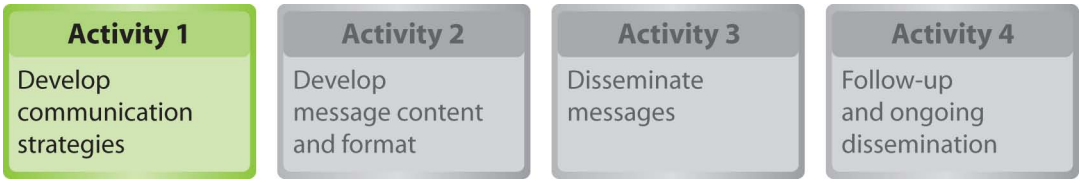
For additional information, see **Chapter 7: Principles of Evaluation**.

Activities

Activities, as defined in the framework of the products and dissemination logic model, are actions that use available inputs to create and disseminate information through a variety of media. The model highlights four broad types of activities:

Activity 1: Develop communication strategies
Activity 2: Develop message content and format
Activity 3: Disseminate messages
Activity 4: Follow-up and ongoing dissemination

Activity 1: Develop communication strategies



A communication strategy provides a framework for transferring information between partners and broader audiences. It is a tool for enhancing not only environmental health literacy and knowledge but also communication and trust.[30]

Developing a communication strategy involves defining goals of communication, setting objectives, characterizing the target audience and identifying its communication habits. The target audiences for communication in PEPH projects vary greatly in their scientific literacy, language, general cultural norms and other characteristics. For example, health professionals and community organization members can both be target audiences of a PEPH project communication plan, but the mechanisms for communicating with each can differ because of diversity in scientific literacy and other characteristics.

Communication strategies ideally engage the audience in communication planning activities. Active target audience input and participation is an important tool for identifying communication needs. Formative research—research that helps programs understand the interests, attributes and needs of different populations and persons in the community—can be conducted in ways that assist in tailoring messages to communities of interest. Communication strategies typically include a plan for developing content that is directed toward a target audience and a plan for dissemination.

[30] For additional resources regarding health communication, see Thompson TL. 2003. Handbook of Health Communication. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Feedback from the audience can be collected using a variety of tools. For example, partners can get information through focus groups, through informal and formal discussions with community members and leaders, and from organizations and institutions (such as schools and churches) that often interact and disseminate materials within the community, as just a few examples. The effectiveness of a communication strategy can be measured by consultation among partners in advisory board meetings, by surveys of the target audience and by other methods as well. Partners can evaluate these methods by testing the absorption, effectiveness or impact of different forms of communication. Another way to measure the effectiveness of a communication strategy is to test certain forms of communication on a small sample of the target audience, randomly selected (if possible), and measure retention of message content.

Example Metrics for Activity 1: Develop communication strategies

- Description of goals and objectives of communication strategy
- Description of target audience for communication
- Description of communication channels most effective for audience and message
- Number and description of target audience members who were involved in developing communication strategies
- Description of methods of communication most frequently used by members of the intended audiences
- Description of methods used to obtain feedback from the target audience on the communication strategy

Activity 2: Develop message content and format

Activity 1	Activity 2	Activity 3	Activity 4
Develop communication strategies	Develop message content and format	Disseminate messages	Follow-up and ongoing dissemination

Successful dissemination strategies focus on developing appropriate message content, as well as on the design and format of the product. Using both formal and informal inquiries, grantees can work with members of the target audience to test the messages and ensure that the content is appropriate and meaningful for the audience. These inquiries allow partners to:

- Get to know the target audience to identify the environmental public health concerns that it cares about. Grantees can engage target audiences through meetings, surveys, focus groups and other interactive strategies to determine the most effective communication tools, media and channels for a particular audience.
- Work together to present findings in a way the target audience can understand. Partners can create messages based on what they know about the target audiences' scientific knowledge, skill sets, literacy and interests. Grantees may want to consider developing different materials for different audiences. For example, a brochure designed to raise awareness among community members about environmental public health issues would be different from material developed to persuade policy-makers to address the same issues.
- Determine the media formats the audience finds most comfortable and the format that best communicates the message.
- Test materials on members of the target audience. Encourage testers to provide constructive comment about content and format of messages.
- Revise products based on comments from test audience.

Example Metrics for Activity 2: Develop message content and format

- Number and description of messages developed about environmental health risks
- Description of involvement of target audience in developing theme and content of message
- Number of languages in which materials are available
- Description of steps taken to address cultural context of target audience
- Description of adaptations made to create products appropriate to different audiences
- Number and description of print materials developed
- Number and description of web-based products developed
- Number and description of audio-visual products developed
- Number and description of in-person products developed
- Number and description of other types of products developed
- Description of testing of message with target audience communication strategy

Metrics in Action 4.1: The **Dartmouth Toxic Metals Superfund Research Program Research Translation Core (RTC)** works to communicate the Superfund Research Program's research results in user-friendly formats that will help federal and state agencies, non-profits and grass-roots organizations make informed decisions on issues that affect the health of their communities.

The RTC decided that a video would be an effective way to clearly communicate technical scientific concepts and environmental public health warnings, as well as preventive actions that could be taken to mitigate arsenic contamination. The RTC created a 10-minute video, entitled "In Small Doses: Arsenic," to help private well owners and the general public understand risky behaviors. It also informed scientific colleagues, interest groups and the public about what actions they could take to benefit public health. The video explains how naturally occurring arsenic moves into groundwater, how it is detected, what can be done to remove it and the current science surrounding the question of how much arsenic is too much. The RTC's main purpose in developing the video was to ensure that the general population could understand the message. The group also provided the video to federal and state environmental agencies, scientific colleagues and interest groups.

Metrics for developing message content and format:

- Description of involvement of target audience in developing theme and content of message: *The video was developed with input from households that had conducted arsenic remediation on their personal well-water systems. The video was also tested and revised based on input from a target audience test group.*
- Number and description of audio-visual products developed: *One 10-minute video, entitled "In Small Doses: Arsenic."*

For more information about the Dartmouth Toxic Metals Superfund Research Program, visit: http://www.dartmouth.edu/~toxmetal/.

Activity 3: Disseminate messages

The goal of dissemination is to ensure that the messages and products reach the target audience so that recipients can fit new information into their current understandings and experiences.[31] Active dissemination of environmental public health messages will likely require that grantees work with other partners, media contacts and community members to ensure that information is passed on to those who need it. Distribution of these messages may require the use of media such as radio, television and social networking tools, as well as more individualized distribution channels such as classrooms, community events and similar opportunities where members of the partnership have an opportunity to interact directly with the target audience.

Four main types of dissemination products can be developed: in-person, print, web-based, and audio/visual. Personal contact can involve meeting with people and providing information through the other three types of products (paper, audio-visual or web-based materials). Personal contact can also include telling audiences how and where to access additional materials. Print materials can be distributed at any location where members of the target audience are present and likely to respond to handouts. For example, public venues such as community centers and libraries could be effective places to distribute project information, as well as in seminars, courses or schools. Internet-based materials can be used to reach people in their own settings, where they are most comfortable reading and digesting information. Audio-visual materials can be distributed in a downloadable format on a website or showcased on a project's website.

[31] Research Utilization Support and Help (RUSH) Project. 2001. Developing an Effective Dissemination Plan. Available: *http://www.researchutilization.org/matrix/resources/dedp/* [accessed 16 December 2011].

Example Metrics for Activity 3: Disseminate messages

- Description of dissemination plans
- Number of channels or strategies used to disseminate products and messages
- Description of plans for disseminating information during events, gatherings or new events created to increase participation of audience
- Number of events attended to disseminate products or materials
- Budget allocated for dissemination activities
- Number of products or materials distributed
- Number of partners, volunteers and community members disseminating materials (for example, number of individuals or hours spent disseminating)
- Number of target audience members who understand the message
- Number of target audience members who have incorporated the message into their own beliefs, attitudes and behaviors
- Number of audience members who are able to spread the message to others

Metrics in Action 4.2: The **Southern California Environmental Health Sciences Center Community Outreach and Education Program (COEP)** wanted to develop a high-impact way to communicate the findings of its research to key stakeholders. They secured funding from the California Air Resources Board to create a documentary video, "A Breath of Air: What Pollution is Doing to Our Children." The 28-minute video features a scientist, key government regulators, the executive director of the Center for Community Action and Environmental Justice, and several families affected by air pollution. The Center eliminated physical and financial barriers to access by making the video available in multiple formats for free. COEP also lowered the conceptual barriers to access by making the material available in multiple languages and presenting the technical information at different levels of detail.

The Center disseminated the video to more than 500 organizations, resulting in thousands of viewings. Organizations that have ordered the video include ten California chapters of the Lung Association, three nursing schools, seven health departments and many others. The video is offered for free in Spanish and English on DVD or VHS cassette, and it is available for download from the California Air Resources Board website.

Metrics for disseminating messages:

- Budget allocated for dissemination activities: *XX% of the budget was allocated for dissemination activities.*
- Number of products or materials distributed: *One video was distributed to more than 500 organizations, including ten California chapters of the Lung Association, three nursing schools, seven health departments and many others.*

For more information about the Southern California Environmental Health Sciences Center, visit: http://hydra.usc.edu/scehsc/index.html.

Activity 4: Follow-up and ongoing dissemination

Activity 1	Activity 2	Activity 3	Activity 4
Develop communication strategies	Develop message content and format	Disseminate messages	Follow-up and ongoing dissemination

Many projects strive for continual improvement of their products and dissemination strategies in order to remain current and adapt to changing needs.

Some approaches for updating and following up on the creation and dissemination of products and messages:

- Communicate new research findings on a regular basis (include dates on materials and update regularly)
- Continue to involve the target audience in translation and dissemination activities
- Engage groups that will assist in the dissemination of materials and expand to new target audiences
- Share resources with other programs
- Provide additional training, education and community-building exercises
- Maintain a website and update it on a regular basis
- Provide handouts that participants can take home
- Test and seek feedback on products and messages on an ongoing basis

Example Metrics for Activity 4: Follow-up and ongoing dissemination

- Number and description of regularly scheduled meetings
- Monthly newsletters or web-based outreach to inform target audiences of ongoing events
- Weekly radio or television public service announcements
- Number and description of forums created to increase and maintain participation
- Survey results from participants about messages and dissemination techniques, including reports, factsheets or summaries of survey findings
- Description of improvements made to content, format and strategies
- Description of methods used to engage target audience and other partners in improving the communication strategy, content and format
- Description of ways survey results were used to inform changes to dissemination strategies

Outputs

One of the primary goals of dissemination activities is to create outputs in the form of products and messages. These outputs are the results of the efforts of the PEPH grantees to translate research findings into public health interventions. In this section, we discuss the three outputs below.

Output 1: Findings communicated in various products (in-person, print, web, and audio-visual)

Output 2: Access to environmental health messages and information

Output 3: Multi-directional communication and engaged partners

Output 1: Findings communicated in various products

Almost all PEPH grantees will develop and disseminate products and messages at some point during a project. Thoughtful development of messages and products leads to an increase in knowledge, capacity and engagement of a target audience. Concrete products are often the most straightforward outputs of activities. The products themselves and information about them can be distributed and disseminated through a wide range of mechanisms and channels. These include brochures, leaflets, databases, internet sites, mailing lists and much more.

Some examples of how to measure findings communicated in various products include:

- **In-person interactions:**
  - Recording interactions with groups and individuals at events (e.g., fairs and community forums)
  - Recording meetings and taking notes during community forums and meetings
  - Tracking number of giveaways and estimating number of contacts made during events and engagement activities
- **Print materials:**
  - Counting the number of print materials created
  - Keeping a record of the number of materials disseminated and locations of dissemination
  - Recording additional requests for materials and number distributed
- **Web-based products, including social media:**
  - Installing a counter on website to track number of visitors and geographic distribution
  - Creating a survey for site visitors

- **Web-based products, including social media:** *(continued)*
  - Tracking and counting the number of links from other sites to the PEPH project or program website
  - Keeping web logs for site activities and counting number of materials downloaded from site (such as fact sheets and curricula)
- **Audiovisual products:**
  - Tracking community-wide showings of videos (documentaries, short films, etc.)
  - Describing partnerships with local television stations that can air informational programming and public service announcements (PSAs)
  - Tracking ratings and viewership of broadcast materials

Example Metrics for Output 1: Findings communicated in various products

In-person interactions

- Number of and description of events attended such as health fairs, community forums, workshops, home health visits, meetings, focus groups and one-on-one conversations
- Description of national conferences and town hall meetings in which partners participated and communication products were disseminated
- Number of partner participants and attendees at these meeting and forums
- Number of questions asked during and after the meeting
- Number and description of events held with government agencies, advocacy groups, non-government officials
- Number of materials picked up at the dissemination events
- Number of partners organizing events to demonstrate involvement in the partnership
- Number of contact hours of partners involved in research
- Effectiveness of in-person meetings, established by feedback from participants

Print materials

- Number of products and materials distributed
- Number of requests made for the materials
- Description or lists of places distributed
- Description or lists of audiences receiving materials
- Description of the target audience that received the materials and an indication of whether the audience reviewed the materials or forwarded them to other recipients
- Co-authorship on materials (with a mix of partners as appropriate)
- Involvement of partners and target audiences in research translation for content
- Effectiveness of products, established by feedback from product recipients and users

Example Metrics for Output 1: Findings communicated in various products *(continued)*

Web-based products

- Number of hits to the website by originating sources of the hit (.edu, .gov, etc.)
- Number of hits to website by geographic areas
- Number of third party links to the website
- Number of downloads
- Average and range of time users spend at website
- Description or lists of source sites that are driving users to the website
- Amount of use of interactive websites (such as Web 2.0)
- Number and description of comments collected from web pages and blogs
- Number of contributions collected (such as blogs, wikis, forums, etc.)
- Number of unique visitors
- Page views per visitor (e.g., total time spent per user, frequency of visits, depth of visits)
- Description of activity on website discussion board
- Effectiveness of products, established by feedback from product recipients and users

Social media

- Number and demographics of members or followers
- Number and description of messages sent
- Number of people who open a message
- Number of people who click on certain links within a message
- Number of people who forward the message on to others; size of secondary audience

Audio-visual products

- Number of products disseminated
- Description of how product is tailored to audience
- Description of type (such as podcast, YouTube video, film)
- Number of viewers
- Pick-up of the product by other media such as newspapers and TV
- Number of discussions in newspapers, news television, YouTube
- Number of discussions in social media
- Traffic to and usage of products posted online or provided by other means
- Interactions (such as leaving comments, participating in discussion forums, leaving reviews and ratings, etc.)
- Effectiveness of audio-visual products, established using feedback from product recipients and users

Metrics in Action 4.3: The **University of California, San Diego's (UCSD) Superfund Research Program (SRP)** created a 28-minute UCSD-TV video documentary ("Los Laureles Canyon: Research in Action") to explore complex environmental health issues, build cross-border partnerships, reach mass audiences and bring about change. The video has been viewed over 100,000 times. This documentary film constitutes a useful model for reaching lay audiences and has been featured on a wide-range of media outlets, including Cable TV, UCSD TV, the Research Channel – National Science Foundation Emerging Frontiers Program, the 2009 American Association for the Advancement of Science Annual Meeting, the Global Action Research Center Sustainability Solutions Database and most recently at the opening session of the 2010 American Public Health Association Film and Media Festival.

The goal of the work presented in this documentary is to enable community leaders to identify priority environmental health issues and provide decision-makers (including those at U.S. EPA and Mexican Government Agencies) with relevant information to eliminate or reduce exposure of vulnerable border communities to Superfund chemicals and other environmental hazards. The documentary features UCSD SRP's efforts to help address the flow of Superfund chemicals and other hazardous wastes along and across the U.S.-Mexico border. It highlights how SRP integrates participatory watershed-based planning with environmental health science (including the development and application of novel SRP biomolecular technologies) and climate change science.

Metrics for findings communicated in various products:

- Number of products disseminated: *One documentary video was created.*
- Number of viewers: *The video has been viewed over 100,000 times through a wide-range of media outlets.*

For more information about the UCSD SRP, visit: http://superfund.sdsc.edu/.

Metrics in Action 4.4: The **Bay Area Breast Cancer and the Environment Research Center/ Zero Breast Cancer** has adopted new technologies to communicate with its partners. The Center uses social media tools such as Facebook and Twitter to disseminate research findings, prevention messages and updates on Center activities. The use of these innovative channels enables the Center to stay in touch with partners and develop a reputation as a reliable source of breast cancer information.

With a goal of "translating and communicating research findings to the public, policy makers and other audiences most likely to benefit from the findings," the Center developed a strategic plan that incorporated traditional communication channels in addition to web-based and social media outlets. This multi-pronged approach provides the Center with a way to reach many different audiences by using multiple channels to disseminate the same message. The Center committed to building and maintaining the infrastructure necessary to monitor and evaluate its dissemination activities. This included a subscription to Constant Contact (a direct email marketing package) and staff time to maintain Facebook and Twitter accounts.

As part of its dissemination plan, the Center monitors the number of messages sent out via each communication channel, the number of viewers and the topic or content of the message delivered. Unlike traditional media such as television, radio and newspapers, social media allow the Center to track the number of people who open a message, the number of people who click on certain links within a message and the number of people who forward the message on to others. This information is valuable in understanding which messages resonate with the target audience. The information also helps the Center shape future messages.

Metrics for findings communicated in various products:

- Number and demographics of members or followers: *The Center has more than 1,000 followers on Twitter and 864 Facebook "friends." Followers are 70% female, and more than half are 40 or older.*
- Number and description of messages sent: *The center averages at least one tweet and one Facebook message per day. The message focuses on prevention activities followers can do, such as reminders to eat fruits and vegetables daily.*

For more information about the Center, visit: http://bayarea.bcerc.org.

Output 2: Access to messages

Access to translated materials is an intangible output of dissemination activities. Through the use of a solid communication strategy and the development of messages and products in an appropriate format, partners can maximize accessibility for a target audience. Partners can also facilitate information transfer to new groups through the connections and social networks of the target audience.

In this section, we distinguish between two categories of access: physical and conceptual. Physical access means that the intended audience can see, listen or otherwise directly interact with the products. To assess this, project partners might ask: Are the products physically available to the audience? Are they distributed in areas inhabited by the target audience? If materials are available on the web, does the audience have access to the Internet? Partners can increase physical access by using multiple channels or strategies for communicating PEPH messages. Disseminating and broadcasting messages at various times of the day or week can also be effective. In addition, networking with target audiences and attending other events can provide more opportunities for ensuring that products and messages make it into the hands of the target audience.

Conceptual access refers to how well the audience understands the intended message. To ensure that the target audience has conceptual access to products and messages, partners might ask: Are the products written in ways to be easily understood by the target audience? Do the messages make sense in the cultural context of the audience? Are technical concepts, graphs and jargon explained clearly? Partners can increase conceptual access by monitoring the use of materials and feedback and by using multiple communication strategies (e.g., pairing print materials with in-person interactions). Consulting with representatives of the target audience to identify emerging language or behavioral trends can also be very helpful.

Grantees can optimize both physical and conceptual access by using different modes of communication (e.g., both individualized and group-focused) and different mechanisms for dissemination (e.g., print or web-based).

Example Metrics for Output 2: Access to messages

Physical access

- Attendance at events
- Number and description of written materials distributed
- Number of views for videos or other media
- Number of website hits
- Number of home environmental health or promotora (community health worker) visits
- Number of medical or household personal exposure interventions
- Estimates of television and radio spot coverage based on time covered, number of listeners or television coverage viewership
- Number of target audience members who report having access to project-related information, products or messages

Conceptual access

- Number of languages in which the products are available, especially the language of the target audience
- Description of efforts to explain scientific concepts in lay terms as well as in terms that are meaningful for the target audience (e.g., describing specific respiratory symptoms might be more effective than discussing potential respiratory effects of environmental hazards)
- Description of how products and messages are consistent with cultural understandings of the target audience
- Reports of understanding from target audience

Metrics in Action 4.5: Reducing exposure to developmental toxicants among Latino children is the mission of the **Outreach Core (OC)** and **Research Translation Core (RTC)** within the **Duke University Superfund Research Center** The program partners include the North Carolina Division of Public Health's Nutrition Services Branch and the North Carolina Healthy Start Foundation. The OC and RTC conduct environmental health outreach and education directed at low income and minority women and their children, enhance the capacity of disadvantaged communities to understand threats posed by environmental contaminants and provide a bridge between campus research, communities and policymakers.

The partners develop materials that address the specific needs of different audiences, and they use a variety of dissemination strategies to increase the audiences' access to information. To address conceptual access, the group developed novellas that provided information about fish consumption by pregnant and early postpartum Latina women. The OC and RTC developed the outreach materials based on input from Latina women, who reviewed the materials and provided feedback. The OC and RTC incorporated the new informational products into several subsequent projects. They also disseminated the materials through the Center's local and national networks, as well as through a partner's public access website.

Metrics for access to messages:

- Number and description of materials distributed: *The OC and RTC created a novella targeting Latina women. The novella provided information about fish consumption for pregnant and early postpartum women.*
- Number of languages in which the products are available, especially the language of the target audience: *The novella is available in Spanish and English.*

For more information about the Duke Superfund Research Program, visit: http://superfund.geneimprint.com.

Output 3: Multi-directional communication and engaged partners

Output 1	Output 2	Output 3
Findings communicated in various products	Access to messages	Multi-directional communication and engaged partners

Open communication between partners and participants in PEPH projects can be an important component of a communication strategy. Examples of multi-directional communication include developing opportunities for interactive dialog among project members and intended audiences; developing mechanisms for raising awareness of environmental health issues while enhancing communication; and establishing long-term trusting relationships with partners, key members of audiences, key informants, etc.

For more information, see **Chapter 2: Partnerships**.

Multi-directional communication between partners can provide useful feedback on products and messages including the quality, focus and relevance of the products. More engagement of partners and participants often leads to clearer messages, better products and materials and better dissemination.

Grantees can assess multidirectional communication and engagement by examining the distribution of resources, decision-making processes, contributions to message development and dissemination strategies, and feelings of ownership.

Opportunities for multi-directional communication include:

- Radio shows
- Website discussion boards or chat rooms with researchers, doctors or other experts
- Lunchtime forums
- Group conversations
- Conferences, workshops
- Promotora visits
- Health fair booths
- Trainings
- Science day town hall meetings
- Focus groups

Example Metrics for Output 3: Multi-directional communication and engaged partners

Participation

- Reports of regularly scheduled meetings and interactions
- Number of partners in attendance at formal and informal interactions
- Number of members participating in community forums, website discussion groups, radio shows or other interactive media
- Types of partners participating in meetings
- Diversity of partners by ethnic group, cultural group and geographic location

Quality and equality of interactions

- Description of opportunities for partners to be heard
- Description of exchanges that occur
- Anecdotal evidence of ease of use and implementation of message
- Number of new or revised products and dissemination techniques that were developed based on feedback from partners and the community

Retention

- Retention rates of volunteers and partners who regularly disseminate material
- Number of participants from the target audience or community at regularly scheduled meetings over time

Consistency

- Frequency of reviews for consistency in messages and products
- Description of procedures or actions for evaluating consistency in messages and products

Metrics in Action 4.6: The **Aberdeen Area Tribal Chairman's Health Board (AATCHB)** and The **University of Iowa Environmental Health Sciences Research Center (EHSRC) Community Outreach and Engagement Core** jointly hosted the Asthma Education Conference for Tribal Health Officers Serving the Northern Plains Area in South Dakota in October, 2006. The goal of the meeting was to advance the knowledge of asthma among tribal health professionals working within the Aberdeen Area (North Dakota, South Dakota, Nebraska and Iowa) by providing an opportunity for communication among all partners. The tribal health professionals were able to gain a better understanding of asthma and its environmental triggers in their communities and use this knowledge to deliver better medical care and improve health outcomes. At the same time, tribal members were able to provide project staff with insight into the problem of asthma in the Native American community and discuss cultural issues related to potential treatments. The conference also provided an opportunity to foster new and ongoing collaborations between tribal health leaders, Native American health organizations, area universities and government entities. Collaborations and meetings such as this one allow communities to voice their needs to partners and gain access to environmental public health information, while they also provide an opportunity for project staff to hear from partners.

Metrics for multi-directional communication and engaged partners:

- Description of opportunities for partners to be heard: *The Core hosted a conference that was structured so that all participants had a chance to lead, moderate and participate in sessions.*
- Diversity of partners by ethnic group, cultural group and geographic location: *Partners from all over the state participated in the conference, including tribal health leaders, Native American health organizations, area universities and government entities.*

For more information about the University of Iowa EHSRC, visit: http://www.ehsrc.uiowa.edu.

Impacts

Impacts are benefits or changes resulting from the activities and outputs. The products and dissemination logic model example in this Manual identifies three examples of impacts that can result from effective products and dissemination. Examples of impacts for discussion of products and dissemination are:

Impact 1: Awareness of messages

Impact 2: Ability to act on messages

Impact 3: Communication of messages to others

Impacts are more difficult to measure than activities and outputs in part because it often takes several years for substantive changes to occur. When thinking about the impacts a project might be able to achieve and how to measure those impacts, it can be helpful to think in terms of short-term and long-term impacts. Short-term impacts are typically those changes that would be expected to see in the first few years of a project. Long-term impacts might not be seen for 5 or more years. It is helpful for grantees to identify intended impacts so that they can identify measures that will help document their progress in achieving impacts.

Grantees also may be hesitant to claim credit for impacts because other organizations or other contextual factors may have contributed to the changes. While grantees may not be able to claim sole credit for these impacts, it is important to be able to track these broader changes and to document the contributions made by the project to achieving these impacts.

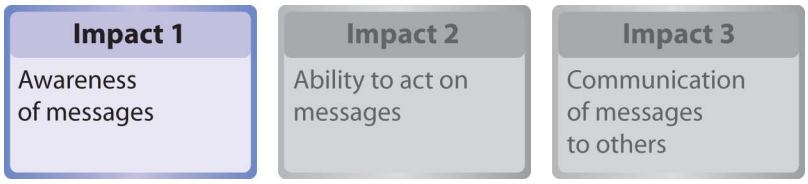
For additional information on long-term impacts, see **Chapter 7: Principles of Evaluation**.

Although there are challenges associated with measuring impacts, tracking progress towards these goals helps grantees stay on track, demonstrate success and identify areas for improvement. Most importantly, the ultimate goal of products and dissemination is to produce outcomes and impacts that lead to improvements in health through a reduction in environmental health hazards.[32]

In measuring impacts of dissemination activities, it may be helpful to consider the impacts in three stages: awareness, action and advocacy. Individuals who are aware of the issue understand your message and are able to contemplate how the environmental public health issue might affect them or their community. Individuals who are taking action are in the process of changing their behavior based on your message. Finally, individuals who are advocating have changed their behavior and are sharing your environmental public health message with others.

[32] See also, Silka L. 2000. Evaluation as a strategy for documenting the strengths of community-based participatory research in: Successful Models of Community-Based Participatory Research, 29-31 March 2000: Final Report, Washington, DC. 49-54. (O'Fallon LR, Tyson FL, Dearry A, eds). Available: *http://www.hud.gov/offices/lead/library/hhts/NIEHS_Successful_Models.pdf* [accessed 16 December 2011].

Impact 1: Awareness of messages



Increased awareness of environmental health messages can lead to a better understanding of environmental exposures and their sources. Audiences gain awareness by listening to, understanding and using the information contained in environmental health messages. In other words, awareness is fully absorbing the information to the point of being able to use it and explain it to others.

With effective awareness, partners, participants, communities and decision-makers can better identify and contemplate environmental health concerns related to the community. They are also better able to understand the relevance of scientific findings and create engaged communities within target audiences around issues relevant to them.

Awareness of environmental health messages can occur through:

- Continuous engagement of partners in dissemination activities
- Consistency of messages and relevance of content to target audiences
- Progression of knowledge and capacity building through messages and project activities, such as increased complexity of materials and literacy level to reflect knowledge gained
- Participation of new partners and audiences

Some strategies for measuring awareness include:

- Using quizzes and surveys in formal and informal settings
- Gathering letters of support, testimonials and other formal evidence of support and recognition of the PEPH project and partner work
- Tracking increases in media coverage or interest in a PEPH topic (for example, the local news does an exposé, or a local television station shows a documentary)

Example Metrics for Impact 1: Awareness of messages

- Results of post-intervention survey to test recall of messages
- Description of audience understanding
- Number of calls or requests for environmental health information from community over time
- Number of articles or other forms of media coverage that address the environmental public health message
- Description of coverage in media of the environmental public health message
- Trends of attendance and contributions at meetings over time (for example, community members with knowledge about the public health issue may be more likely to speak up at meetings and voice their concerns)
- Individuals able to use language and ideas learned from products and dissemination

Metrics in Action 4.7: The **Michigan State University Breast Cancer and Environment Research Center (MSU BCERC)** includes community advocates and faculty members from the Department of Communication. The Community Outreach and Translation Core of the BCERC focuses on disseminating research from the BCERC research core, promoting the BCERC website and encouraging behavioral change. In order to reach out to target audiences to improve the efficacy of future educational messages about breast cancer, MSU BCERC researchers investigated awareness and uptake of environmental public health messages. They conducted a message recall survey of over 350 women about topics and sources of memorable breast cancer messages and used the findings to target educational outreach activities to suit the needs of participants. Results from messaging research are available online, were presented at the research organization's yearly symposium and are released in periodic press reports.

Metrics for awareness of messages:

- Results of post-intervention recall of messages: *Findings indicated that most women (60%) recalled a memorable message, described it, identified its source and noted whether it had resulted in prevention or detection behaviors.*
- Description of audience understanding: *Women were able to describe the message and explain how they could apply it in their own lives.*

For more information about the MSU BCERC, visit: http://www.bcerc.msu.edu.

Impact 2: Ability to act on messages

Impact 1	Impact 2	Impact 3
Awareness of messages	Ability to act on messages	Communication of messages to others

Individuals who are aware of messages are more likely to take action based on them. Effective information and messages from projects can target an audience in a personal and individualized way. These messages often suggest ways in which the target audience can take action to mitigate environmental health hazards. These informed decisions can eventually improve health.

Some strategies to measure the action taken by the target audience include collecting and analyzing:

- Pre- and post-test data on behavior change
- Anecdotal evidence of action in various settings such as home, school and workplace
- Observations of action taken by the target audience

While this section focuses on individual-level awareness and action, another dissemination strategy is to provide information to policy-makers in an effort to inform environmental public health policies and regulations.

Example Metrics for Impact 2: Ability to act on messages

- Descriptions of changes in action, including quantitative results from assessments of behavior change
- Anecdotal evidence of informed decision-making
  - Description of testimonials, articles, etc.
  - Number of calls from community over time
- Description of decisions made by trainees, students and participants because of increased awareness or education from program
- Documentation of published changes in protocols, safety regulations, etc.
- Increased capacity of target audience to address environmental health issues
  - Number of target audience members involved in PEPH projects
  - Number of target audience members involved in PEPH leadership activities
  - Number of new PEPH activities initiated
  - Description of relationships developed between target audience members and health professionals and decision-makers
- Number and description of new programs to encourage identification and reporting of environmental or safety hazards
- Number and description of new research projects, support groups or enforcement committees established
- Participation
  - Number of individuals and partners taking action to change workplace, school or community processes
  - Number of situations where individuals have taken action, such as in a school, community or legislative process

Metrics in Action 4.8: Alaska Community Action on Toxics (ACAT) was established in 1997 to advocate for environmental and community health by limiting the release of contaminants and mitigating the human health effects of toxins in the natural environment. NIEHS grants fund ACAT's community-based participatory research project and the annual Field Institute to provide participants with the tools necessary to conduct their own community-based environmental sampling programs to assess contaminants from local and global sources. Additionally, ACAT, in collaboration with the State University of New York School of Public Health and Norton Sound Health Corporation, has begun a pilot study to help residents design a methodology for conducting research on contaminants so they can be fully engaged in future human health and contaminants studies planned for the region.

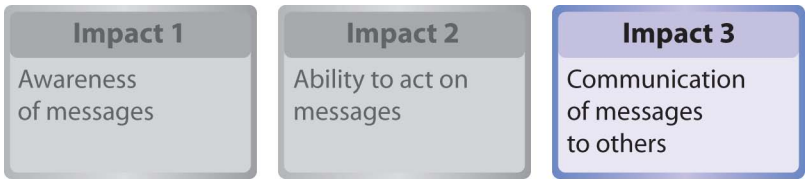
After working with community members for over 10 years, ACAT has seen how communities can affect environmental public health change. After participating in ACAT activities, the indigenous Alaskan community decided in 2009 to reject a proposal for a hazardous waste facility on the island's Northeast Cape. To facilitate support for additional projects, ACAT documented how target audience members became involved as partners to initiate regulatory changes. Based on its successes, ACAT is sharing with other communities those strategies that proved effective in convincing the government to clean up former defense sites in the region.

Metrics for ability to act on messages:

- Anecdotal evidence of informed decision-making: *The indigenous Alaskan communities' decision to reject the 2009 proposal for a hazardous waste facility in their community was based on their knowledge of environmental public health hazards, some of which was gained through interactions with ACAT.*
- Increased capacity of target audience to address environmental health issues: *Since 1997, XXX Alaska Natives have participated in ACAT activities and XXX have actively participated in activities designed to protect their community from environmental public health hazards.*

For more information about ACAT, visit: http://www.akaction.org.

Impact 3: Communication of messages to others



When a target audience has absorbed a message and altered its actions to reflect the knowledge of the environmental health issue, it may also begin to share that information with others. Some ways in which the target audience may share the message are:

- Word of mouth, such as when partners and participants relay messages learned directly to others
- Directing others to websites, radio shows, television shows or other forms of multimedia
- Distributing materials/messages directly to others

Some examples of how to measure sharing of messages include:

- Conducting surveys
- Recording comments from trainers and educators
- Recording anecdotes from participants or "third parties" who are recipients of secondary information
- Conducting website user surveys; for example, asking users who access site or download materials how they heard about the materials or website
- Reviewing media and other groups' literature
- Talking to attendees (formally or informally) to see how they plan to use the information they have learned

Example Metrics for Impact 3: Communication of messages to others

- Description of activities conducted to provide partners with information necessary to advocate
- Number of partners who understand and can share factual information about environmental health hazards
- Number of partners who actively share information about environmental public health issues

Metrics in Action 4.9: NIEHS and the **University of Cincinnati (UC) Center for Environmental Genetics** sponsored a community forum to build momentum for community action against environmental injustice. The Center assists scientists working in environmental health sciences and improves understanding of the relationships between environmental exposures and human disease. It conducted the meeting in partnership with community organizations to give the Cincinnati community the opportunity to hear about research in this area and to give their scientists an opportunity to hear about the concerns of community members. Experts from UC helped residents better understand the exposures they faced each day and offered practical ideas about how individuals can reduce their environmental health risks.

Then NIEHS Acting Director Samuel Wilson, M.D., speaks at the University of Cincinnati Community Forum, September 2008.

The community forum "Your Home, Your Health, Your Voice" focused on empowering individuals dealing with environmental exposures. The forum encouraged attendees to voice their opinions and concerns as well as relay the vital information presented in the forum to loved ones and at-risk members in the community through secondary information transfer. The community forum explicitly encouraged secondary information transfer as a vehicle to promote healthy decision-making in the homes and within the families of participants.

Metrics for communication of messages to others:

- Description of activities conducted to provide partners with information necessary to advocate: *The community forum was conducted to provide partners with information about how to understand and remediate environmental exposures.*
- Number of partners who understand and can share factual information about environmental health hazards: *XX partners participated in the forum, and based on surveys collected after the forum, XX% of those attending were able to identify key facts related to environmental public health hazards.*

For more information about the UC Center for Environmental Genetics, visit: http://www.eh.uc.edu/ceg.

Chapter 4 Case Study: Teens, Nail Salon Workers and Beauty Products

In Oakland, California, the **Asian Communities for Reproductive Justice** established the Participatory Research, Organizing, and Leadership Initiative for Safety and Health (POLISH) to decrease toxic occupational exposures among female Asian Pacific Islander (API) nail salon workers. The project organizers aimed to 1) educate, train and mentor API teenage girls and Vietnamese nail salon workers who are exposed to environmentally toxic products, and 2) increase scientific knowledge of the effects of exposure to environmental hazards associated with beauty products.

Activities

POLISH conducted outreach to 100 nail salons and 2 churches to recruit workers and distribute outreach materials written in Vietnamese. POLISH met every 6 weeks with nail salon workers and worker/owners interested in taking leadership on this issue. They gauged community knowledge of risks through a survey conducted by API youth, and they used the results to develop the program materials. The API youth who participated in this project developed and conducted a survey with 200 API girls on their knowledge of toxins in personal care products and the most popular products used by this community. POLISH created several products to communicate health messages, including a bilingual Vietnamese/English yoga manual on ten easy ways to promote health in the workplace and a tutorial addressing spa chair cleanliness, one of the most common health and safety violations in salons. Based on interactions with and input from the API nail salon workers, the project leaders learned that participants needed information on safer product alternatives that they could use at work before they could change their risky practices.

Metrics:

- Description of target audience for communication: *Asian Pacific Islander female nail salon workers.*
- Number and description of target audience members who were involved in developing communication strategies: *XX API girls participated in the survey development and helped create the communication products.*
- Number and description of regularly scheduled meetings: *Meetings were scheduled every 6 weeks to educate nail salon workers about the environmental public health risks associated with the profession and to identify potential steps the nail salon workers could take to minimize their risk.*

Outputs

With support from an NIEHS extension grant, the project developed a basic health and safety resource handbook of the products of most concern to nail salon workers. Nail salon workers worked with partners to disseminate the handbook to nail salons throughout the community. In 2007, several API women took part in community-based participatory research training provided by POLISH that focused on developing communication products for nail salon workers. To increase physical access to the environmental public health messages, POLISH established a network to distribute materials throughout the salon community. As a next step they are launching a public education campaign to promote the demand for and use of "Three-Free" products (free of toluene, formaldehyde and dibutyl phthalates).

Metrics:

- Number and type of materials distributed: *POLISH created several products to communicate health messages, including a bilingual Vietnamese/English yoga manual on ten easy ways to promote health in the workplace and a tutorial addressing spa chair cleanliness, one of the most common health and safety violations in salons.*
- Number of languages in which the products are available, especially the language of the target audience: *English and Vietnamese*.

Impacts

To date, 15 nail salon workers and worker/owners attend POLISH meetings regularly. They have learned to identify ways in which the California State Board of Barbering and Cosmetology can provide accessible and fair health and safety guidelines for the nail salon community. They also learned processes for licensing, inspections, violations and appeals. The women who participated in the POLISH project gained increased scientific literacy and awareness of personal risk. The group of trainees developed a series of interactive exercises that educated many more Asian girls and boys at an API Youth Conference. Finally, the program was able to help advocates get an ordinance approved in San Francisco that recognizes salons that use the "Three-Free" nail products.

Metrics:

- Number of partner participants and attendees at these meeting and forums: *15 nail salon workers and worker/owners participate regularly in the meetings.*
- Description of audience understanding: *Nail salon workers learned to identify ways that the California State Board of Barbering and Cosmetology can provide accessible and fair health and safety guidelines for the nail salon community. They also learned processes for licensing, inspections, violations and appeals.*
- Change in policy or regulation: *A new ordinance in San Francisco recognizes salons that use the "Three-Free" nail products.*

For more information about the Asian Communities for Reproductive Justice, visit: http://reproductivejustice.org.

Summary of Product and Dissemination Metrics

Example Metrics for Activity 1: Develop communication strategies

- Description of goals and objectives of communication strategy
- Description of target audience for communication
- Description of communication channels most effective for audience and message
- Number and description of target audience members who were involved in developing communication strategies
- Description of methods of communication most frequently used by members of the intended audiences
- Description of methods used to obtain feedback from the target audience on the communication strategy

Example Metrics for Activity 2: Develop message content and format

- Number and description of messages developed about environmental health risks
- Description of involvement of target audience in developing theme and content of message
- Number of languages in which materials are available
- Description of steps taken to address cultural context of target audience
- Description of adaptations made to create products appropriate to different audiences
- Number and description of print materials developed
- Number and description of web-based products developed
- Number and description of audio-visual products developed
- Number and description of in-person products developed
- Number and description of other types of products developed
- Description of testing of message with target audience

Example Metrics for Activity 3: Disseminate messages

- Description of dissemination plans
- Number of channels or strategies used to disseminate products and messages
- Description of plans for disseminating information during events, gatherings or new events created to increase participation of audience
- Number of events attended to disseminate products or materials
- Budget allocated for dissemination activities
- Number of products or materials distributed
- Number of partners, volunteers and community members disseminating materials (for example, number of individuals or hours spent disseminating)
- Number of target audience members who understand the message
- Number of target audience members who have incorporated the message into their own beliefs, attitudes and behaviors
- Number of audience members who are able to spread the message to others

Example Metrics for Activity 4: Follow-up and ongoing dissemination

- Number and descriptions of regularly scheduled meetings
- Monthly newsletters or web-based outreach to inform target audiences of ongoing events
- Weekly radio or television public service announcements
- Number and description of forums created to increase and maintain participation
- Survey results from participants about messages and dissemination techniques, including reports, factsheets or summaries of survey findings
- Description of improvements made to content, format and strategies
- Description of methods used to engage target audience and other partners in improving the communication strategy, content and format
- Description of ways survey results were used to inform changes to dissemination strategies

Example Metrics for Output 1: Findings communicated in various products

In-person interactions

- Number of and description of events attended such as health fairs, community forums, workshops, home health visits, meetings, focus groups and one-on-one conversations
- Description of national conferences and town hall meetings in which partners participated and communication products were disseminated
- Number of partner participants and attendees at these meeting and forums
- Number of questions asked during and after the meeting
- Number and description of events held with government agencies, advocacy groups, non-government officials
- Number of materials picked up at the dissemination events

Example Metrics for Output 1: Findings communicated in various products

- Number of partners organizing events to demonstrate involvement in the partnership
- Number of contact hours of partners involved in research
- Effectiveness of in-person meetings, established by feedback from participants

Print materials

- Number of products and materials distributed
- Number of requests made for the materials
- Description or list of places distributed
- Description or list of audiences receiving materials
- Description of the target audience that received the materials and an indication of whether the audience reviewed the materials or forwarded them to other recipients
- Co-authorship on materials (with a mix of partners as appropriate)
- Involvement of partners and target audiences in research translation for content
- Effectiveness of products, established by feedback from product recipients and users

Web-based products

- Number of hits to the website by originating sources of the hit (.edu, .gov, etc.)
- Number of hits to website by geographic areas
- Number of third party links to the website
- Number of downloads
- Average and range of time users spend at website
- Description or list of source sites that are driving users to the website
- Amount of use of interactive websites (such as Web 2.0)
- Number and description of comments collected from web pages and blogs
- Number of contributions collected (such as blogs, wikis, forums, etc.)
- Number of unique visitors
- Page views per visitor (e.g., total time spent per user, frequency of visits, depth of visits)
- Description of activity on website discussion board
- Effectiveness of products, established by feedback from product recipients and users

Social media

- Number and demographics of members or followers
- Number and description of messages sent
- Number of people who open a message
- Number of people who click on certain links within a message
- Number of people who forward the message on to others; size of secondary audience

Audio-visual products

- Number of products disseminated
- Description of how product is tailored to audience
- Description of type (such as podcast, YouTube video, film)
- Number of viewers
- Pick-up of the product by other media such as newspapers and TV
- Number of discussions in newspapers, news television, YouTube
- Number of discussions in social media
- Traffic to and usage of products posted online or provided by other means
- Interactions (such as leaving comments, participating in discussion forums, leaving reviews and ratings, etc.)
- Effectiveness of audio-visual products, established using feedback from product recipients and users

Example Metrics for Output 2: Access to messages

Physical access

- Attendance at events
- Number and description of written materials distributed
- Number of views for videos or other media
- Number of website hits
- Number of home environmental health or promotora (community health worker) visits
- Number of medical or household personal exposure interventions
- Estimates of television and radio spot coverage based on time covered, number of listeners or television coverage viewership
- Number of target audience members who report having access to project-related information, products or messages

Conceptual access

- Number of languages in which the products are available, especially the language of the target audience
- Description of efforts to explain scientific concepts in lay terms as well as in terms that are meaningful for the target audience (e.g., describing specific respiratory symptoms might be more effective than discussing potential respiratory effects of environmental hazards)
- Description of how products and messages are consistent with cultural understandings of the target audience
- Reports of understanding from target audience

Example Metrics for Output 3: Multi-directional communication and engaged partners

Participation

- Reports of regularly scheduled meetings and interactions
- Number of partners in attendance at formal and informal interactions
- Number of members participating in community forums, website discussion groups, radio shows or other interactive media
- Types of partners participating in meetings
- Diversity of partners by ethnic group, cultural group and geographic location

Quality and equality of interactions

- Description of opportunities for partners to be heard
- Description of exchanges that occur
- Anecdotal evidence of ease of use and implementation of message
- Number of new or revised products and dissemination techniques that were developed based on feedback from partners and the community

Retention

- Retention rates of volunteers and partners who regularly disseminate material
- Number of participants from the target audience or community at regularly scheduled meetings over time

Consistency

- Frequency of reviews for consistency in messages and products
- Description of procedures or actions for evaluating consistency in messages and products

Example Metrics for Impact 1: Awareness of messages

- Results of post-intervention survey to test recall of messages
- Description of audience understanding
- Number of calls or requests for environmental health information from community over time
- Number of articles or other media coverage by others that addresses the environmental public health message
- Description of coverage in media of the environmental public health message
- Trends of attendance and contributions at meetings over time (for example, community members with knowledge about the public health issue may be more likely to speak up at meetings and voice their concerns.)
- Individuals able to use language and ideas learned from products and dissemination

Example Metrics for Impact 2: Ability to act on messages

- Description of changes in action, including quantitative results from assessments of behavior change
- Anecdotal evidence of informed decision-making
  - Description of testimonials, articles, etc.
  - Number of calls from community over time
- Description of decisions made by trainees, students and participants because of increased awareness or education from program
- Documentation of published changes in protocols, safety regulations, etc.
- Increased capacity of target audience to address environmental health issues
  - Number of target audience members involved in PEPH projects
  - Number of target audience members involved in PEPH leadership activities
  - Number of new PEPH activities initiated
  - Description of relationships developed between target audience members and health professionals and decision-makers
- Number and description of new programs to encourage identification and reporting of environmental or safety hazards
- Number and description of new research projects, support groups or enforcement committees established
- Participation
  - Number of individuals and partners taking action to change workplace, school or community processes
  - Number of situations where in messages and products
- Description of procedures or actions for evaluating consistency in messages and products

Example Metrics for Impact 3: Communication of messages to others

- Description of activities conducted to provide partners with information necessary to advocate
- Number of partners who understand and can share factual information about environmental health hazards
- Number of partners who actively advocate about environmental public health issues

Chapter 5:
Education and Training

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Chapter 5: Education and Training

Introduction

By supporting training and education activities, PEPH programs help ensure that grantees are able to disseminate environmental public health knowledge and skills to partners and community members. Armed with knowledge and skills, these trainees become ambassadors who can make different choices personally and can raise awareness of environmental public health issues and solutions among the community.

The target audience is an important consideration for any education or training projects. Involving members of the target audience in the development and conduct of training programs can help ensure that the programs incorporate their learning styles and preferences, thereby resulting in better retention and potential use of the information.

PEPH grantees typically conduct three broad types of training programs, each with a specific target audience that participates in these trainings. The logic model activities, outputs and impacts in this chapter include examples from the following programs:[33]

Community Outreach and Engagement Facility Cores: Many programs at NIEHS require the inclusion of outreach, translation and/or engagement facility cores. Examples include the Environmental Health Sciences Core Centers, the Centers for Children's Environmental Health and Disease Prevention Research, the Superfund Research Program, and the Breast Cancer and Environmental Health Research Program. Such facility cores often fund grantees to translate the latest environmental health science research into tools and resources for a variety of audiences – and some of their work includes training and education programs.

Worker Training Programs: NIEHS has a long history of conducting education and training programs in occupational settings. The Worker Education and Training Program (WETP) supports the development of curricula and initiation of training programs throughout the country to help employers meet Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), Department of Transportation (DOT) and Department of Energy (DOE) requirements. The ultimate goals of the WETP are to protect workers from environmental and occupational hazards, such as chemical, biological and radiological wastes and substances. This program encourages innovation for training difficult-to-reach populations by addressing issues such as literacy, appropriate adult education techniques, training quality improvement and other areas not addressed directly by the private sector. WETP has a long history of conducting evaluations of its funded education and training activities, and many of the metrics and examples in this chapter are from WETP grantees.

Other common activities of facility cores are addressed in **Chapter 4: Products and Dissemination** and **Chapter 6: Capacity Building**.

[33] More information about all of these programs can be found at: National Intitute of Environmental Health Sciences (NIEHS). 2010. Programs: Partnerships for Environmental Public Health. Available: *http://www.niehs.nih.gov/research/supported/programs/peph/prog/index.cfm* [accessed 16 December 2011].

WETP grantees provide training that increases literacy and life skills, improves job safety and worker well-being and addresses the needs and requests of workers themselves. The target audiences for these trainings are workers. For purposes of this discussion, we consider workers to include all levels of an organization's staff, including front-line, hands-on staff, foremen, middle managers and senior management. In many instances, senior management benefits from training that helps them understand the challenges staff face, as well as the structural and policy changes they can support to facilitate safer workplaces for staff.

Health care and public health professionals are considered a subset of workers. Specialized training for health care and public health professionals may include first responder training on blood borne pathogens, nurse training on conducting environmental assessments, environmental health grand round series for physicians or training for community health workers on asthma triggers. Health care professionals are recognized leaders and trusted sources of health information; as such, it is important that their environmental health knowledge and communication skills be sufficient to protect their own health, as well as to protect the health of the communities they serve.

Science Education Programs: Science education programs provide training for students and teachers in a classroom setting. These training opportunities are available at all levels of education, from elementary school to graduate school. For example, the Short Term Educational Experiences for Research (STEER) in the Environmental Health Sciences program is designed to attract talented high school students and undergraduates to research opportunities in the environmental health sciences. In addition to attracting talented students, professional development programs are created for teachers to enhance their knowledge and capacity to increase the awareness of environmental health concepts among students.

Within science education programs, grantees may offer trainings for a variety of audiences, including community partners, researchers, scientists, policy makers, health care professionals, teachers, students in grades K-12, undergraduates and graduate students, as well as workers from every level of an organization. We provide examples of possible PEPH training programs in Exhibit 5.1.

For more information about Science Education Programs, check the following sources:

Highlights from NIEHS' Environmental Health Science Education:
http://www.niehs.nih.gov/research/supported/programs/ehsic/highlights.cfm

Environmental Health Perspectives Science Education Program:
http://ehp03.niehs.nih.gov/static/scied.action

Environmental Health Sciences as an Integrative Context for Learning:
http://www.niehs.nih.gov/research/supported/programs/ehsic/index.cfm

Exhibit 5.1 Examples of possible PEPH trainings

Workers

- Organizing occupational training for skilled laborers in safety and health issues or new skills (e.g., annual hazardous material handling refresher)
- Holding trainings oriented toward the needs of unskilled workers to allow them to enter into environmental health and remediation fields of work
- Planning trainings aimed at addressing issues such as how to prevent and respond to threats to workers from new and emerging materials (e.g., nano materials, new hazardous materials, radiation or dirty bombs)

Students

- Training doctoral students in interaction with community members via webinar
- Developing easy-to-implement environmentally focused curricula
- Conducting workshops at academic conferences
- Conducting classroom activities
- Organizing science fairs
- Developing class projects
- Conducting science camps while schools are not in session

Researchers and Scientists

- Training researchers in outreach methods and techniques
- Helping researchers learn how to identify what works for the target audience
- Training researchers in techniques to gain understanding of audiences
- Conducting train-the-trainer meetings to teach researchers how to train others to conduct surveys and interviews, facilitate focus groups, communicate with lay audiences, collect patient data, collect environmental exposure data, etc.

Community Partners

- Educating partners on science topics relevant to the study
- Teaching partners about the Institutional Review Board (IRB) process
- Offering technical workshops to bring partners together to develop recommendations, materials and education tools
- Providing opportunities to learn budgeting and financial management
- Training partners to collect and analyze data
- Communicating environmental health information

Education and Training Logic Model

The logic model in Figure 5.1 provides a framework for evaluating education and training within PEPH programs. This model identifies potential activities, outputs and impacts of successful education and training programs. This chapter provides grantees with a tool to brainstorm other activities, outputs and impacts that are applicable to their specific projects. This model contains three major components:

- Activities are actions that use available inputs to create and maintain education and training projects.
- Outputs are the direct products of education and training activities.
- Impacts are benefits or changes resulting from the activities and outputs. Ultimate or long-term impacts are also examined in the Evaluation chapter (see Chapter7, Principles of Evaluation).

Figure 5.1 Education and Training Logic Model with Examples of Activities, Outputs and Impacts

Sources of Data

Grantees may find the following sources of data to be helpful in tracking achievements related to training and education:

- Activity logs
- Contact logs
- Participant lists
- Feedback forms
- Meeting agendas
- Telephone logs
- Communication strategies and plans
- Budgets
- Group discussions
- Surveys
- Interviews
- Meeting notes
- Email exchanges
- Internet web logs

For a more comprehensive list of data sources, see **Chapter 7: Principles of Evaluation**.

Activities

Regardless of the type of training grantees conduct for their target audience, they will likely incorporate some of the activities described below. Activities, in the framework of an education and training logic model, are actions that are based on available inputs to create and maintain education and training programs. Four types of activities for education and training are presented here:

Activity 1: Identify training needs

Activity 2: Develop and test programs and materials

Activity 3: Conduct training programs

Activity 4: Revise approach, program or materials as needed

Activity 1: Identify training needs

Grantees typically conduct training programs as a service to their communities. As such, the training programs are designed to meet the specific needs of a target audience. Grantees may want to identify the target audience or audiences for the training programs and then work with representatives from the target audience to identify and prioritize training needs. This can include both current and anticipated training needs. Gatherings such as the NIEHS Worker Education and Training Program (WETP) annual meeting can help establish training priorities and goals, and they can increase information sharing between partners and community members. Grantees can also conduct a formal training needs assessment by surveying partners.

Example Metrics for Activity 1: Identify training needs

- Description of intended target audience for the training
  - Language, literacy and education levels
  - Cultural sensitivities
  - Barriers that might keep trainees from adhering to training messages
  - Special needs
  - Relevant background that might influence beliefs and values derived from preliminary interactions
- Description of training needs identified
- Description of methods used to identify training needs
- Number of participants who helped to establish education and training priorities
- Description of contributions made by each partner
- Description of goals and objectives of the training program

Metrics in Action 5.1: The **Society for Occupational and Environmental Health (SOEH)*** is a science-based forum for leaders in academia, management, organized labor and government. SOEH's mission is to establish evidence-based positions on public policy issues related to improving occupational and environmental health. In order to accomplish this, SOEH first worked with partners to establish education and training partnerships and priorities. Partners included: NIEHS, the Association of Occupational and Environmental Clinics (AOEC), the Urban Public Health Program of Hunter College of the City University of New York, the New York City Department of Health and Mental Hygiene and the School of Public Health of the University of Medicine and Dentistry of New Jersey. These partners identified mold-related health concerns as a major training need.

In response, the society staff convened a series of national workshops addressing mold in 2004. The workshops were designed to: 1) develop a consensus document on the state of knowledge pertaining to health effects of mold exposure on workers, 2) discuss approaches and training techniques for protecting workers and communities, and 3) develop strategies to disseminate the results of the workshops to diverse audiences. More than 60 experts from governmental agencies, industrial hygiene firms, abatement contractors, labor unions, universities and trade associations attended the workshops. At the end of the workshops, the group had developed important guidelines for use by training organizations to protect and train workers engaged in maintenance and remediation work with mold.

Metrics for identifying training needs:

- Description of training needs identified: *Mold-related health concerns for those working with mold remediation.*
- Description of goals and objectives of the training program: *Develop a consensus document on the state of knowledge pertaining to health effects of mold exposure on workers; discuss approaches and training techniques for protecting workers and communities; develop strategies to disseminate the results of the workshops to diverse audiences.*

*The SOEH website is no longer accessible.

Activity 2: Develop and test programs and materials

Activity 1	**Activity 2**	Activity 3	Activity 4
Identify training needs	Develop and test programs and materials	Conduct training programs	Revise approach, program or materials as needed

Another important task is to work with partners to identify key goals and objectives of the training program, and to develop education and training strategies and materials. Grantees can keep in mind the level of engagement, literacy and education of the target audience while developing programs and materials. Adult audiences typically learn more when trainers use a variety of lecture, interactive, hands on and experiential activities in training programs. Finally, target audiences can test the programs and materials, and grantees can revise and adapt them as needed to ensure that the content, reading level and language are appropriate to the target audience.

Grantees may want to incorporate principles of adult learning and literacy into their education and training programs. Guidance documents that provide helpful information about adult learning and literacy principles include:

Final Version of the Minimum Health and Safety Training Criteria: *Guidance for Hazardous Waste Operations and Emergency Response* (HAZWOPER) Supporting and All-Hazards Disaster Prevention, Preparedness, and Response
http://tools.niehs.nih.gov/wetp/index.cfm?ID=142

Adult Learning Guide
http://wcwpds.wisc.edu/mandatedreporter/adult_learning.pdf

The Right To Understand: Linking Literacy to Health and Safety Training
http://www.lohp.org/publications/lit_safety.html

Many other training materials are available on the WETP website:
http://tools.niehs.nih.gov/wetp/index.cfm?id=25

A quick search of the internet will also provide other sources.

Activities that grantees might conduct while developing and testing training programs and materials include:

- Gather data on the target audience (language, literacy and education levels, and other relevant background) that might influence beliefs and values
- Involve the target audience in the development process
- Determine levels of comprehension
- Identify preferred training methods of target audiences
  - Determine the primary sources audiences use to obtain information (e.g., peers, television, church or radio)
  - Interact with schools and community organizations to determine learning styles and levels of literacy
  - Survey belief and value systems
- Develop (or adapt) curricula
- Develop (or adapt) materials
- Involve audience in development
- Identify and train trainers
- Test and refine materials with target audiences
- Revise program or materials as needed

For more activities see also the NIEHS Worker Education and Training Program Online Curricula Catalogue: http://tools.niehs.nih.gov/wetp/index.cfm?id=603

Example Metrics for Activity 2: Develop and test programs and materials

- Number of training programs developed
- Number of training materials developed
- Description of goals and objectives of training programs
- Description of training program activities
- Description of outreach activities to involve and educate the community in the research process
- Number and description of testing activities
- Description of results of testing activities
- Description of changes made to program as a result of testing
- Number of trainers identified and trained
- Description of format of training programs (e.g., web-based training classes, certified peer recognition programs, annual workshops at conferences, resource manuals, training websites, validation tools or guides for conducting research)
- Description of team-building and facilitation skills learned by partners to facilitate implementation of education and training programs
- Description of tools, techniques and strategies used to determine the accessibility of education and training materials (e.g., classroom, online, workshops or handouts in public forums
- If conducting a WETP program, description of adherence to Final Version of the Minimum Health and Safety Training Criteria: Guidance for Hazardous Waste Operations and Emergency Response (HAZWOPER) Supporting and All-Hazards Disaster Prevention, Preparedness, and Response Training (http://tools.niehs.nih.gov/wetp/index.cfm?ID=142) or the Clearinghouse website (http://tools.niehs.nih.gov/wetp/)

Metrics in Action 5.2: In 2005, the **American Federation of State, County, and Municipal Employees (AFSCME)** provided hazardous materials training to several hundred school custodial workers in Tucson, Arizona. The goal of the training was to teach the janitorial staff the knowledge and skills necessary to address any hazardous waste accidents within the school setting. Because the school custodial staff in Tucson is primarily Hispanic, AFSCME developed bilingual educational and training materials and curricula. It also offered the custodial workers the option of taking the class with a Spanish-speaking instructor or an English-speaking instructor who also spoke Spanish. AFSCME worked with members of the target population to develop and test the training materials. The testers provided valuable feedback about the language, and AFSCME changed several examples in the training materials to reflect the specific conditions the custodial workers might experience in the schools.

Metrics for developing and testing programs and materials:

- Description of goals and objectives of training programs: *The goal of the training was to teach the janitorial staff the knowledge and skills necessary to address any hazardous waste accidents within the school setting.*
- Description of changes made to program as a result of testing: *AFSCME changed several examples in the training materials to reflect the specific conditions the custodial workers might experience in the schools.*

For more information about AFSCME, visit: http://www.afscme.org.

Activity 3: Conduct training programs

Activity 1	Activity 2	Activity 3	Activity 4
Identify training needs	Develop and test programs and materials	Conduct training programs	Revise approach, program or materials as needed

Conducting a training involves a variety of preparatory and implementation activities. Some key activities grantees will likely accomplish prior to the training include:

- Arranging for facilities that are convenient for members of the target audience
- Scheduling dates and time that work for members of the target audience
- Publicizing the trainings in places the target audience will see or hear
- Producing or obtaining training materials (copies, booklets, binders, markers, etc.)

In conducting training programs, grantees may want to consider how to incorporate the following aspects of a successful training:

- **Location:** Grantees can foster goodwill and trust among partners, as well as improve attendance at the training, by conducting the training in a location convenient for the target audience.
- **Timing:** Trainings offered at times the target audience can attend may increase participation. Some audiences may need trainings during work hours, while others may prefer to have trainings in the evenings.
- **Advance notice of training dates and topics:** Provide adequate notice about training opportunities so that participants can make time for the training in their schedules.
- **Setting:** Conduct the training in a room that enhances the experience. A windowless conference room is often less preferable than a room with windows and some architectural interest. Room set-up options include chairs with no tables, rows of tables facing all one direction, round tables, U-shaped table, etc. Each of these set-up options sends a different message to the audience about the level of participation that is expected.
- **Teaching style:** Adapt the teaching style to the training to fit the audience and topic. Incorporate opportunities for lecture, hands-on training, small group discussions, risk mapping, peer trainers and role play, as well as time for discussions among the participants. Many audiences appreciate being treated as experts and given time to present their views on the topic.

Example Metrics for Activity 3: Conduct training programs

- Dates and locations of education or training sessions
- Number of participants at education or training sessions
- Number of contact hours with trainees
- Number and types of partners who participate in implementing the education and training curricula
- Assessment of whether characteristics of the actual trainees matched the intended target audience (e.g., were those who attended or were trained part of the intended audience?)
- Results of surveys of participants about their satisfaction with training in regards to:
  - Location
  - Physical characteristics of meeting space (room set-up, food, etc.)
  - Sufficient advance notification of the meeting
  - Time and length of the educational or training sessions
  - Clarity of educational and training materials
  - Level of participation in the meetings
  - Clarity of information in the materials and the materials and the presentations
  - Responsiveness of the trainers to questions

Metrics in Action 5.3: The NIEHS **Minority Worker Training Program (MWTP)** has successfully trained underserved, unemployed and unskilled workers to protect themselves and their peers from environmental and occupational exposures. This environmental career-oriented program includes training in exposure safety, life skills relevant to worker needs and occupational skills. The main goal of the program is to increase the number of underrepresented minorities in the construction and environmental remediation industries. The different programs provide:

- Job training, including literacy, life skills, environmental preparation and other related courses and construction-skills training
- Environmental worker training, including hazardous waste, asbestos and lead abatement training
- Safety and health training

In particular, the Brownfields and MWT programs have achieved great success in the area of environmental justice by moving underserved and underrepresented workers into long-term employment in the environmental restoration and hazardous material fields, as well as most recently in the area of green jobs such as energy retrofitting and solar panel installation. As of 2011, the program has successfully trained over 8,400 students and employed approximately 70% of those students in jobs directly related to their training, with ongoing career opportunities offered through local apprenticeship and community college programs.

Metrics for conducting training programs:

- Number of participants at education or training sessions: *8,400 minority workers have participated in Brownfields and MWT programs.*
- Results of surveys of participants about their satisfaction with training: *XX of students reported being very satisfied or extremely satisfied with the training.*

For more information about NIEHS MWTP, visit:
http://www.niehs.nih.gov/careers/hazmat/programs/mwt/index.cfm.

Metrics in Action 5.4: NIEHS Worker Education and Training Program (WETP) grantees, such as the **Western Region Universities Consortium (WRUC)**, must file an annual progress report that includes training attendance numbers, descriptions of curricula and strategies, and assessments of the effectiveness of all trainings conducted. For example, during the grant period from August, 2008 to April, 2009, the WRUC trained 1,889 multicultural workers in 124 courses, for a total of 21,184 contact hours. The courses covered a wide range of topics including hazardous waste sites, emergency response, hazardous materials transportation and hazard communication courses, as well as other occupation-specific topics. WRUC offered courses throughout EPA Regions IX and X, as well as in the Pacific Islands, on Native American reservations and for maquiladora workers in Nogales, Sonora, Mexico.

Potential metrics for attendance and participation at educational and training events:

- Number of participants at education or training sessions: *From August 2008 to April 2009, the WRUC trained 1,889 multicultural workers in 124 courses.*
- Number of contact hours with trainees: *WRUC provided 21,184 contact hours with trainees.*

For more information about the WRUC, visit:
http://www.niehs.nih.gov/careers/hazmat/programs/awardees/wruc.

Activity 4: Revise approach, program or materials as needed

Activity 1	Activity 2	Activity 3	Activity 4
Identify training needs	Develop and test programs and materials	Conduct training programs	Revise approach, program or materials as needed

Revising training approaches, programs or materials often involves input from participants. Grantees can assess participants' improvements in knowledge, skills and behaviors, as well as their satisfaction with the training. Examples of strategies grantees can use to collect this information from training participants include:

- Asking participants to fill out evaluation forms immediately after an education or training experience
- Evaluating the performance of trainers or educators to improve future trainings
- Meeting with trainees and students after some time has passed to get feedback

Revisions to training programs may include any aspect, including the setting, materials, examples, format, hands-on components, location, room set-up, instructors, etc.

Example Metrics for Activity 4: Revise approach, program or materials as needed

- Number and description of methods used to assess participants' satisfaction with training
- Number and description of revisions or adaptations made to training programs as a result of participant feedback
- Description of strategies used to communicate changes to program as a result of assessments (e.g., handouts or a website)
- Retention and attendance numbers and trends to assess whether revisions are making a difference

The Worker Education and Training Program has more than 20 years of experience evaluating training and education programs. It has developed many materials that provide more information about evaluation methods. These materials are available on the WETP website at: http://tools.niehs.nih.gov/wetp/index.cfm?id=92.

Metrics in Action 5.5: The Hazardous Materials Training and Research Institute (HMTRI) developed the Community and College Consortium for Health and Safety Training (CCCHST), which provides training components for both the EPA Hazardous Waste Worker Training Program and the DOE Worker Training Program. The curriculum uses a train-the-trainer model to conduct worker education training.

As the program evolved, workers' needs changed as they became interested in learning about other topic areas. Participants used the end-of-class surveys to provide more information about additional training topics. HMTRI used this feedback to develop new courses and materials. New training modules include: CPR/AED and first aid training, forklift training, quality assurance and inspector safety awareness, building inspector training, hazard awareness, chainsaw safety, wet debris removal, asbestos awareness and respirator awareness courses. HMTRI changed the structure of the course so that participants take the general course as well as two elective components to ensure that trainees get the basic information together with specialized information that meets their individualized needs.

Metrics for revising approach, program or materials as needed:

- Number and description of methods used to assess participants' satisfaction with training: *Participants complete a training evaluation after each training component that assesses satisfaction with the trainer, the material and the location and asks for feedback on additional training needs.*
- Number and description of revisions or adaptations made to training programs as a result of participant feedback: *Nine new training modules were created to address trainees' requests for additional topic areas.*

For more information about HMTRI, visit: http://www.hmtri.com.

Outputs

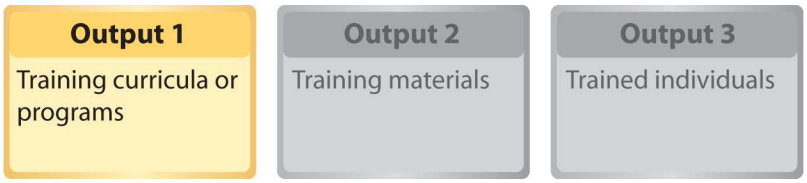
Outputs are the results of the efforts of the PEPH grantees to provide training and education opportunities. In this section, we discuss three key outputs of PEPH programs:

Output 1: Training curricula or programs

Output 2: Training materials

Output 3: Trained individuals

Output 1: Training curricula or programs



A common output of education and training programs is a formal curriculum. A curriculum typically includes:

- Defined goals and objectives
- Specific topic areas for discussion
- Prescribed session formats, schedule and number of contact hours
- Training for teachers
- Evaluation opportunities

The formal curriculum may take the form of a series of power points, a binder with training materials[34] or other formal documentation of the content of the training program. Grantees can reproduce or share these products with others as needed.

Example Metrics for Output 1: Training curricula or programs

- Description of formal curriculum or training program
- Number of curriculum or training programs developed
- Number and types of curricula distributed, including syllabi, manuals, handouts, presentations, websites

[34] In this Manual, we distinguish specific training materials (handouts, worksheets, instructional videos, binders) from formal curricula, which typically involve a prescriptive set of expectations for educational achievement. Training materials are a central component of training curricula.

Metrics in Action 5.6: The **Baylor College of Medicine** partnered with the Harris County Department of Education to develop the Environment as a Context for Opportunities in Schools (ECOS) curricula. ECOS is a school-based program used in more than ten elementary schools in the Houston Independent School District. ECOS aims to develop and evaluate a scalable model for integrating science content across the elementary school curriculum using environmental themes that are relevant to students. Specific program objectives are:

(1) To collaboratively design, implement and evaluate an instructional program in elementary schools that integrates science, health, reading, language arts and mathematics

(2) To improve teacher practice through summer and school-year professional development over multiple years

(3) To support school-wide reform of teaching and learning

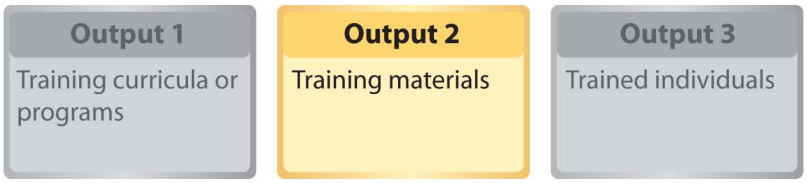
ECOS provides more than 60 teachers annually with intensive year-round professional development designed to support their efforts to integrate reading, language arts and mathematics with environmental health science themes. Teachers receive materials for their classrooms and stipends for training and evaluation data collection. Materials include activity guides, teacher guides, storybooks to read with students and a mini magazine that provides additional ideas to connect class activities to other areas. ECOS serves as the primary hands-on element of the science curriculum and has posted free lessons available for download in order to share the material with others.

Metrics for revising approach, program or materials as needed:

- Description of formal curriculum or training program: *The Baylor College of Medicine and the Harris County Department of Education developed the ECOS curriculum to provide teachers with the knowledge and skills they need to incorporate environmental health lessons into standard science curricula.*
- Number and types of curricula distributed, including syllabi, manuals, handouts, presentations and websites: *All curricula are available as in-person trainings, as well as through free downloads from the ECOS website.*

For more information about ECOS, visit: http://www.ccitonline.org/ceo/content.cfm?menu_id=100.

Output 2: Training materials



Grantees may also develop materials to use in conjunction with an education or training program. Training materials can help emphasize a specific point within a training, and they can provide participants with items they can consult at a later date. These materials may include handouts, summary sheets, training guides, quick-reference cards and web-based electronic materials. Training materials may also include promotional items such as magnets, pens and bags.

Booklets, such as "*Protecting Yourself While Helping Others*,"[35] developed by the NIEHS Hurricane Response Worker Education and Training Program, provide a point of reference containing relevant information and can be widely disseminated. Over 50,000 copies of the booklet were distributed, in three languages, along the gulf coast after Hurricanes Katrina and Rita. Training materials can help partners engage and translate valuable scientific information for the target audience in an entertaining and interactive way. Such materials can be an effective tool to reach many individuals, and all can be measured as outputs.

The use of "new media" approaches (e.g., blogs, podcasts and cell phone applications) can also be an effective way to reinforce or refresh participants, and they too can be measured (see Chapter 4: Products and Dissemination). New media can be highly effective in disseminating materials, but it is important to remember the characteristics of the target audience in PEPH programs. Not all audiences have telephones, cell phones or access to computers or the internet.

Example Metrics for Output 2: Training materials

- Number and description of training materials developed
- Number of training materials distributed
- Description of strategies used to distribute training materials

[35] Hazardous Materials Training and Research Institute (HMTRI). 2005. Protecting Yourself While Helping Others. Available: *http://www.elcosh.org/record/document/927/d000883.pdf* [accessed 16 December 2011].

Metrics in Action 5.7: The **Community Outreach and Education Core (COEC)** at Wayne State University created the Healthy Homes = Healthy Kids Train-the-Trainer Program in collaboration with the Detroit Head Start program and the EPA. The program provides parents and other caregivers with the information and training they need to create a hazard-free indoor environment for children. Parents and caregivers participate in workshops where they learn about house-based health and safety risks through hands-on training. The program also provides a variety of fact sheets and posters in English, Spanish and Arabic that describe common indoor environmental hazards and prevention strategies for participants to take home and consult. Training participants can use the materials to learn more about exposure, as well as pass on this information to other parents and caregivers.

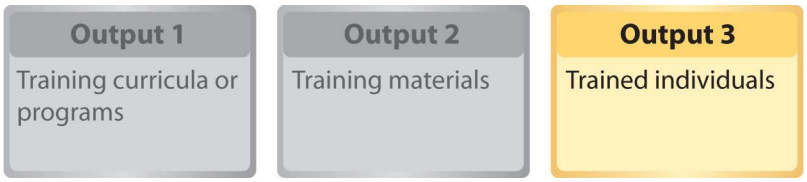
Before and after the workshop, researchers measure knowledge gained by participants. Researchers also conduct follow-up surveys to gauge the effectiveness of the program and to assess participants' use of the skills in their daily lives.

Metrics for training materials:

- Number and description of training materials developed: *Fact sheets and posters in English, Spanish and Arabic that describe common indoor environmental hazards and prevention strategies.*
- Description of strategies used to distribute training materials: *Materials are distributed during parent and caregiver training workshops.*

For more information about the Wayne State University COEC, visit: http://www.cec.wayne.edu/communityoutreach.php.

Output 3: Trained individuals



PEPH education and training programs increase the number of people with the knowledge and skills to address environmental public health issues. This knowledge includes understanding the issue itself, as well as the potential challenges and solutions associated with the issue. In addition to receiving training to address environmental public health issues, these individuals also have the potential to become trainers themselves.

Evidence that participants fully understand information from education and training programs is an important, if elusive, component of PEPH work. For example, one approach for measuring full comprehension of material requires the following of the participants: [36]

- Tuning in (exposure to the material, listening)
- Maintaining interest in the subject of the training (students/trainees who stay until the end of activities)
- Comprehending the content
- Generating related knowledge and ideas about environmental health
- Acquiring relevant skills
- Agreeing with the communication's position, which might require an attitude change
- Storing this new position or attitude in memory

Example Metrics for Output 3: Trained individuals

- Number of participants who attend training events
- Assessments of participant knowledge gained using surveys, quizzes, tests or other forms of feedback
- Awareness and identification of environmental public health issues as a result of training
- Description of behavior changes as a result of training
- Number of participants who become trainers

[36] Backer TE, Rogers E, Sopory P. 1992. Health Communication, Designing Health Communication Campaigns: What Works? Thousand Oaks, CA: Sage Publications, Inc.

Metrics in Action 5.8: The **Laborers International Union of North America (LIUNA)** Training provides instructional development training to affiliate training instructors engaged in training construction craft laborers to work on hazardous waste clean-up. This three-part training provides new instructors with the skills and tools needed to begin the transition into their new profession. The first portion consists of 40 hours of training that focuses on principles of adult learning, instructional strategies, activity-based learning, elements of trade teaching, use of the LIUNA Training curriculum and management of the learning environment. Training is highly interactive with instructors presenting material in front of the classroom a minimum of once per day. The final presentation is videotaped for review and peer feedback.

After the initial 40-hour course, the instructors participate in 16 hours of online learning. The topics in the online learning modules reinforce the classroom learning, familiarize instructors with technologies that can be used in the classroom and develop a network among the instructors that serves as a source of support, information sharing and communication.

Finally, the new instructors attend a 16-hour refresher course that takes place approximately 6 weeks after their initial 40-hour training. The refresher provides an opportunity for the instructors to reflect on and share their experiences in putting theory into practice. Instructors also participate in a viewing of their final presentation from the 40-hour training and a structured feedback session. Individual consultations with the training facilitator provide an opportunity for the instructors to examine their progress from the initial training and chart a course for further development at their training fund.

Metrics for trained individuals:

- Number of participants who attend training events: *19 trainees participated in the full training program in 2010.*
- Assessments of participant knowledge gained using surveys, quizzes, tests or other forms of feedback: *Through the use of quizzes, written assessments, performance assessments, group discussions and facilitator feedback, trainers are able to evaluate participants' incorporation of the knowledge and skills into their own training techniques.*

For more information about LIUNA, visit: http://www.liunatraining.org.

Impacts

Impacts are benefits or changes resulting from the activities and outputs. The education and training logic model example in this Manual identifies three examples of impacts:

Impact 1: Knowledge of issue

Impact 2: Secondary information transfer

Impact 3: Safer workplace

Impacts are more difficult to measure than activities and outputs in part because it often takes several years for substantive changes to occur. When thinking about the impacts a project might be able to achieve and how to measure those impacts, it can be helpful to think in terms of short-term and long-term impacts. Short-term impacts are typically those changes that would be expected to see in the first few years of a project. Long-term impacts might not be seen for 5 or more years. It is helpful for grantees to identify intended impacts so that they can identify measures that will help document their progress in achieving impacts.

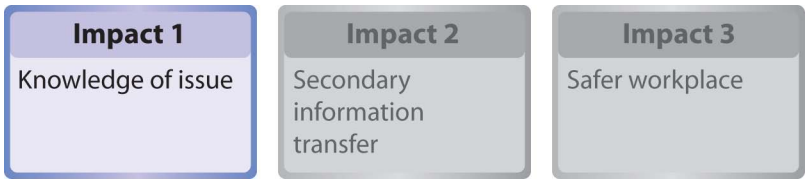
For additional information on long-term impacts, see **Chapter 7: Principles of Evaluation**.

Grantees also may be hesitant to claim credit for impacts because other organizations or other contextual factors may have contributed to the changes. While grantees may not be able to claim sole credit for these impacts, it is important to be able to track these broader changes and to document the contributions made by the project to achieving these impacts.

Although there are challenges associated with measuring impacts, tracking progress towards these goals helps grantees stay on track, demonstrate success and identify areas for improvement. Most importantly, the ultimate goal of education and training is to produce outcomes and impacts that lead to improvements in health through a reduction in environmental health hazards.[37]

[37] See also, Silka L. 2000. Evaluation as a strategy for documenting the strengths of community-based participatory research in: Successful Models of Community-Based Participatory Research, 29-31 March 2000: Final Report, Washington, DC. 49-54. (O'Fallon LR, Tyson FL, Dearry A, eds). Available: *http://www.hud.gov/offices/lead/library/hhts/NIEHS_Successful_Models.pdf* [accessed 16 December 2011].

Impact 1: Knowledge of issue



Increased knowledge of environmental public health issues can be manifested in several ways. It might mean improved scientific literacy within the community, increased knowledge of environmental health risk and prevention strategies, or increased knowledge of public health or worker safety messages. Increased knowledge of a specific environmental public health issue can also lead to increased awareness of program research and increased participation of targeted populations and young students in science and environmental health.

With increased knowledge, partners, participants, communities and decision-makers can better identify and contemplate environmental health concerns related to the community. They are also better able to understand the relevance of scientific findings and create engaged communities within target audiences around issues relevant to them.

Strategies for measuring knowledge include:

- Using quizzes and surveys in formal and informal settings
- Tracking changes in behavior using observations, self-reports or outcome data, such as number of worker injuries or student engagement in activities
- Tracking changes in content of classroom projects: presentations, journals, etc.

Example Metrics for Impact 1: Knowledge of issue

- Results from surveys, tests, quizzes, participant testimonials or letters of support from program participants
- Assessments of retention of information (answers to questions remain stable over time)
- Changes in policy and structure that support behavior change, as well as changes in subsequent behavior

Metrics in Action 5.9: The **Fox Chase Cancer Center and Mount Sinai School of Medicine** work together on the **Breast Cancer and the Environment Research Center's (BCERC) Community Outreach and Translation Core (COTC)**, which is funded to ensure that the views and concerns of the breast cancer advocacy community are heard and that research findings are disseminated to the public. Goals of the COTC include:

- Engaging children and their parents in the activities of the COTC for the duration of the 5-year study. Participants only need to see study staff once per year, so the COTC aims to bridge the distance between study visits and maintain interest in the study by offering participants unique opportunities for fun and education.
- Actively involving research participants in the research process. In one project, COTC attempted to increase the value of knowledge by distributing "Young Scientists' Club" membership binders. The children can use the binders to store their fact sheets and newsletters. They can also track their study progress using special Growing Up Healthy stickers, mailed to them upon completion of each study component.

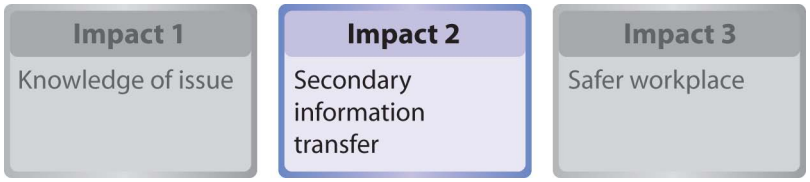
The Mount Sinai COTC also offered science and health education workshops and a targeted newsletter to African-American and Latina girls. The workshops and newsletter spurred interest in the science behind environmental health risks. After participating in the program, minority youth in East Harlem became more involved in the research and in community engagement efforts surrounding environmental health issues. They took the knowledge they had gained by participating in the Growing Up Healthy activities and applied that knowledge and skills to other areas.

Metrics for knowledge of issue:

- Results from surveys, tests, quizzes, participant testimonials or letters of support from program participants: *XXX young girls completed follow-up surveys 6 months after the Growing Up Healthy program and of these, XX% were still able to recall key facts from the program.*
- Changes in policy and structure that support behavior change, as well as changes in subsequent behavior: *Participants in the Growing Up Healthy program continued to participate in and contribute to other research projects.*

For more information about the Fox Chase/Mount Sinai BCERC, visit: http://www.bcerc.org/fccc.htm.

Impact 2: Secondary information transfer



Secondary information transfer is when a participant applies the knowledge or skills gained through training in another setting. Secondary information transfer can occur through word of mouth as trainees/students relay the messages they learned directly to others or when training participants direct others to education/training websites or other resources. Secondary information transfer in schools, workplaces or social settings extends the impact of PEPH activities by broadening the audience that hears the environmental public health messages. This transfer of information can be an effective vehicle for disseminating information about environmental public health issues.

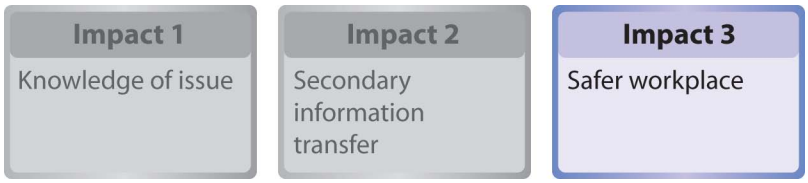
Strategies for measuring secondary information transfer include:

- Conducting surveys to assess trainees' use of the knowledge and skills obtained during training
- Recording comments from trainers and educators
- Recording anecdotes from participants or "third parties" who are recipients of secondary information
- Talking to training participants (formally or informally) to see how they plan to use the information they have learned
- Observing and recording participants sharing information with others

Example Metrics for Impact 2: Secondary information transfer

- Description of ways messages are relayed to others (e.g., trainees give the message to others or community organizations adopt the message as their own to include in project literature)
- Description of secondary transfer from participant evaluations of education and training or other methods of follow-up with students and trainees
- Description of the adoption of curricula in non-PEPH activities
- Number and description of endorsements of education/training principles by third-party organizations
- Number of times messages, documents, media tools and/or curricula are referenced by third parties

Impact 3: Safer workplace



The goal of all NIEHS worker training programs is a safer work environment. As mentioned earlier in the chapter, workplace training programs provide training for all levels of employees. Managers and other organizational leaders can facilitate safer workplaces by adopting policies that promote safe workplaces, by obtaining tools and other infrastructure that help create safe workplaces, by practicing safe workplace procedures themselves and by supporting safer workplaces in general. Managers and other leaders are generally at the top of a hierarchy of controls that must be in place in order to support behavior change among employees. By incorporating key safety messages into their daily lives, workers make decisions that affect their safety and the safety of others. Because the WETP has done so much work to identify metrics for worker education and training programs, we have included a safer workplace as an impact. Grantees are encouraged to identify and develop metrics that relate to their specific target audiences.

Strategies for assessing safer workplace behaviors include:

- Documenting changes to processes, products and policies that facilitate safe work environments
- Tracking training participants after worker safety training and asking them about their work environment and work behaviors
- Collecting stories and testimonials from workers and supervisors
- Observing employee behavior
- Creating an employee safety committee

Example Metrics for Impact 3: Safer workplace

- Results from post-training interviews or surveys
- Results from reports of number of illnesses and injuries sustained in a workplace that resulted in lost work days
- Number of stop-work orders issued in a workplace
- Number and descriptions of reports of unsafe working conditions by workers
- Records of workspace monitoring
- Description of worker training that includes information such as access to material safety data sheets for hazardous materials in the workplace
- Description of requests for personal protective equipment and counts of equipment provided

Metrics in Action 5.10: The **Center for Construction Research and Training (CPWR)** conducts a 16-hour Permit-Required Confined Space Entry course across the country in an effort to develop a national corps of confined space instructors. It ensures widespread availability of courses by establishing trainers in multiple locations, trades and sectors, including trade unions.

Metric for safer workplace:

- Number and descriptions of reports of unsafe working conditions by workers: *A trainer reported the following anecdote from a participant in the training:*

  "As a welding apprentice I take work assignments from my foreman. The foreman assigned me the task of welding inside a steel vessel. Although a technician monitored for oxygen at the ground-level opening of the vessel, he didn't take oxygen samples at any other heights inside the vessel. Based on my experience in the training program, I knew that I couldn't work in the vessel until samples had been taken at multiple heights, so I refused the assignment until further samples at other levels could be obtained. After explaining the issue to the foreman, the foreman instructed the technician to take additional measures. The technician discovered oxygen levels were only 16% inside the vessel and since welding and grinding would have also used oxygen, I was able to stay safe in the workplace by waiting to continue with the assignment until the oxygen levels had improved."

For more information about the CPWR, visit: http://www.cpwr.com.

Metrics in Action 5.11: The **SEIU Education and Support Fund** provides a Hazardous Waste Worker Training Program that is designed to prevent acute and chronic injury and illness among workers who are exposed to hazardous materials in emergency situations. The training is provided mostly to members of the Service Employees International Union (SEIU), including hospital workers and public-sector bluecollar road maintenance workers.

Metric for safer workplace:

- Reports of unsafe working conditions by workers and actions taken: *The program reported the following anecdote as an example of how participants in the training had applied the knowledge and skills learned in the program to their jobs:*

  "In 2005, staff at a medical center in Northern California spilled idamycin, a chemotherapy drug. Initially, the department called housekeeping. However, personnel that had completed the SEIU Education and Support Fund's Hazardous Waste Worker Training Program recognized that it was a hazardous substance and should be treated with care. The trained personnel closed off the area and called for experts to assess the situation."

For more information abou tthe SEIU Education and Support Fund, visit: *http://www.niehs.nih.gov/careers/hazmat/programs/awardees/seiu/index.cfm*.

Summary of Education and Training Metrics

Example Metrics for Activity 1: Identify training needs

- Description of intended target audience for the training
  - Language, literacy and education levels
  - Cultural sensitivities
  - Barriers that might keep trainees from adhering to training messages
  - Special needs
  - Relevant background that might influence beliefs and values derived from preliminary interactions
- Description of training needs identified
- Description of methods used to identify training needs
- Number of participants who helped to establish education and training priorities
- Description of contributions made by each partner
- Description of goals and objectives of the training program

Example Metrics for Activity 2: Develop and test programs and materials

- Number of training programs developed
- Number of training materials developed
- Description of goals and objectives of training programs
- Description of training program activities
- Description of outreach activities to involve and educate the community in the research process
- Number and description of testing activities
- Description of results of testing activities
- Description of changes made to program as a result of testing
- Number of trainers identified and trained
- Description of format of training programs (e.g., web-based training classes, certified peer recognition programs, annual workshops at conferences, resource manuals, training websites, validation tools or guides for conducting research)
- Description of team-building and facilitation skills learned by partners to facilitate implementation of education and training programs
- Descriptions of tools, techniques and strategies used to determine the accessibility of education and training materials (e.g., classroom, online, workshops or handouts in public forums
- If conducting a WETP program, description of adherence to Final Version of the Minimum Health and Safety Training Criteria: Guidance for Hazardous Waste Operations and Emergency Response (HAZWOPER) Supporting and All-Hazards Disaster Prevention, Preparedness, and Education and Training: Summary of Metrics Examples Page 187 Response Training (http://tools.niehs.nih.gov/wetp/index.cfm?ID=142) or the Clearinghouse website (http://tools.niehs.nih.gov/wetp/)

Example Metrics for Activity 3: Conduct training programs

- Dates and locations of education or training sessions
- Number of participants at education or training sessions
- Number of contact hours with trainees
- Number and types of partners who participate in implementing the education and training curricula
- Assessment of whether characteristics of the actual trainees matched the intended target audience (e.g., were those who attended or were trained part of the intended audience?)
- Results of surveys of participants about their satisfaction with training in regards to:
  - Location
  - Physical characteristics of meeting space (room set-up, food, etc.)
  - Sufficient advance notification of the meeting
  - Time and length of the educational or training sessions
  - Clarity of educational and training materials
  - Level of participation in the meetings
  - Clarity of information in the materials and the presentations
  - Responsiveness of the trainers to questions

Example Metrics for Activity 4: Revise approach, program or materials as needed

- Number and description of methods used to assess participants' satisfaction with training
- Number and description of revisions or adaptations made to training programs as a result of participant feedback
- Description of strategies used to communicate changes to program as a result of assessments (e.g., handouts or a website)
- Retention and attendance numbers and trends to indicate revisions are making a difference

Example Metrics for Output 1: Training curricula or programs

- Description of formal curriculum or training program
- Number of curriculum or training programs developed
- Number and types of curricula distributed, including syllabi, manuals, handouts, presentations, websites

Example Metrics for Output 2: Training materials

- Number and description of training materials developed
- Number of training materials distributed
- Description of strategies used to distribute training materials

Example Metrics for Output 3: Trained individuals

- Numbers of participants who attend training events
- Assessments of participant knowledge gained using surveys, quizzes, tests or other forms of feedback
- Awareness and identification of environmental public health issues as a result of training
- Description of behavior changes as a result of training
- Number of participants who become trainers

Example Metrics for Impact 1: Knowledge of issue

- Results from surveys, tests, quizzes, participant testimonials or letters of support from program participants
- Assessments of retention of information (answers to questions remain stable over time)
- Changes in policy and structure that support behavior change, as well as changes in subsequent behavior

Example Metrics for Impact 2: Secondary information transfer

- Description of ways messages are relayed to others (e.g., trainees give the message to others or community organizations adopt the message as their own to include in project literature)
- Description of secondary transfer from participant evaluations of education and training or other methods of follow-up with students and trainees
- Description of the adoption of curricula in non-PEPH activities
- Number and descriptions of endorsements of education/training principles by third-party organizations
- Number of times messages, documents, media tools and/or curricula are referenced by third parties

Example Metrics for Impact 3: Safer workplace

- Results from post-training interviews or surveys
- Results from reports of number of illnesses and injuries sustained in a workplace that resulted in lost work days
- Number of stop-work orders issued in a workplace
- Number and description of reports of unsafe working conditions by workers
- Records of workspace monitoring
- Description of worker training that includes information such as access to material safety data sheets for hazardous materials in the workplace
- Description of requests for personal protective equipment and counts of equipment provided

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Chapter 6:
Capacity Building

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Chapter 6: Capacity Building

Introduction

Capacity building[38] can be integral to the promotion and sustainability of environmental health programs. It is the "process that improves the ability of a person, group, organization, or system to meet its objectives or to perform better."[39] NIEHS has defined capacity building as "any activity that improves an entity's ability to achieve its mission"[40] and the "engagement of existing and new stakeholders [as well as] training for a variety of audiences."[41] By building capacity, PEPH projects can prolong and multiply positive health effects and partner benefits, thus adding value to outcomes. Sustained capacity can make individuals and organizations more competent, not only by addressing issues of direct interest to a project, but also by providing access to more resources, knowledge and skills for addressing additional matters.[42]

Capacity building generally includes increasing organizational capacity, physical and communication infrastructure, and individuals' knowledge and skills. Increased capacity can lead to initiation and maintenance of a reduction in or elimination of environmental heath exposures and risks. In this Manual, we organize our discussion of capacity building into three categories:

- **Organizational capacity:** Some organizations start from scratch and need to begin with building basic organizational structures. Others have existing frameworks that some partners have to learn to navigate. Writing down policies and procedures can help establish and transfer institutional knowledge and can contribute to organizational stability. Obtaining and building organizational capacity can increase partners' abilities to accomplish their goals. For example, developing operating norms and procedures that promote mutual respect, appreciation for differences and opportunities for universal participation can facilitate effective partnerships.[43] In addition, nurturing human resources can lead to greater retention of staff and an increase in interest, motivation and creativity among partners.
- **Physical and communication infrastructure:** Physical infrastructure is the basic equipment and building space needed for the operation of a PEPH project. Communication infrastructure is the underlying base for an organization's data, voice and video systems.
- **Knowledge and skills:** A range of strategies and practices are used in an organization to identify, create, represent, distribute and enable adoption of insights and experiences that can occur to individuals. Knowledge is often reflected in the understanding of organizational processes or practices as well as in subject matter expertise. Skills are defined as the proficiency, facility or dexterity that is acquired or developed through training or experience by individuals.

[38] For more information on capacity building, see Alliance for Nonprofit Management. 2010. About Capacity Building. Available: *http://www.allianceonline.org/resources*, then click Capacity Building [accessed 16 December 2011].

[39] Brown L, LaFond A, Macintyre K. 2001. Measuring Capacity Building: MEASURE Evaluation Project for USAID. Available: *http://www.heart-intl.net/HEART/Financial/comp/MeasuringCapacityBuilg.pdf* [accessed 16 December 2011].

[40] *Environmental Health Perspectives*, International Program. 2010. Capacity Building. Available: *http://ehp.niehs.nih.gov/international/capacity.html* [accessed 16 December 2011].

[41] NIEHS. 2008. Partnerships for Environmental Public Health: RFI Executive Summary. 12. Available: *http://www.niehs.nih.gov/funding/grants/announcements/peph/docs/rfi-exec-summary.pdf* [accessed 16 December 2011].

[42] Hawe P, Noort M, King L, Jordens C. 1997. *Multiplying health gains: The critical role of capacity-building within health promotion programs.* Health Policy 39(1): 29-42.

[43] Israel BA, Schulz AJ, Parker EA, Becker AB. 1998. Review of community-based research: *Assessing partnership approaches to improve public health.* Annu Rev Publ Health 19: 185.

Using This Chapter

This chapter develops approaches and metrics for evaluating capacity among PEPH grantees, which includes various types of organizational and individual partners. Many of the approaches partners might take to assess resources, knowledge and skills of partner groups and individuals might be the same (such as asking questions and discussing approaches). However, the actual capacity that these groups and individuals develop over the course of the project might differ. The next section in this chapter discusses how grantees can conduct capacity building at various levels:

- For the project as a whole
- For a particular group within a project (community organizations, researchers, health professionals and policy- and decision-makers)
- For individuals within one of these groups

The remainder of this chapter provides approaches and metrics for assessing capacity building activities, outputs and impacts in PEPH programs. Although approaches might be similar, the actual capacities addressed might vary across the various types of partners and might evolve over the course of a project. These approaches and metrics are generally drawn from PEPH examples and are intended to stimulate readers' thoughts and ideas. They are not intended to be a prescriptive set of steps to be followed.

Levels of Capacity Building

PEPH programs typically focus on capacity building of community residents, researchers, health professionals and decision-makers so that these individuals and groups can work together on environmental public health projects. These individuals and groups have been identified as participants in various PEPH projects, and each has different needs, skills and resources. This section identifies specific capacities that PEPH partners can emphasize for the four different target groups.

Community Organizations

Local communities are one of the most common targets of PEPH capacity building efforts. Capacities sought by community organizations can include:

- Environmental health tools and skills
  - Knowledge of community health indicators and environmental exposures
  - Ability to assess community health
  - Ability to communicate health impacts, risks and data to citizens
  - Ability to perform intervention and prevention strategies
- Research process tools and skills
  - Knowledge of the research process
  - Grantsmanship (the ability to write grants, track and manage funds, etc.)[44]
  - Ability to contribute to research question development
  - Ability to participate in data collection, analysis and outreach
  - Systematic program evaluation

[44] For more information on writing grant proposals for capacity building, see Chandler S. 2008. Writing Proposals for Capacity Building. The Grantsmanship Center. Available: *http://www.tgci.com/magazine/Writing%20Proposals%20for%20Capacity%20Building.pdf* [accessed 16 December 2011].

Researchers

Historically, academic institutions rarely had structures to foster or reward researchers for partnering with communities, decision-makers, or health care professionals. Because this is an evolving area for academic researchers, they may benefit from building a capacity to conduct collaborative research.

Capacity building for researchers might focus on training to work effectively with communities, regulators, legislators, public health officials, decision-makers and other partners.[45] Researchers could need formal training or cultural immersion along with other forms of capacity building to work in integrated, interdisciplinary teams involving community members, social scientists, economists, urban planners, community organizations, health professionals, decision-makers and others. Capacity building for researchers could involve the following skills and knowledge areas:

- Ability to provide training, mentoring and infrastructure for the individuals in their organization
- Ability to conduct collaborative, equitable research projects that engage other partners in research, using, for example, the principles of community-based participatory research[46]
- Ability to facilitate the dissemination of findings and knowledge gained
- Knowledge of scientific translation practices
- Ability to translate scientific information into regulations and policies for the benefit of community members
- Knowledge of cultural sensitivity and norms
- Ability to interact in a culturally appropriate way with other partners

Health Professionals

Health professionals, such as doctors, nurses, clinicians, state and local health officials as well as other public health professionals are significant partners in PEPH projects. Because they are on the front line within the community, it can be important for health professionals to have state of the art understanding of environmental health-related issues. Yet clinical and public health professionals often lack formal environmental health and exposure training.[47]

Because they often have the greatest interaction with the public, nurses in particular can play a crucial role in environmental health. Nurses serve in a variety of specialty settings ranging from public health to acute care and are often the first point of contact for the public when environmental health concerns arise. Community members see nurses as trusted sources of information, and yet, like doctors, nurses often have not received any environmental health instruction.[48]

[45] For more information on capacity building in research projects, see Breen CM, Jaganyi JJ, van Wilgen BW, van Wyk E. 2004. Research projects and capacity building. Water SA 30(4): 429-434. Available: *http://ajol.info/index.php/wsa/article/viewFile/5094/12684* [accessed 16 December 2011].

[46] Israel BA, Schultz AJ, Parker EA, Becker AB. 1998. Review of community-based research: assessing partnership approaches to improve public health. Annu Rev of Publ Health 19: 173-202.

[47] Mccurdy LE, Roberts J, Rogers B, Love R, Etzel R, Paulson J, Witherspoon N, Dearry A. 2004. Incorporating environmental health into pediatric medical and nursing education. *Environ Health Perspect* 112(17). Available: *http://ehp.niehs.nih.gov/docs/2004/7166/abstract.html* [accessed 16 December 2011].

[48] Pope AM, Snyder MA. 1995. Nursing, Health & the Environment: Strengthening the Relationship to Improve the Public's Health. Institute of Medicine (U.S.), Committee on Enhancing Environmental Health Content in Nursing Practice.

Additionally, local and state health officials often play a critical role in public health monitoring and intervention in environmental exposure situations. These officials can provide helpful insight into the environmental health implications of policy and regulatory decisions.

Common ways to build the capacity of health professionals are to offer them continuing education units,[49] to involve them directly as partners at the commencement of a PEPH program, to provide literature for use in their offices and to develop talking points for them to pass on to patients.

Health professionals might benefit from capacity building in the following areas:

- Environmental health principles and approaches
- Exposure reduction approaches
- Risk assessment and communication
- Project assessment and evaluation
- Other professional development related to environmental, public and community health

Decision-makers

Many environmental public health prevention and exposure reduction strategies can call for developing new policies or regulations at the local and national level. Therefore, the capacity of decision-makers can be a top priority in PEPH programs. PEPH partners can create materials and resources targeted at decision-makers to assist them in better understanding the interaction between environmental exposures and human health.

Decision-makers include:

- Elected and non-elected officials and government employees at local, state, regional and federal levels
- Regulators, such as staff at the Environmental Protection Agency, the Food and Drug Administration, the Consumer Product Safety Commission or their state counterparts
- Local leaders, including school principals, school board presidents and tribal council members

Decision-makers may benefit from skills and knowledge in the following areas:

- Environmental health and environmental science literacy
- Exposures and how they can occur
- Costs saved through environmental disease prevention
- Community-based concerns
- Individual research projects and findings that might provide evidence and inspiration to policy change
- Networking skills to provide access to environmental public health experts whom decision-makers can call on for information (for example, regulators might need to know who the university subject matter experts are that they can consult if they have questions, as well as how to locate information on environmental public health)

[49] For example, the American College of Preventive Medicine offers an annual Board Review Course that covers all areas of preventive medicine, including Biostatistics, Epidemiology, Health Services Administration, Occupational Medicine fundamentals, Environmental Health, Injury Epidemiology and Prevention, Clinical Preventive Services, Chronic Disease and Infectious Disease, and Behavioral Medicine. For more information, visit *http://www.acpm.org*, then click Meeting and Events, then Board Review Course.

Building the capacity of decision-makers is related to building the capacity among community organization members, researchers and health professionals to understand and inform policy issues.

These groups might need training to:

- Understand how the legislative process works, for example:
  - Where and when local elected officials meet
  - How topics are added to meeting agendas
  - What local official to contact
  - How decisions are made at the state level
  - How often, where and when state decision-making meetings take place
  - Which state lobbyists can affect environmental policies
- Understand the best method of communicating to and with decision-makers, including not only environmental public health information research findings, but also the best way of communicating community concerns
- Understand how to encourage decision-makers to enact change

A Capacity Building Logic Model

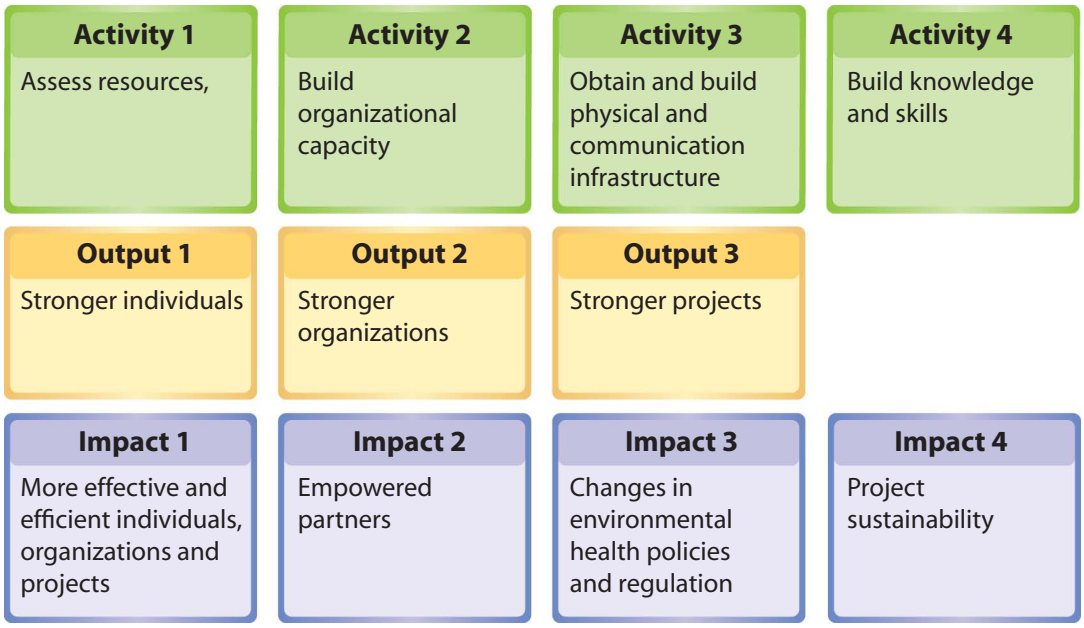
This model identifies potential activities, outputs and impacts of successful capacity-building strategies. Grantees can use this chapter to brainstorm other activities, outputs and impacts that are applicable to their specific projects. This model contains three major components:

- Activities are actions that are based on available inputs to build capacity
- Outputs are the direct products of capacity-building activities
- Impacts are benefits or changes resulting from the activities and outputs (ultimate or long-term impacts are also examined in Chapter 7: Principles of Evaluation)

We developed the logic models in this Manual recognizing that grantees reflect a wide range of experience and capacity. Some grantees have been funded for more than 20 years, while others are just getting started. In general, the logic models show increasing levels of maturity from left to right and from top to bottom. Additionally, projects might not necessarily adhere to or exhibit all of the elements of the model.

Ideally, anyone working to build capacity will recognize themselves in one or more of the logic model components. The elements of the model are numbered in Figure 6.1 to provide reference for discussion in the text of this chapter.

Figure 6.1 Capacity Building Logic Model Framework with Examples of Activities, Outputs and Impacts



Sources of Data

Grantees may find the following sources of data to be helpful in tracking achievements related to products and dissemination:

- Activity logs
- Contact logs
- Participant lists
- Feedback forms
- Publication and material development lists
- Meeting agendas
- Telephone logs
- Communication strategies and plans
- Budgets
- Group discussions
- Surveys
- Interviews
- Meeting notes
- Email exchanges
- Internet web logs

For a more comprehensive list of data sources, see **Chapter 7: Principles of Evaluation**.

Activities

Activities, as shown in the capacity building logic model, are actions that are based on available inputs to build capacity. The logic model example used in this Manual identifies four potential activities for capacity building:[50]

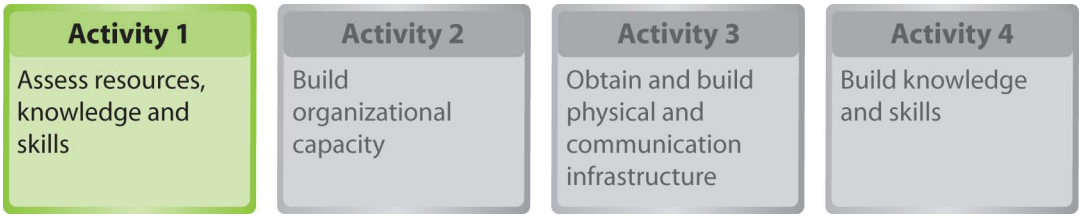
Activity 1: Assess resources, knowledge and skills

Activity 2: Build organizational capacity

Activity 3: Obtain and build physical and communication infrastructure

Activity 4: Build knowledge and skills

Activity 1: Assess resources, knowledge and skills



In order to build capacity, partners can assess the resources, knowledge and skills the project has at its disposal, both on an individual and organizational level. In cataloguing assets and needs, partners can discuss the current project mission, goals, objectives and funding to gauge where to build capacity.

Specifically:

- What resources, knowledge and skills do partners possess that they could bring to the project?
- What resources, knowledge and skills are necessary to complete the PEPH project?

Resources are people, infrastructure and funds grantees can use to accomplish PEPH goals.

Knowledge is 1) the theoretical or practical understanding of a subject acquired by a person through experience or education, 2) the facts and information known in a particular field, and 3) awareness or familiarity gained by experience of a fact or situation.

Skills are the proficiency, facility or dexterity that is acquired or developed through training or experience.

[50] For more information on approaches to capacity building, see Crisp BR, Swerissen H, Duckett SJ. 2000. Four approaches to capacity building in health: consequences for measurement and accountability. Health Promot Int 15(2): 99-107.

Partners can begin to answer these questions using the following approaches:

- Gather and analyze ideas from partners and audiences about assets and needs
  - Discuss these assets and needs in round-table meetings
  - Administer questionnaires or surveys to assess capacity
  - Evaluate and analyze findings of programs and services
  - Document partners' strengths (e.g. see Table 6.1)
  - Conduct outreach and focus groups
  - Hold public and partner meetings
- Identify and prioritize critical needs for various partners
- Assess current capacity required to address needs (for example, community organizations can possess the knowledge that would allow researchers to delineate local living patterns)
- Identify and develop best strategies to meet needs and align them with the goals of the project

Metrics for Activity 1: Assess resources, knowledge and skills

- Description of activities conducted to assess needs and resources
- Number and description of resources identified
- Number and description of partners involved in assessment activities
- List of current capacities
- List of identified capacity needs
- Description of strategies to address gaps
- Number and description of project strategy reviews
- Number and description of revisions to the project plan

Table 6.1 Example Balance Sheet of Resources, Knowledge and Skills for Partners[51]

Partner Group		
Community Organizations	**Current Capacity**	**Needed Capacity**
	Knowledge: Knows the community's health problems and understands how community interacts and functions **Resource:** Existing organizational structure, such as a coherent identity, existing membership, etc.	**Knowledge:** How to conduct research to reduce environmental exposures of concern **Resource:** Procedures that help define the community as a unit of identity **Resource:** Funding to conduct research to reduce exposures
Researchers	**Current Capacity**	**Needed Capacity**
	Knowledge: Environmental health risks and indicators **Skill:** Experience in applying for and receiving funding **Resource:** Access to management infrastructure for grant administration	**Resource:** Relationships with community members **Knowledge:** Community dynamics
Health Professionals	**Current Capacity**	**Needed Capacity**
	Knowledge: Understands local health complaints and has access to community health data **Resource:** Health clinics available to treat and diagnose individuals who have been exposed to an adverse environmental agent	**Resource:** Funding to conduct interventions **Knowledge:** Environmental exposure science **Skill:** Experience with environmental exposures and interventions
Decision-makers	**Current Capacity**	**Needed Capacity**
	Resource: Networks with other decision-makers **Knowledge:** Understands the regulatory system	**Knowledge:** Awareness of environmental health risks in the communities **Resource:** Networks with experts and community members experienced with environmental exposures and interventions

[51] Adapted from, Centers for Disease Control and Prevention (CDC). 2008. State Asthma Control Program Evaluation: Reference materials for designing and implementing evaluations, Module 1: Partnerships, Draft. Available: *http://www.ct.gov/dph/lib/dph/hems/asthma/pdf/module1_partnerships_%282%29.pdf* [accessed 16 December 2011].

Metrics in Action 6.1: The **Promoting the Occupational Health of Indigenous Farmworkers Project** is a collaboration among the Oregon Law Center, Salud Medical Center, *Pineros y Campesinos Unidos del Noroeste* (Northwest Treeplanters and Farmworkers United), Portland State University School of Community Health and Farmworker Justice. The Project conducted surveys in 2008 and 2009 to assess the occupational and health needs of indigenous farmworkers from Mexico and Guatemala working in Oregon versus Latino farmworkers. The indigenous workers are not of Latino descent; they speak distinct languages and have unique cultural perspectives. The farmworker survey was part of a larger plan to identify the workers' occupational health concerns and develop community-based strategies to address these needs.

Based on the findings of the survey, the researchers proposed "employing more people who speak indigenous languages as organizational leaders, interpreters, and health workers to help reduce some of the linguistic and cultural barriers to occupational safety training and other health and social services identified in this study." To address this need, they developed an approach to train the farmworkers as promotores (health promoters). They used linguistically and culturally appropriate educational materials, and they worked with the farmworkers to advocate for healthier working conditions. By assessing the resources, knowledge and skills among the indigenous farmworker population, the project enabled the farmworkers to build the necessary capacity to meet their community needs.

Metrics to assess resources, knowledge and skills:

- Description of activities conducted to assess needs and resources: *The project conducted a survey of indigenous farmworkers to identify needs and resources.*
- Number and description of partners involved in assessment activities: *Five local organizations participated in the partnership: Oregon Law Center, Salud Medical Center, Pineros y Campesinos Unidos del Noroeste (Northwest Treeplanters and Farmworkers United), Portland State University School of Community Health, and Farmworker Justice.*

For more information about the Promoting the Occupational Health of Indigenous Farmworkers Project, visit: http://www.fwjustice.org/workplace-safety/indigenous-worker-safety.

Activity 2: Build organizational capacity

Activity 1	Activity 2	Activity 3	Activity 4
Assess resources, knowledge and skills	Build organizational capacity	Obtain and build physical and communication infrastructure	Build knowledge and skills

Some organizations start from scratch and need to begin with building basic organizational structures. Others have existing frameworks that some partners have to learn to navigate. Writing down policies and procedures can help establish and transfer institutional knowledge, and it can contribute to organizational stability as well. Obtaining and building organizational capacity can also increase partners' abilities to accomplish their goals. For example, developing operating norms and procedures that promote mutual respect and appreciation for differences can encourage participation and facilitate effective partnerships.[52] In addition, continuous participation by partners and involvement of new individuals and groups can lead to greater retention of staff and an increase in interest, motivation and creativity among partners. Examples of approaches to building organizational capacity include:

- Expanding and supporting the workforce by:
  - Recruiting and hiring employees
  - Mentoring staff and participants
  - Growing a volunteer program
  - Securing expert support
- Defining organizational hierarchy and roles by:
  - Forming the basic structure of an organization (for example, bringing together community members with similar goals to form a community organization)
  - Establishing lines of communication (for example, creating an email account for the organization, checking it regularly and ensuring other community members know the address)
  - Creating a directory of participants and an organizational chart
- Setting up procedural infrastructure by outlining how to:
  - Manage nominations and the leadership selection process
  - Write ground rules
  - Smooth conflicts
  - Support members
  - Conduct effective meetings

Also see **Chapter 2: Partnerships**

[52] Israel BA, Schulz AJ, Parker EA, Becker AB. 1998. Review of community-based research: Assessing partnership approaches to improve public health. Annu Rev Publ Health 19: 185.

Metrics for Activity 2: Build organizational capacity

Community Organizations

- Description of bylaws, leadership voting process and conflict management procedures
- Number of community organization members involved in evaluation of PEPH project activities
- Number of outside experts hired or brought in to help community conduct PEPH activities
- Number of products to disseminate environmental public health information to communities
- Number of grants applied for with a community member as a principal investigator (PI)

Researchers

- Number of disciplines and training backgrounds represented by researchers
- Number of researchers involved in interactions with other partners
- Number of research partners on a community advisory board (CAB) and description of interests represented by each
- Number of employees paid by the researcher for participating in the project
- Number of researchers who have completed Institutional Review Board (IRB) training or have experience in obtaining IRB approval
- Description of improvements in researchers' grant management, budgeting or financial skills

Health Professionals

- Description of organizational structures and policies that facilitate and enable health professionals to participate in community research

Decision-makers

- Number of people interested in environmental public health issues on phone or email lists (either created by decision-makers or provided by community organizations)
- Number of volunteers recruited to take environmental public health messages back to their communities

Metrics in Action 6.2: The **University of Texas at El Paso** established the Encuentros: Binational Community Lead Project Project to assess lead exposure among the children of the El Paso, Texas / Juarez, Mexico binational community using a participatory-based research approach. One of the primary study objectives was to involve the community in the research process and the creation of the prevention and intervention strategy to reduce lead exposure.

The project leaders partnered with several community organizations, including Adults and Youth United Development Association (AYUDA), *Organizacion Popular Independiente* (OPI), and *Salud y Desarrollo Comunitario* (SADEC). Together these groups engaged in activities to increase the community's capacity to deliver environmental health intervention, prevention and educational services in a binational setting. The researchers built upon a preexisting framework from an earlier EPA study, incorporating new partners into the organizational hierarchy. The project team set up new procedural infrastructure by joining environmental health scientists and community organization members in an interdisciplinary investigative team. With organizational capacity in place, the research team went on to evaluate lead exposure and its adverse effects on the health of low-income Hispanic children living near the U.S.-Mexico border.

Metrics for building organizational capacity:

- Number of community organization members involved in evaluation of PEPH project activities: *Each of the three primary partners had a minimum of X people involved in the project.*
- Number of disciplines and training backgrounds represented by researchers: *In addition to the community groups, the partnership also included environmental health scientists.*

For more information about the Encuentros Project, visit: http://encuentros.utep.edu.

Activity 3: Obtain and build physical and communication infrastructure

Activity 1	Activity 2	**Activity 3**	Activity 4
Assess resources, knowledge and skills	Build organizational capacity	Obtain and build physical and communication infrastructure	Build knowledge and skills

Physical infrastructure is the basic equipment and building space needed for the operation of a PEPH project. Communication infrastructure is the foundation for an organization's data, voice and video systems. Examples of approaches to building organizational and communication infrastructure include:

- Building or maintaining physical infrastructure
  - Spaces for meetings
  - Equipment (such as computers, telephones, emails and supplies)
  - Research tools
  - Computer access
- Creating and maintaining communication infrastructure by setting up:
  - Directory and rosters
  - Email listservs
  - Website forums

Metrics for Activity 3: Obtain and build physical and communication infrastructure

- Description of space and other physical structures obtained
- Number and description of directories, rosters or listservs created/obtained
- Number and description of other resources obtained
- Number and amount of other funding sources
- Description of meeting space obtained
- Number and description of supplies obtained
- Number of grant applications submitted
- Number of grants awarded
- Number and description of non-grant resources and materials obtained

Metrics in Action 6.3: NIEHS formed the **Superfund Research Program** (SRP) in 2002 to "increase the understanding of different remedial options, in order to optimize the protectiveness to the environment and human health and the cost-effectiveness of remedial decisions." As part of its training program, SRP conducts interactive, web-based "Risk eLearning" seminars in collaboration with the U.S. Environmental Protection Agency (EPA). SRP built its communication capacity by partnering with the EPA to use its technical infrastructure and large distribution network to broadcast information on innovative technologies for testing and cleaning up contaminated sites. The webinars disseminate new remediation techniques and the "state of science" to a target audience of on-the-ground personnel: EPA risk assessors, regional project managers, state and local regulatory agencies, environmental engineering and consulting firms, and academia.

By sharing assets and infrastructure SRP is able to provide both free and timely information to the target audience. SRP also partners with diverse EPA programs that sponsor topics of interest to their missions and with expert speakers from the academic, private and government sectors. The EPA also provides use of its Hazardous Waste Clean-Up Information (CLU-IN) website to host and archive the Risk eLearning events. The program uses the archived seminars and an online participant feedback form to evaluate event participation and to determine the presence of a learning outcome.

Metrics for obtaining and building physical and communication infrastructure:

- Description of other resources obtained: *SRP uses EPA's webinar technology six to eight times per year to distribute information about testing and remediation of contaminated sites.*
- Number and description of other directories, rosters or listservs created/obtained: *SRP uses EPA's broad distribution network (electronic directory) and its Hazardous Waste Clean-Up Information (CLU-IN) website to host and archive the Risk eLearning events.*

For more information about the SRP Risk eLearning program, visit: http://www.niehs.nih.gov/research/supported/srp/events/riskelearning/index.cfm.

Activity 4: Build knowledge and skills

Activity 1	Activity 2	Activity 3	Activity 4
Assess resources, knowledge and skills	Build organizational capacity	Obtain and build physical and communication infrastructure	Build knowledge and skills

Expanding knowledge and skills is an integral part of building capacity of individuals and organizations in a PEPH project. Knowledge is 1) the theoretical or practical understanding of a subject acquired through experience or education, 2) the facts and information known in a particular field, and 3) awareness or familiarity gained by experience of a fact or situation. Skills are the proficiency, facility or dexterity that is acquired or developed through training or experience. To strengthen skills, individual partners and participants might need to learn first about environmental public health.

Capacity building involves enhancing the knowledge and skills of the individuals within an organization as well as developing the knowledge and skills of others in the community. Partners can use many approaches to build their knowledge and skills within PEPH projects. These include:

- Knowledge and skills development
  - Mapping knowledge repositories (databases, bookmarking engines, etc.)
  - Creating or maintaining expert directories (facilitates access to experts)
  - Learning from other projects and reviewing lessons learned
  - Measuring and reporting intellectual capital
  - Utilizing collaborative technologies (groupware, etc.)
- Training
  - Participating in formal and informal education and training
  - Developing and delivering site-specific training for instructional staff and partners
  - Testing the knowledge of participants with quizzes or tests
  - Training knowledge brokers (some organizational members take on responsibility for a specific "field" and act as first reference for discussing a particular subject)
  - Forming master-apprentice or mentoring relationships
- Research
  - Recruiting and training volunteers to assist with research, e.g. home health workers, community-based outreach workers
  - Involving partners in multiple stages of research

See Chapter 5 for more information on education and training.

- Research *(continued)*
  - Developing specific research techniques and approaches (e.g., behavioral, statistical, epidemiological or toxicological approaches; biomonitoring, modeling, survey design/analysis, outreach, communication or environmental sampling techniques)
  - Providing cross-disciplinary training opportunities
- Outreach and communication
  - Understanding and meeting the needs of other partners
  - Translating messages and findings to different audiences
  - Encouraging storytelling as a means of transferring tacit knowledge
  - Communicating with the media
  - Hosting a speaker series
  - Hosting meetings and providing letters of introduction for various partners
- Grant writing and management
  - Formulating research questions, specific aims, technical expertise and other components for writing a clear, fundable proposal
  - Budgeting and fiscal management of grant funds
  - Understanding administrative requirements of grants, which might include institutional review board (IRB) training, calculating facilities and administrative costs or obtaining a DUNS number (a data universal numbering system used to track payments)
  - Learning how to track project-specific progress and document success
  - Recording processes and results so that institutional memory loss is kept to a minimum after key personnel depart
  - Planning for grant renewals in sufficient time to avoid funding gaps
  - Locating alternative sources of funding, such as individual donations, conference fees, membership dues and private foundation grants
- The policy-making process
  - Communicating effectively with decision-makers
  - Providing scientific data in appropriate formats
- PEPH project skills
  - Learning ways to sustain PEPH project effects and maintain partnerships, skills and resources
  - Increasing the scope and impact of a PEPH project through engagement of new partners

Building knowledge and skills capacity typically focuses on organizational objectives such as improved performance, innovation, the sharing of lessons learned, integration and continuous improvement of the organization. This approach can help individuals and groups share valuable organizational insights, avoid redundant work, reduce training time for new employees, retain intellectual capital as employees leave the organization and adapt to changing environments and markets. Many of the activities can lead to the creation of communities of practice,[53] the transfer of best practices, familiarity with key data sources and their strengths and limitations, and the use of environmental health information as a foundation for identifying needs and setting priorities.

Metrics for Activity 4: Build knowledge and skills

- Number of classes, workshops and other training sessions offered or attended
- Description of new skills obtained
- Results of pre- and post-test questionnaires measuring changes in knowledge and skills
- Description of efforts undertaken to share information among PEPH project partners
- Number of papers published in non-academic outlets – for example, newspapers, newsletters or online forums
- Number of forums where community members and health professionals meet to discuss environmental public health concerns (sponsored by PEPH partners)
- Number of decision-makers who attend environmental public health seminars and workshops
- Number of comments and recommendations by decision-makers on safety or other protocols
- Number of environmental public health regulatory changes introduced by decision-makers
- Number of researchers or community organization members invited to policy meetings

[53] A group of people who share an interest, art or profession. Wenger E. 1998. Communities of Practice: Learning, Meaning, and Identity. Cambridge: Cambridge University Press.

Metrics in Action 6.4: The **Deep South Center for Environmental Justice (DSCET)** at Dillard University (DSCEJ) and the United Steel Workers (USW) partnered in 2005 to develop the "Safe Way Back Home" project to help New Orleans residents displaced by Hurricane Katrina. The project team built knowledge and skills in the community by providing health and safety training and appropriate protective equipment to community residents, local business owners and other volunteers.

From 2006 to 2009 more than 650 people received remediation training and utilized their new knowledge and skills to clean more than 60 yards and 2 schools. Because of this training, the residents were able to safely remove contaminated soil, pressure-wash sidewalks, and revitalize the landscapes in their neighborhoods, thus beginning the difficult task of rebuilding their community after the disaster. The project participants also gained knowledge about how to recruit community members and policy-makers through events that highlighted community service and self empowerment. For example, their 2006 showcase block party, celebrating the transformation of Aberdeen Road, garnered new support from policy-makers.

Metrics for building knowledge and skills:

- Number of classes, workshops and other training sessions offered or attended: *Trainings were offered in 6 neighborhoods, with over 650 people participating in them.*
- Description of new skills obtained: *Residents were trained in soil remediation and landscaping, and in community building as well.*

For more information about the Deep South Center for Environmental Justice, visit: http://www.dscej.org.

Building Researcher Capacity for Involving Tribal Governments and Members in Environmental Public Health Research and Outreach

Some environmental public health research or outreach projects may involve Native American communities and tribal governments, also known as American Indian / Alaska Natives (AI/AN). There is a special political relationship between the United States and AI/AN governments – as defined by treaties, statutes, court decisions, presidential memoranda and the United States Constitution – that differentiates Native American governments from other interests and constituencies.

One way to build organizational capacity is to ensure that researchers are aware of cultural differences and expectations when working with tribal partners. For example, tribal populations operate as sovereign government entities, and researchers need to be prepared to work with these partners in a manner that respects this independence. In addition to thinking about how the metrics provided in this capacity building chapter can be applied to working with tribal partners, we have gathered input from those who work with tribes about how to build capacity for developing lasting relationships with tribal partners.

When working with tribes, environmental public health researchers or outreach professionals will want to be sensitive to each tribe's history and culture, as each of the more than 560 federally recognized tribes is distinctive. To be successful in engaging Native American communities, in either research or outreach endeavors, grantees should take time to learn about the tribal governmental structure and the culture of their partners. This will ensure that project activities are beneficial to the community as well as the academic researchers. Researchers should also include any costs associated with the tribal partnership in the grant budget. Tribes are one of several groups that historically have been marginalized in the United States, so paying particular attention to their needs, listening to their advice, giving them a voice and reporting findings to the community before publication is especially critical.[54]

Most tribes also have a process in place to review and approve human research within the tribal community. The review process may be a tribally constituted Institutional Review Board (IRB), an Indian Health Services IRB or a review by the tribal council. Researchers who plan on working with tribal communities should ask tribal leaders for guidance on the review processes in place, the timelines for reviews and the processes for proceeding with research activities upon approval. Tips for working with Native American individuals, organizations and governments include:[55, 56]

- Understand the unique relationship between Native Americans and the United States government. It is a political relationship – not race-based.
- Take the time to identify the appropriate contact. Your initial contact with a tribal organization should be with someone at a technical or administrative level. That contact will provide you with the proper guidance about whom to contact and by what methods.
- Because of historical precedent, Native Americans may be suspicious of outsiders and their ideas.
- Do not assume one tribe or one leader speaks for all.
- Work with key tribal representatives to identify activities, problems and challenges that the tribe is interested in addressing; issues may be raised by tribal governments, federal staff or national and regional tribal partnership groups.
- Offer tribal representatives the opportunity to provide meaningful input and involvement.
- Native Americans object to being "consulted" or "studied" by people who have little intention of doing anything in response to their concerns. Be prepared to negotiate to find ways to accommodate the tribe's concerns. Be prepared to respond with reasons why you may or may not follow advice provided.
- Those you work with might not be able to answer questions immediately. They may need to think about it and consult with others.
- Most tribal governments are not wealthy, and it may be difficult for tribal officials to attend meetings or to exchange correspondence. In addition, tribal governments in general do not have large support staff to assign to meetings, follow-up, etc.

[54] Dixon M, Roubideaux Y. 2001. Promises to Keep: Public health policy for American Indians and Alaska Natives in the 21st century. 142-143. Washington, DC: American Public Health Association.

[55] Minnesota Indian Affairs Council. 2011. Protocol When Working with Tribes. Available: *http://www.cdfa.ca.gov/ahfss/emergency_preparedness/pdfs/Protocol_Working_Tribes_condensed.pdf* [accessed 16 December 2011].

[56] American Indian Environmental Office (AIEO), U.S. Environmental Protection Agency (EPA). 2011. Policy for Consultation and Coordination with Indian Tribes. 1. Available: *http://www.epa.gov/indian/pdf/eo-13175.pdf* [accessed 15 February 2012].

- Respect Tribal Council representatives as elected officials of a government. Treat them with the respect you would treat a senator or governor.
- As in all business relationships, honesty and integrity are highly valued.
- After making decisions or plans, provide feedback in a formal, written communication explaining how the tribe's input informed the final action.[57]

Overall, it is also important to demonstrate respect for tribal governments and members, as it is for any partner. You can show your respect in many ways:

- Remember that you are a guest of the tribe that you are visiting and conform to tribal customs and laws.
- Be willing to admit limited knowledge of tribal culture, and invite tribal members to educate you about specific cultural protocols in their community as well as their relationships with the environment and science. When in doubt, do not make assumptions; rather, ask respectfully.
- Listen and observe more than you speak. Learn to be comfortable with silences or long pauses in conversation. Tribal communities consider any interruption highly disrespectful, and interrupting during a conversation may undermine your credibility.
- Clarify environmental public health jargon, acronyms and standard operating procedures that, while perhaps commonplace for academic researchers or outreach professionals, may not be familiar to partners. Adjust presentations accordingly without being patronizing, using a "plain language" approach (http://www.plainlanguage.gov/).

Many tribal members speak English as a second language; according to the U.S. Census Bureau, 25% of Native Americans speak a language other than English at home.[58] Cross-cultural communication may be more challenging than typical conversations if dominant-culture members assume that the elements of their own culture are clearly understood by everyone. Being sensitive to possibilities for such misunderstandings and seeking clarification in a patient and respectful manner can assist in bridging gaps in cross-cultural communication. In addition, although researchers may want to conduct research that they believe will help Native communities, tribal groups may reject requests for collaboration because they have different priorities. Researchers should respect these tribal decisions.

Tribal traditions often require that tribal leaders deliberate extensively and consider the long-term consequences of their decisions. This approach may contrast with the time frames of environmental public health researchers and EPH projects. Moreover, tribal leaders may only meet at set times of the year, so researchers should be aware of these schedules and allow plenty of time for tribal decision-making.

[57] Ibid.

[58] The Knowledge Portal. 2011. Working Effectively with Tribal Governments: Cross-Cultural Communication. Available: *http://tribal.golearnportal.org/nav3/index.html* [accessed 16 December 2011].

Researchers should also be aware that tribes, like other governmental bodies, experience changing priorities with changing administrations. These changes may occur at the tribal council or government level, but also within boards and community organizations. Because these relatively small populations are essentially trying to staff the full structure of governance, what may appear to be small changes in the surrounding economy, climate, social structure, etc. can cause major shifts in their limited resources, both human and financial. Researchers can stay informed of the broader political and socio-economic picture within the tribe by reading the local tribal press and listening to tribal radio broadcasts, which are available in many areas. The information from these sources will enable researchers to think about how their work fits into the larger picture of tribal priorities and to anticipate and modify their process and objective to ensure that a respectful partnership continues.

Templates for formal agreements are available from many sources. One source is: **http://www.ncaiprc.org/memorandum-of-understanding**.

Finally, if researchers intend to disseminate any data or materials, they should work directly with the tribal community to develop a formal, signed agreement that provides details of the goals of the projects, defines the outputs and outcomes, and specifies the roles and responsibilities of all partners. This includes explicit details about who "owns" data, what types of analyses will be conducted, how findings and conclusions will be developed, what approval procedures are needed to publish results and any other issues where assumptions that may have unintended consequences should be made explicit.

Researchers will want to learn about a potential partner's history, government, and culture and then begin to engage a partner in a respectful and just manner, as they would with any other community partner. It is not enough to merely obtain tribal input on an issue. Tribes must have appropriate, timely and meaningful involvement in research projects. In the end, only direct interactions, experiences and personal relationships will build the understanding necessary to include tribal governments and members equitably in environmental public health research and outreach endeavors.

The following sources provide additional information about working with tribal governments:

- National Congress of American Indians Policy Research Center. Available: http://www.ncaiprc.org.
- The Native American Policy of the U.S. Fish and Wildlife Service. Available: http://www.fws.gov/southwest/NAL/docs/NativeAmericanPolicy%5B1%5D.pdf [accessed 6 June 2011].
- U.S. Fish and Wildlife Service. Working with Tribes in the Midwest Region to Fulfill our Federal Trust Responsibilities. Partnerships with Native Americans. Available: http://www.fws.gov/midwest/tribal/tribevideo.htm [accessed 6 June 2011].
- U.S. Department of the Interior, National Park Service. Resources for Federal Agencies. Available: http://www.nps.gov/nagpra/AGENCIES/INDEX.HTM [accessed 6 June 2011].
- Working Effectively with Tribal Governments. Available: http://tribal.golearnportal.org/nav3/index.html [accessed 3 June 2011).

Outputs

Increased capacity can lead to improved ability of a person, group, organization or system to meet its objectives or perform better. Subsequently, increased capacity increases the likelihood of improvements in community health. Outputs are the direct products of capacity-building activities. Using metrics to measure outputs provides an assessment of the strengths and weaknesses of the program and its capacity.

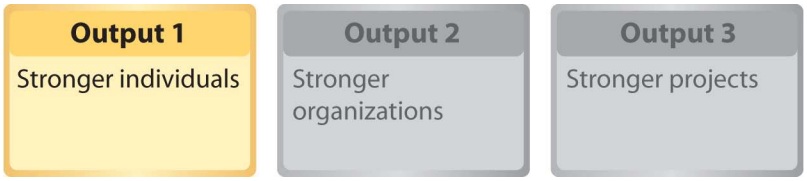
We identify in this chapter three possible outputs that can result from activities that build capacity:

Output 1: Stronger individuals

Output 2: Stronger organizations

Output 3: Stronger projects

Output 1: Stronger individuals



Members of a partnership who participate in capacity-building activities will become more informed, better trained and stronger partners. Researchers who improve their interpersonal skills might find that community members are more willing to participate in their research. Health professionals who are familiar with environmental health literature are more likely to share this information with patients, as well as to seek feedback to determine how their health is being affected. Decision-makers who meet with community members, researchers and other experts about environmental exposures can call upon these individuals and their organizations to provide testimony to encourage policy changes.[59] Possible outputs of greater levels of competence across all groups include improved skills in information gathering, collaboration, decision-making and communication, as well as increased interdisciplinary interactions. For example, a researcher who becomes acquainted with cultural norms of a certain community of people can begin to have more productive interactions with members of that community.

Possible approaches to assessing the increased strength of individuals include:

- Periodic assessments of the capacity needs of partners
- Pre- and post-testing for trainings and other self-evaluation tools[60]
- Comprehension tests for partners of environmental science information
- Surveys and discussions regarding the progress of projects and partners

[59] Orians C, Rose S, Hubbard B, Sarisky J, Reason L, Bernichon T, et al. 2009. Strengthening the capacity of local health agencies through community-based assessment and planning. Public Health Rep 124: 879.

[60] Centers for Disease Control and Prevention (CDC). 2010. Health Impact Assessment. Available: http://www.cdc.gov/healthyplaces/hia.htm [accessed 16 December 2011].

Metrics for Output 1: Stronger individuals

All partners

- Description of established core competencies
- Results of self-evaluation or other assessments of skills
- Measures of competency from pre- and post-project testing of abilities

Community Organizations

- Number of other community members mobilized
- Number of grants applied for and received
- Number of grants that have a community organization member as a principal investigator (PI)

Researchers

- Description of improvement in interpersonal skills
- Number of relationships with community members, health professionals, decision-makers and other researchers
- Description of the effectiveness of translated materials for different audiences

Health Professionals

- Number of patients provided with environmental public health information
- Assessment of ability to fulfill public health core competencies

Decision-makers

- Description of participation in PEPH project meetings or forums
- Number of environmental public health issues presented to the public

For more information on core competencies for environmental health practitioners, see the following resources: 1) "APHA Core Environmental Public Health Competencies" (**http://www.apha.org/programs/standards/healthcompproject/corenontechnicalcompetencies.htm**) and 2) CDC-Environmental Health Competency Project: Recommendations for Core Competencies for Local Environmental Health Practitioners **http://www.cdc.gov/nceh/ehs/Corecomp/Core_Competencies_EH_Practice.pdf**.

Metrics in Action 6.5: The Native TEACH Partnership is a collaborative project between the Northwest Indian College (NWIC) and the **University of Washington (UW) Center for Ecogenetics and Environmental Health Community Outreach and Ethics Core**. The partnership arose from a mutual interest in exploring what tribal college students think about the field of environmental health. The project participants used a combination of talking circles and written surveys to explore concepts unique to Native American environmental health science.

Students from UW and NWIC who were involved in the project also played an integral role in research planning, implementation and data evaluation. Through their participation, they have increased their understanding of environmental public health issues and their capacity to conduct scientific research. The American Indian Higher Education Consortium (AIHEC) recognized the benefits of this project and allowed Native TEACH to administer their survey at the AIHEC 2009 Student Conference, significantly increasing the scope and reach of the research project.

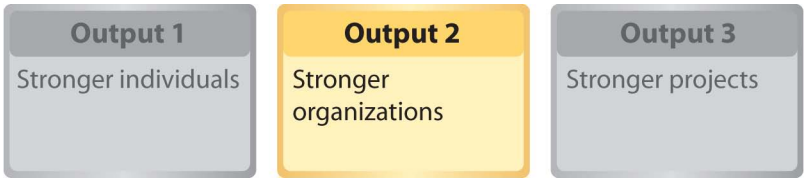
Researchers and community members also benefited from an increase in communication and a greater understanding of cultural norms. Through a combination of traditional Native American storytelling and mainstream scientific communication methods (charts, graphs and maps), project leaders shared their findings with tribal college and university communities, environmental public health professionals, Native American health researchers and tribal elders.

Metrics for stronger individuals:

- Description of established core competencies: *Through their participation, tribal college students have increased their understanding of environmental public health issues and their capacity to conduct scientific research.*
- Description of improvement in interpersonal skills: *Researchers and community members also benefited from an increase in communication and greater knowledge of cultural norms.*

For more information about the Native TEACH Partnership, visit: http://depts.washington.edu/ceeh/community_teach.html.

Output 2: Stronger organizations



Another potential output of capacity building is stronger organizational structures available to support the project or its constituent partners. Stronger organizations offer partner organizations greater knowledge, skills, infrastructure and resources on which to rely as well as greater organizational sustainability. For example, community organizations can set up meeting spaces in their own name, which makes the name recognizable to the community, produces regular membership lists and establishes an organizational identity for the community.

Research organizations can create governance rules for the collaboration of researchers and other partners in the research process, resulting in established structures (such as community advisory boards) for collaborating with communities. Health professional organizations can initiate curricula to provide health professionals with environmental public health training. Decision-maker organizations that have consortium agreements with researcher, health professional or community organizations can have a greater collective awareness of the need for environmental public health regulation and can therefore initiate more discussions on environmental public health concerns.

Metrics for Output 2: Stronger organizations

Community Organizations

- Description of community organization governance rules and how they are enforced
- Existence and use of membership lists to communicate with members
- Number of members in the community organization
- Descriptions of physical buildings and equipment available to the community organization
- Description of financial stability/sustainability of organization

Researchers

- Description of community advisory board members and their roles and contributions to the project
- Number of times the community advisory board weighs in on project decisions
- Number of projects receiving institutional review board (IRB) approval
- Description of financial stability/sustainability of research project

Health Professionals

- Number of health professionals partnering with environmental health projects
- Number of environmental public health courses or workshops required for board certification
- Number of health professionals specializing in environmental public health

Decision-makers

- Description of the diversity of decision-makers' staff
- Description of changes in political support for environmental public health interventions
- Number of environmental public health consortium agreements with researchers, health professionals or community organizations

Metrics in Action 6.6: Concerned Citizens of Tillery (CCT) is a community-based organization that has promoted social justice and self-determination for rural African American communities since 1978. A prime example of organizational growth and strength is the development and sustainability of the North Carolina Environmental Justice Network (NCEJN) and its annual EJ Summit. The NCEJN began as a project within CCT and has become its own independent non-profit organization. NCEJN's mission is to promote health and environmental equality for all people of North Carolina through community action for clean industry, safe workplaces and fair access to all human and natural resources. They focus on organization, advocacy, research and education based on principles of economic equity and democracy.

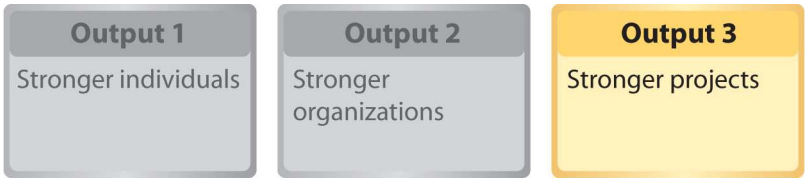
NCEJN has established several structures to collaborate with the community. It holds quarterly meetings in several counties in North Carolina that bring groups and individuals together from across the state to discuss and act on items that affect communities suffering from environmental injustices. Each year, more than 250 people attend these meetings, bringing the issues of environmental justice to the forefront of several local newspapers. In October, 2007, NCEJN held the 9th Environmental Justice Summit, entitled "Head 'em Up – Move 'em Out: Landfills & Hogs." More than 125 community members, elected officials, researchers and students attended and participated in scientific presentations, workshops and plenary sessions. The sheer number of participants in this organized conference activity demonstrates the significant organizational strength of NCEJN.

Metrics for stronger organizations:

- Number of members in the community organization: *250 people attend CCT's annual meeting.*
- Description of financial stability sustainability of organization: *CCT has obtained more than $XXX,XXX in funding from five different sources to ensure a diverse funding stream.*

For more information about the Native TEACH Partnership, visit: http://depts.washington.edu/ceeh/community_teach.html.

Output 3: Stronger projects



A third possible output of capacity building is that a project itself is strengthened, and thus has a more solid foundation on which to begin or continue environmental public health projects and activities. This might mean that partners engage in more effective and efficient PEPH projects and environmental public health interventions. For example, partners work to coordinate activities, thereby reducing duplication of services and using resources wisely in addressing environmental public health issues.

Approaches to measuring the strength of a project can include talking to partners to gain their input. Assessments of the coordination of the project, communications among partners and increased educational opportunities can also be important. A strong foundation can in turn lead to stronger partners and organizations (Outputs 1 and 2). Regular project assessment and progress check-ins by partners can also improve processes, facilitate best-practice tracking, provide an accounting and description of accomplishments from the project, and identify strengths of the projects and partners.

Metrics for Output 3: Stronger projects

- Description of knowledge, skills, infrastructure and resources of individual and organizational partners
- Measures of changes in the knowledge, skills, infrastructure and resources of individual and organizational partners
- Description of improved efficiencies
- Description of the level of coordination of partners
- Description of a project's ability to respond to contextual factors such as budget restrictions, administrative rules, etc.
- Measures of project progress towards goals

Impacts

Impacts are benefits or changes resulting from the activities and outputs. We identify the following four examples of impacts that can result from effective capacity-building activities.

Impact 1: More effective and efficient individuals, organizations and projects

Impact 2: Empowered partners

Impact 3: Changes in environmental health policies and regulation

Impact 4: Project sustainability

Impacts are more difficult to measure than activities and outputs in part because it often takes several years for substantive changes to occur. When thinking about the impacts a project might be able to achieve and how to measure those impacts, it can be helpful to think in terms of short-term and long-term impacts. Short-term impacts are typically those changes that would be expected to see in the first few years of a project. Long-term impacts might not be seen for 5 or more years. It is helpful for grantees to identify intended impacts so that they can identify measures that will help document their progress in achieving impacts.

Grantees also may be hesitant to claim credit for impacts because other organizations or other contextual factors may have contributed to the changes. While grantees may not be able to claim sole credit for these impacts, it is important to be able to track these broader changes and to document the contributions made by the project to achieving these impacts.

For additional information on long-term impacts, see **Chapter 7: Principles of Evaluation**.

Although there are challenges associated with measuring impacts, tracking progress towards these goals helps grantees stay on track, demonstrate success and identify areas for improvement. Most importantly, the ultimate goal for capacity building is to produce outcomes and impacts that lead to improvements in health through a reduction in environmental health hazards.[61]

[61] See also, Silka L. 2000. Evaluation as a strategy for documenting the strengths of community-based participatory research. In: Successful Models of Community-Based Participatory Research, 29-31 March 2000: Final Report, Washington, DC. 49-54. (O'Fallon LR, Tyson FL, Dearry A, eds). Available: *http://www.hud.gov/offices/lead/library/hhts/NIEHS_Successful_Models.pdf* [accessed 16 December 2011].

Impact 1: More effective and efficient individuals, organizations and projects

Impact 1	Impact 2	Impact 3	Impact 4
More effective and efficient individuals, organizations and projects	Empowered partners	Changes in environmental health policies and regulation	Project sustainability

Effectiveness is the extent to which an activity fulfills its intended purpose or function. **Efficiency** refers to accomplishing PEPH activities within a reasonable time frame by making the most of available resources. Projects will become more effective and efficient as capacity is built at all levels: at the project level, within each of the groups or organizations that participate in the project, and finally among the individuals within these groups. For example:[62]

- For **community organizations**, their capacity to manage or assist an effective and efficient project can grow as members become better research partners.
- For **researchers**, increased capacity can facilitate the research process and the effectiveness of PEPH research.
- For **health professionals**, increased capacity may result in better transfer of environmental health exposure information to patients that they can use to improve their health.
- For **decision-makers**, increased capacity can lead to increased access to relevant information that they can use in policy-making.

Some questions to ask when evaluating the effectiveness and efficiency of PEPH projects:

- How effectively are the overall mission, sub-missions or core capabilities being met?
  - What do partners or members say about the effectiveness of the project?
  - Are there aspects of the mission or core capabilities that still need to be met?
  - What can the project do to address these?
- How efficient are project processes?
  - Are there steps in the process that could be cut without sacrificing effectiveness or quality?
  - Are there others who could do an aspect of the project more efficiently or for less money?

[62] Hawe P, Noort M, King L, Jordens C. 1997. Multiplying health gains: the critical role of capacity-building within health promotion programs. Health Policy 39: 29-42.

Metrics for Impact 1: More effective and efficient individuals, organizations and projects

- Results from surveys that address changes in knowledge, skills and satisfaction
- Description of the quality of partnerships, communications and project management
- Description of improvements in operations to maximize efficiency
- Feedback or survey results showing partner satisfaction with project
- Description of project productivity
- PEPH activity completion times
- Description of cost effectiveness
- Description of standards or protocols followed, such as "Good Laboratory Practice"

Metrics in Action 6.7: The **University of Texas Medical Branch-Galveston (UTMB)** Center to Eliminate Health Disparities (CEHD) provides community education on protection from environmental toxins in Galveston, TX. CEHD seeks to reduce health inequities by understanding the social determinants of health and then proposing changes in health systems. The program conducts workshops in which the community members prioritize their needs for rebuilding their neighborhoods. The objectives of the workshops are to 1) increase general environmental health and safety literacy, 2) provide a hazards assessment framework within which citizens can realistically appraise risk to self and family, and 3) disseminate information on precautionary measures to minimize exposure and recognize signs and symptoms of exposure-related health effects. By training community members how to reduce environmental risks, the group builds effective individuals who can readily recognize and address risks while they are still manageable.

The education programs are developed and implemented in partnership with the NIEHS Community Outreach and Education Core (COEC), St. Vincent's House, the Jesse Tree and t.e.j.a.s. In an effort to maximize the efficiency of the project, the partners worked together to determine which organization was best capable of providing certain aspects of the training. Partner organizations also regularly provide feedback about any successes or challenges they face with the project activities.

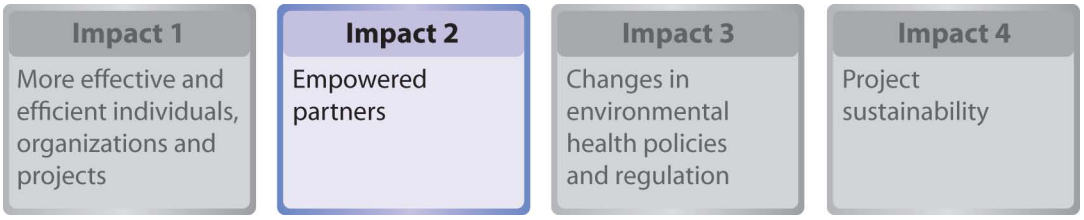
By conducting such a wide variety of capacity-building activities, CEHD ensures that its partner organizations and the individuals who make up those organizations have the knowledge and skills they need to be effective advocates for change.

Metrics for more effective and efficient individuals, organizations and projects:

- Feedback or survey results showing partner satisfaction with project: *The partners regularly provide feedback about any successes or challenges they face with the project activities.*
- Descriptions of improvements in operations to maximize efficiency: *Researchers and community members also benefited from an increase in communication and greater knowledge of cultural norms.*

For more information about the UT CEHD, visit: http://www.utmb.edu/cehd.

Impact 2: Empowered partners



The capacity built through participation in PEPH projects can result in a collective increase in knowledge, expertise and skills that can empower partners to contribute in a unique way both to the specific PEPH project and to environmental public health concerns more generally. Partners and individuals who have actively participated in these PEPH projects have gained knowledge, skills and abilities that spill over to other projects and areas of their lives. Examples of these additional benefits that empower individuals and organizations in communities could include:

- Greater self-efficacy, self-esteem, and perceived power
- Creation of marketable skills from the program that are useful in their jobs
- The ability to engage in conversation and understand policy and community realities
- Willingness to participate in other research projects
- Political legitimacy and social status
- Greater access to resources
- More meaningful involvement in regulatory and policy discussions
- Deeper understanding of the research basis for both health and policy recommendations
- Larger influence over environmental public health concerns through research, outreach, policy change, behavior change and education

Empowerment can manifest itself differently for individuals and organizations in the four groups discussed in Table 6.1. For example, research organizations could be empowered by their new partnerships with community organizations to expand collaborations to new groups or address new exposures. Alternatively, individual health professionals could be empowered by their new knowledge of environmental health research to intervene more on their patients' behalf. For decision-makers, empowerment through their new understanding of the environmental health risks affecting their constituents could lead them to build governmental coalitions that attempt to address environmental public health issues.

Metrics for Impact 2: Empowered partners

- Frequency and magnitude of partner involvement in other partners' activities (such as number of community members who are engaged in researcher's activities or number of researchers who are involved in the creation of public policy)
- Number of individuals in partnerships who speak to government leaders about additional health issues
- Number of individuals in partnerships who run for city council or other leadership positions
- Number of partners who speak at conferences on projects of mutual interest to other partners

Metrics in Action 6.8: The **Brown University Superfund Research Program** teamed up with the Environmental Justice League of Rhode Island (EJLRI) to develop the **Community Environmental College (CEC)**. The mission of the CEC is to empower communities by developing leaders to take action to promote safe and healthy environments for all. The CEC holds a summer program in Providence, RI for high school students of all backgrounds. During the summer program, students learn about basic environmental health issues. Brown University students teach 8-week courses, including "Environmental Justice," "Food Justice" and "Leadership, Media and the Arts." The courses incorporate lectures, educational games, field trips and hands-on community-based projects. For example, students conduct a corner store "makeover," in which the store is redesigned to feature more nutritional food. Students in "Leadership, Media and the Arts" are taught how to use media to disseminate a message, educate their peers and become leaders for environmental justice. The students also pick an issue and develop an action plan to address it. Each program provides a student stipend and a certificate at the end of the year. Students who participate in these activities are then prepared to return home and advocate for environmental justice issues that affect their communities.

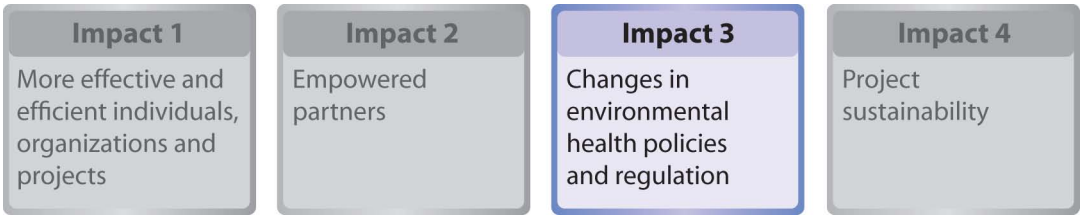
Students involved with another CEC project write and produce short plays on environmental health themes for public presentation. The CEC also enables Brown University students to develop skills as educators and agents for community change. By educating students and encouraging them to take on leadership roles in their own communities, the CEC program is able to empower partners from underserved communities.

Metrics for empowered partners:

- Number of partners who speak at conferences on projects of mutual interest to other partners: *10 students who participated in these trainings created and presented workshops on food justice and environmentally sustainable transportation options.*
- Number of individuals in partnerships who speak to government leaders about additional health issues: *Five students who participated in these activities worked with store owners to increase access to nutritional food.*

For more information about the Brown University Superfund Research Program, visit: http://www.brown.edu/Research/SRP/.

Impact 3: Changes in environmental health policies and regulation



The PEPH program seeks to minimize and prevent adverse health effects from environmental exposures. These PEPH efforts use findings from scientifically robust research to develop solutions that impact public health and policy.

Approaches and techniques for measuring policy and regulatory impacts might include:

- Cataloguing activities related to policy and regulatory efforts
- Holding meetings specifically to address the topic of collecting evidence of policy and regulatory changes
- Assessing partners' networks of policy references and relationships

Policy and regulatory impacts can include:

- Transfer about knowledge of PEPH partnership, communication and capacity-building skills transferred across projects or consortia to influence policy in other areas
- Partners working together to affect corporate, institutional, policy or governmental change
- Involvement and cooperation of federal partners such as the Department of Homeland Security, the Occupational Safety and Health Administration or the Environmental Protection Agency

Metrics for Impact 3: Changes in environmental health policies and regulation

- Descriptions of networks and relationships developed to influence policy decisions
- Number of policy and regulatory decision-makers identified and/or contacted
- Description of types of data provided to decision-makers
- Number of responses submitted to agency requests for information
- Number of briefings or town hall meetings attended by policy-makers
- Number of petitions filed
- Frequency and number of individuals involved in changing environmental public health policy and regulations
- Description of institutional, policy or legislative changes
- Description of changes in community regulations, ordinances or laws
- Description of changes in corporate or business practices
- Description of changes in legislation, policies and regulation
- Description of changes in clinical practice guidelines

Metrics in Action 6.9: Since 2000, **Occidental College's Center for Food and Justice (CFJ)**, has developed two inter-connected models to improve school food. Through Project CAFE (Community Action on Food Environments), the Healthy School Food Coalition (HSFC)—a program affiliated with CFJ—organized students and parents to partner with school officials and health advocates to develop and implement groundbreaking nutrition policies within the Los Angeles Unified School District (LAUSD), such as banning the sale of soda and junk food. Because of HSFC efforts, participation rates for meal programs have risen at school sites, and food in all district schools has improved.

The project leaders also evaluate access factors in participating schools and communities; raise awareness of nutrition, environmental public health and food access; develop and implement intervention strategies; and assess the environmental and policy impact of those strategies. Activities include training residents to undertake community and school food assessments, developing appropriate and feasible action plans and creating local community nutrition advisory councils to mobilize efforts to move intervention strategies forward.

Metrics for changes in environmental health policies and regulation:

- Descriptions of networks and relationships developed to influence policy decisions: *The CFJ worked with students, parents, school district personnel and health advocates to influence policy.*
- Descriptions of institutional, policy or legislative changes: *Policies put in place that ban the sale of soda and junk food in LAUSD.*

For more information about the Center for Food and Justice, visit: http://departments.oxy.edu/uepi/cfj.

Impact 4: Project sustainability

While financial sustainability is a key component of project sustainability (see Chapter 3 for more on leveraging), project sustainability reflects a project's ability to sustain project services and activities. Project sustainability ensures that valuable information and services continue to be provided to communities. Examples of strategies to ensure project sustainability include:

- **Community Organizations**
  - Sharing environmental public health information with other groups and potential partners
  - Submission of competitive renewals for projects
  - Support from local government, universities or other funding sources
- **Researchers**
  - Identification of potential future research needs
  - Submissions of competitive renewals for projects
  - Submissions of additional secondary grant applications
  - Replication of partnership and communication models and shared success in new populations
- **Health Professionals**
  - Attention to additional environmental health concerns of community members
  - Profession-wide adoption of environmental public health curricula in medical and nursing schools
- **Decision-makers**
  - Sustained focus on regulating environmental public health risks
  - Increased involvement of more decision-makers in PEPH project-related issues

Not all PEPH capacity-building efforts will result in follow-up projects or continuing activity with the same partners or the same subject. However, sustained activity that stems from a PEPH project can be an indication that the PEPH project has increased the capacity of its partners.

Metrics for Impact 4: Project sustainability

Community Organizations

- Number of PEPH products used or cited in outreach materials developed by the community
- Number of people not directly involved in the PEPH project that are informed of related PEPH activities
- List of community organization members serving as principal investigators (PIs) on related grant applications and awards
- Number of local government and university partners
- Letters of support from government or university partners

Researchers

- Number and description of meetings to discuss community health concerns
- Number of communications by community organization members to researchers about environmental public health concerns
- List of potential future research needs agreed upon by partners
- Number of grants and grant renewals submitted
- Amount of outside funding received
- Additional projects and partners
- Description of shared partnership and communication models presented at conferences and workshops

Health Professionals

- Number of courses and workshops attended by health professionals about environmental public health concerns
- Number of annual meetings attended to discuss community environmental public health concerns

Decision-makers

- Number of ongoing government environmental public health committees
- Description of sustained involvement of governmental and non-governmental agencies in areas related to the PEPH project

Metrics in Action 6.10: Researchers in Seattle, WA found that many low-income children in Seattle-King County live in indoor environments that place them at substantial risk for ongoing exposure to asthma triggers. To address this problem, the **Seattle Partners for Healthy Communities** created a multidisciplinary partnership of community agencies, community activists, public health professionals, academics and health providers to design and implement the Seattle-King County Healthy Homes I and II – Asthma Intervention Project. To improve environmental conditions in these homes, during Healthy Homes I the project leaders developed a culturally-sensitive community outreach method. The partners recruited community volunteers to provide in-home environmental assessments, asthma education, social support and asthma-control resources (bedding covers, vacuums, cleaning supplies, etc), using culturally-sensitive outreach and communication strategies. Community workers continue to conduct follow-up visits with the households for one year.

The partnership built on the success of the first project by expanding the program in Healthy Homes II to include an evaluation of the impact of several different asthma intervention methods. It incorporated lessons learned during the first phase, the perspectives of community partners and evidence from scientific literature. In addition to the in-home intervention, the second project also included a "Community Asthma Nurse" to provide patient education, self-management training, development of a patient-specific asthma action plan and case management/review. Some community members also received a structural remediation of their house to lessen asthma triggers. Researchers found that children in households that received the Community Asthma Nurse component of the project experienced more symptom-free days, signifying a successful health intervention.

Metrics for project sustainability:

- Lists of potential future research needs agreed upon by partners: *The second phase of the project (Healthy Homes II) addressed the need for an asthma care nurse to help provide patient education, self-management training, development of a patient-specific asthma action plan and case management/review. It also included an evaluation of different asthma intervention methods.*
- Number of grants and grant renewals submitted: *NIEHS and the Department of Housing and Urban Development provided two additional grants for Healthy Homes II.*

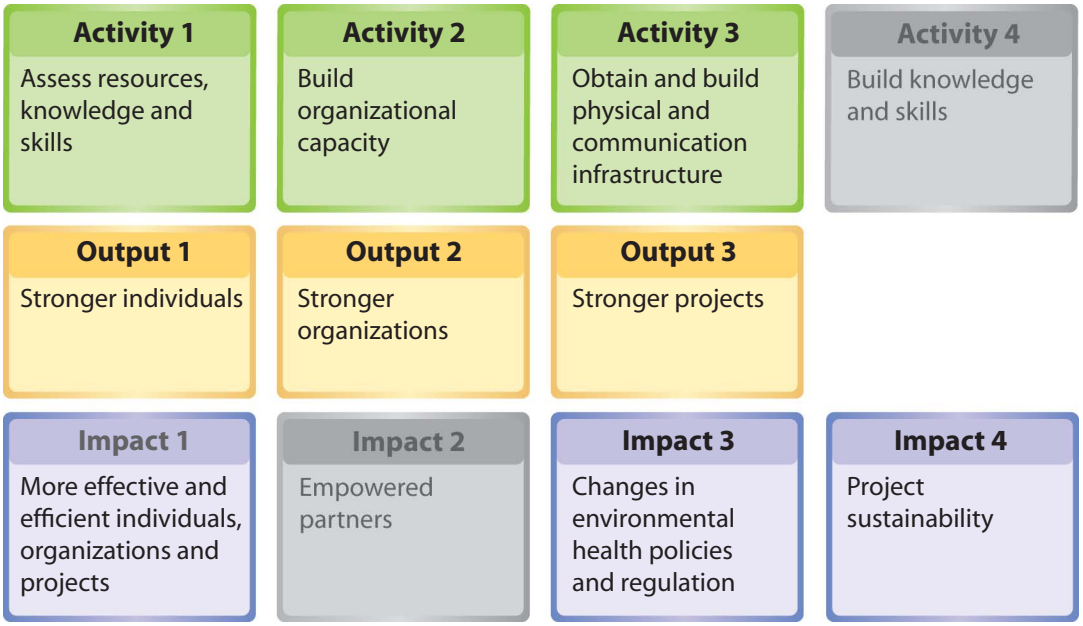
For more information about the Healthy Homes Initiative, visit:
http://www.kingcounty.gov/healthservices/health/chronic/asthma/past/HH2.aspx.

Chapter 6 Case Study: Swinomish Tribe in Puget Sound

This case study shows the activities, outputs and impacts for capacity building within the **Swinomish Indian Tribal Community**, a fishing community located adjacent to the Salish Sea (Puget Sound and the coastal waterways around southern Vancouver Island) in Washington State. Screening studies of the sediment and water in Tribal tidelands indicated the presence of numerous persistent pollutants, including arsenic and polychlorinated dibenzofurans (PCDFs).[63]

Swinomish people frequently gather shellfish at these contaminated sites. The Swinomish wished to undertake a more extensive study with more detailed sampling to understand better the magnitude and health implications of the contamination. In 2002, the U.S. EPA funded the Bioaccumulative Toxics in Native American Shellfish (BTNAS) program so the Tribe could study their exposures to low level, bioaccumulative toxics when participating in subsistence gathering and consumption of local shellfish.[64]

Figure 6.2 A Capacity Building Logic Model Framework for the Bioaccumulative Toxics in Native American Shellfish (BTNAS) Project



[63] Johnson A. 1999. Investigation of chemical contamination at Whitmarsh Landfill and Padilla Bay Lagoon. Olympia, WA: Washington State Department of Ecology; Johnson A. 2000a. Sediment quality on the west side of inner Fidalgo Bay. Olympia, WA: Washington State Department of Ecology; Johnson A. 2000b. Results of a screening analysis for metals and organic compounds in shellfish from Padilla Bay and vicinity. Olympia, WA: Washington State Department of Ecology; Johnson A, Serdar D, and Davis D. 1997. Survey for petroleum and other chemical contaminants in the sediments in Fidalgo Bay. Olympia, WA: Washington State Department of Ecology.

[64] Swinomish Indian Tribal Community. 2010. Bioaccumulative Toxics in Native American Shellfish Project, 2002-2006. Available: *http://www.swinomish-nsn.gov/Resources/Environment/Shellfish/Bioaccumulate-Toxics-In-Native-American-Shellfish.aspx* [accessed 16 December 2011].

Activities

After assessing their resources (Activity 1), the Swinomish Tribe recognized that it possessed the infrastructure capacity required to support an in-depth environmental sampling, analysis, risk management and education plan with a significant cultural component. Rather than hire outside consultants, the Tribe identified a Tribal employee to serve as the project manager in an effort to build greater organizational capacity (Activity 2). The Swinomish project manager recruited partners to participate on a Technical Advisory Board. The partners included experts from EPA Region X, the Washington State Department of Health, the Washington State Department of Ecology and scholars at Seattle University and the University of Washington's (UW) Center for Ecogenetics and Environmental Health (CEEH). The Technical Advisory Board worked to build Tribal technical capacities. All aspects of the research were vetted with the technical advisory committee—from choice of sampling regimes to laboratory detection limits and changes in the conventional human health risk assessment metrics—in order to reflect more adequately Tribal practices. The Tribe considered dissemination a key component of the project and set up a comprehensive communication strategy with print, web, television, public forum presentations and traditional food-related events (Activity 3). This included young Tribal members who honed their video production skills by creating short films and public service announcements, which they later expanded into a full-length feature film (Output 1 and Impact 2).

Metrics:

- Number and description of resources identified: *The tribe identified one significant resource: infrastructure capacity required to support an in-depth environmental sampling, analysis, risk management and education plan with a significant cultural component.*
- Number of outside experts hired or brought in to help community conduct PEPH activities: *None; rather than hire outside consultants, the Tribe identified a Tribal employee to serve as the project manager.*

Outputs

The EPA research grant awarded to the Tribe provided the foundation for a stronger project and the resources needed to move forward (Output 3). The partnerships built via the Technical Advisory Board bolstered the Swinomish project manager's skills (Output 1), as well as the Swinomish Tribal organization as a whole (Output 2), in performing environmental health research. The members conducted a community survey and Seafood Diet Interviews to assess the effectiveness and impact of their communication strategy.

The Tribe also strengthened ties to researchers, decision-makers and other tribes (Output 2). The Technical Advisory Board urged the project leaders to present their scientific findings, and it provided introductions to the UW Department of Environmental and Occupational Health Services, the Institute for Risk Analysis and Risk Communication and various government agencies. The Technical Advisory Board weighed in on project descriptions, which led to a mid-project adjustment in the risk analysis technique (Output 3).

Equally important in this case study is that the Swinomish BTNAS project activities and outputs led to increased capacity building for all of the members of the Technical Advisory Board, resulting in better trained individuals available for future research (Output 1). While the Swinomish Tribe improved their capacity to address environmental health concerns, the Technical Advisory Board partners learned how to work more effectively with Native American communities by experiencing first-hand the importance of acknowledging unique cultural beliefs and practices, as well as how these can affect the process and outcomes of any research project. Learning how to work together with Native American communities provided capacity-building benefits to both the Technical Advisory Board individuals and their organizations.

Metrics:

- Descriptions of established core competencies: *Participation in the Technical Advisory Board bolstered the project manager's management skills.*
- Description of community advisory board members and their roles and contributions to the project: *The Technical Advisory Board included experts from EPA Region X, the Washington State Department of Health, the Washington State Department of Ecology and scholars at Seattle University and the University of Washington's Center for Ecogenetics and Environmental Health (CEEH).*

Impacts

The project, one of the first of its kind by a Native American tribe, generated interest across the country and allowed Swinomish representatives to connect with other environmental health professionals and discuss research activities, outputs and impacts (Impact 1). For example, the Tribe partnered with the University of Washington's School of Environmental and Public Health to conduct a workshop about Tribal risk in August, 2010. Swinomish BTNAS participants have also represented the Tribe on advisory boards of research projects headed by other tribes and universities.

Results from the BTNAS project have been instrumental in Swinomish policies such as the Tribe's Water Quality Standards, and they have been cited in arguments for revising Washington State's Water Quality Standards, Sediment Quality Standards and Model Toxics Control Act (Impact 3).

The Swinomish Tribe also leveraged the funding that they received from the initial EPA grant to sustain their environmental public health work and extend the project's reach into new areas (Impact 4). The Swinomish Tribe, in collaboration with tribal communities across the Salish Sea, continues to conduct research on identifying and addressing environmental public health concerns for their communities.

The achievements of BTNAS project goals are documented in the Final Report and an independent evaluation (Impact 1). By following rigorous scientific protocols for the sampling collection and analysis, while simultaneously adhering to cultural norms by ensuring that beliefs and practices were incorporated into the risk assessment, results showed that consumption of local shellfish posed health risks to the Swinomish people. The Swinomish Tribe also successfully built its capacity to address the problem.

Metrics:

- Descriptions of improvements in operations to maximize efficiency: *The Tribe conducted a workshop to examine strategies for reducing Tribal risk as a way to maximize efficiency.*
- Descriptions of institutional, policy or legislative changes: *The Tribe advocated for changes to the Tribal and State Water Quality Standards, Sediment Quality Standards and the Model Toxics Control Act.*

Summary of Capacity Building Metrics

Example Metrics for Activity 1: Assess resources, knowledge and skills

- Description of activities conducted to assess needs and resources
- Number and description of resources identified
- Number and description of partners involved in assessment activities
- List of current capacities
- List of identified capacity needs
- Description of strategies to address gaps
- Number and description of project strategy reviews
- Number and description of revisions to the project plan

Example Metrics for Activity 2: Build organizational capacity

Community Organizations

- Description of bylaws, leadership voting process and conflict management procedures
- Number of community organization members involved in evaluation of PEPH project activities
- Number of outside experts hired or brought in to help community conduct PEPH activities
- Number of products to disseminate environmental public health information to communities
- Number of grants applied for with a community member as a principal investigator (PI)

Researchers

- Number of disciplines and training backgrounds represented by researchers
- Number of researchers involved in interactions with other partners
- Number of research partners on a community advisory board (CAB) and description of interests represented by each
- Number of employees paid by the researcher for participating in the project
- Number of researchers who have completed Institutional Review Board (IRB) training or have experience in obtaining IRB approval
- Description of improvements in researchers' grant management, budgeting or financial skills

Health Professionals

- Description of organizational structures and policies that facilitate and enable health professionals to participate in community research

Decision-makers

- Number of people interested in environmental public health issues on phone or email lists (either created by decision-makers or provided by community organizations)
- Number of volunteers recruited to take environmental public health messages back to their communities

Example Metrics for Activity 3: Obtain and build physical and communication infrastructure

- Description of space and other physical structures obtained
- Number and description of directories, rosters or listservs created/obtained
- Number and description of other resources obtained
- Number and amount of other funding sources
- Description of meeting space obtained
- Number and description of supplies obtained
- Number of grant applications submitted
- Number of grants awarded
- Number and description of non-grant resources and materials obtained

Example Metrics for Activity 4: Build knowledge and skills

- Number of classes, workshops and other training sessions offered or attended
- Description of new skills obtained
- Results of pre- and post-test questionnaires measuring changes in knowledge and skills
- Description of efforts undertaken to share information among PEPH project partners
- Number of papers published in non-academic outlets – for example, newspapers, newsletters or online forums
- Number of forums where community members and health professionals meet to discuss environmental public health concerns (sponsored by PEPH partners)
- Number of decision-makers who attend environmental public health seminars and workshops
- Number of comments and recommendations by decision-makers on safety or other protocols
- Number of environmental public health regulatory changes introduced by decision-makers
- Number of researchers or community organization members invited to policy meetings

Example Metrics for Output 1: Stronger individuals

All partners

- Description of established core competencies
- Results of self-evaluation or other assessments of skills
- Measures of competency from pre- and post-project testing of abilities

Community Organizations

- Number of other community members mobilized
- Number of grants applied for and received
- Number of grants that have a community organization member as a principal investigator (PI)

Researchers

- Description of improvement in interpersonal skills
- Number of relationships with community members, health professionals, decision-makers and other researchers
- Description of the effectiveness of translated materials for different audiences

Health Professionals

- Number of patients provided with environmental public health information
- Assessment of ability to fulfill public health core competencies

Decision-makers

- Description of participation in PEPH project meetings or forums
- Number of environmental public health issues presented to the public

Example Metrics for Output 2: Stronger organizations

Community Organizations

- Description of community organization governance rules and how they are enforced
- Existence and use of membership lists to communicate with members
- Number of members in the community organization
- Descriptions of physical buildings and equipment available to the community organization
- Description of financial stability/sustainability of organization

Researchers

- Description of community advisory board members and their roles and contributions to the project
- Number of times the community advisory board weighs in on project decisions
- Number of projects receiving institutional review board (IRB) approval
- Description of financial stability/sustainability of research project

Example Metrics for Output 2: Stronger organizations *(continued)*

Health Professionals

- Number of health professionals partnering with environmental health projects
- Number of environmental public health courses or workshops required for board certification
- Number of health professionals specializing in environmental public health

Decision-makers

- Description of the diversity of decision-makers' staff
- Description of changes in political support for environmental public health interventions
- Number of environmental public health consortium agreements with researchers, health professionals or community organizations

Example Metrics for Output 3: Stronger projects

- Description of knowledge, skills, infrastructure and resources of individual and organizational partners
- Measures of changes in the knowledge, skills, infrastructure and resources of individual and organizational partners
- Description of improved efficiencies
- Description of the level of coordination of partners
- Description of a project's ability to respond to contextual factors such as budget restrictions, administrative rules, etc.
- Measures of project progress towards goals

Example Metrics for Impact 1: More effective and efficient individuals, organizations and projects

- Results from surveys that address changes in knowledge, skills and satisfaction
- Description of the quality of partnerships, communications and project management
- Description of improvements in operations to maximize efficiency
- Feedback or survey results showing partner satisfaction with project
- Description of project productivity
- PEPH activity completion times
- Description of cost effectiveness
- Description of standards or protocols followed, such as "Good Laboratory Practice"

Example Metrics for Impact 2: Empowered partners

- Frequency and magnitude of partner involvement in other partners' activities (such as number of community members who are engaged in researcher's activities or number of researchers who are involved in the creation of public policy)
- Number of individuals in partnerships who speak to government leaders about additional health issues
- Number of individuals in partnerships who run for city council or other leadership positions
- Number of partners who speak at conferences on projects of mutual interest to other partners

Example Metrics for Impact 3: Changes in environmental health policies and regulation

- Description of networks and relationships developed to influence policy decisions
- Number of policy and regulatory decision-makers identified and/or contacted
- Description of types of data provided to decision-makers
- Number of responses submitted to agency requests for information
- Number of briefings or town hall meetings attended by policy-makers
- Number of petitions filed
- Frequency and number of individuals involved in changing environmental public health policy and regulations
- Description of institutional, policy or legislative changes
- Description of changes in community regulations, ordinances or laws
- Description of changes in corporate or business practices
- Description of changes in legislation, policies and regulation
- Description of changes in clinical practice guidelines

Example Metrics for Impact 4: Project sustainability

Community Organizations

- Number of PEPH products used or cited in outreach materials developed by the community
- Number of people not directly involved in the PEPH project that are informed of related PEPH activities
- List of community organization members serving as principal investigators (PIs) on related grant applications and awards
- Number of local government and university partners
- Letters of support from government or university partners

Researchers

- Number and descriptions of meetings to discuss community health concerns
- Number of communications by community organization members to researchers about environmental public health concerns
- Lists of potential future research needs agreed upon by partners
- Number of grants and grant renewals submitted
- Amount of outside funding received
- Additional projects and partners
- Description of shared partnership and communication models presented at conferences and workshops

Health Professionals

- Number of courses and workshops attended by health professionals about environmental public health concerns
- Number of annual meetings attended to discuss community environmental public health concerns

Decision-makers

- Number of ongoing government environmental public health committees
- Description of sustained involvement of governmental and non-governmental agencies in areas related to the PEPH project

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Chapter 7:
Principles of Evaluation

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Chapter 7: Principles of Evaluation

Introduction

In previous chapters, we provide information about how to develop evaluation metrics for specific aspects of environmental public health programs. This chapter provides an overview of basic evaluation principles, including:

- Logic models
- Types of evaluations
- Components of evaluation plans

Readers can apply these principles in the planning and implementation of their environmental public health programs to ensure that they are able to document and publicize their successes.

Why evaluate?

Evaluation "involves the systematic collection of information about the activities, characteristics and outcomes of programs, personnel, and products…to reduce uncertainties, improve effectiveness and make decisions with regard to what those programs, personnel, or products are doing and affecting."[65] The benefits of evaluations include the ability to:

- Assess effectiveness and impact
- Determine factors that lead to program success (or failure)
- Identify areas for program improvement
- Justify further funding
- Identify new audiences and applications for projects

When to evaluate?

Evaluations may be undertaken at any time, and they are generally most effective when they are conducted as an integral aspect of the program. Evaluations that are conducted throughout a project's lifespan can provide opportunities for program improvement as the program is evolving rather than after it is complete. Ongoing evaluations also provide an opportunity to adapt the evaluations to address project goals and objectives that may have changed over time. During certain points in a project's lifecycle, there is value in stepping back to examine more fully the operations or impacts of the project. Choosing the right timing depends on the specifics of the project and its particular context. Grantees will likely need to balance many factors, including the evaluation purpose, scale, cost and program resources, when thinking about the timing of an evaluation.

[65] Patton MQ. 1982. Practical Evaluation. Beverly Hills, CA: Sage Publications, Inc. 15.

Metrics in Action 7.1: The **Detroit Community-Academic Urban Research Center (URC)** incorporates evaluations into its overall program planning and development activities. The Detroit URC links a university, eight community-based organizations, a city health department and a healthcare system to identify problems affecting the health of residents of Detroit, Michigan. The partners also promote and conduct interdisciplinary research, which assesses, leverages and enhances the resources and strengths of the communities involved. The URC Board conducts its work in accordance with a set of Community-Based Participatory Research (CBPR) principles adopted by the URC Board that foster, for example, equal participation by all partners in all aspects of the Center's activities and recognition that community-based participatory research is a collaborative process that is mutually beneficial to all partners involved. The 15 member board provides leadership for the group and annually evaluates the partnership and its activities in order to assess the extent to which the partnership is following its key principles of collaboration, participation and equity. The board uses the evaluation findings to build on successes of the program and to share outputs and short-term outcomes with partners. In addition, the findings often lead to changes in board activities, policies or research focus. Conducting annual evaluations allows the Detroit URC to be responsive to short-term changes and to work towards the best possible outcomes.

For more information about the Detroit URC, visit: http://www.detroiturc.org.

Ethical considerations

Because PEPH researchers and evaluators often interact with the community and solicit personal information, it is advisable that they understand their legal and moral obligations to human subjects who participate in research and the evaluation of that research. This understanding can lead to greater trust by their partners and fewer conflicts or misunderstandings down the road. Partners can become familiar with the principles of:[66]

- Ethics
- Confidentiality
- Accountability
- Competency
- Relevancy
- Objectivity
- Independence

For example, university researchers must comply with federal laws and follow the guidelines set out by their institutional review boards (IRBs).[67] When publicizing evaluation findings, partners must remember to keep sensitive information confidential and protect the identities of their subjects.

[66] For more information, see also, U.S. Government Accountability Office (GAO). 2007. Government Auditing Standards, July 2007 Revision. Available: *http://www.gao.gov/new.items/d07731g.pdf* [accessed 16 December 2011]; American Evaluation Association (AEA). 2004. Guiding Principles for Evaluators. Available: *http://www.eval.org/publications/guidingprinciples.asp* [accessed 16 December 2011].

[67] Penslar RB, Porter JP. 1993. Office for Human Research Protections (OHRP) IRB Guidebook. United States Department of Health and Human Services (HHS). Available: *http://www.hhs.gov/ohrp/archive/irb/irb_guidebook.htm* [accessed 15 February 2012].

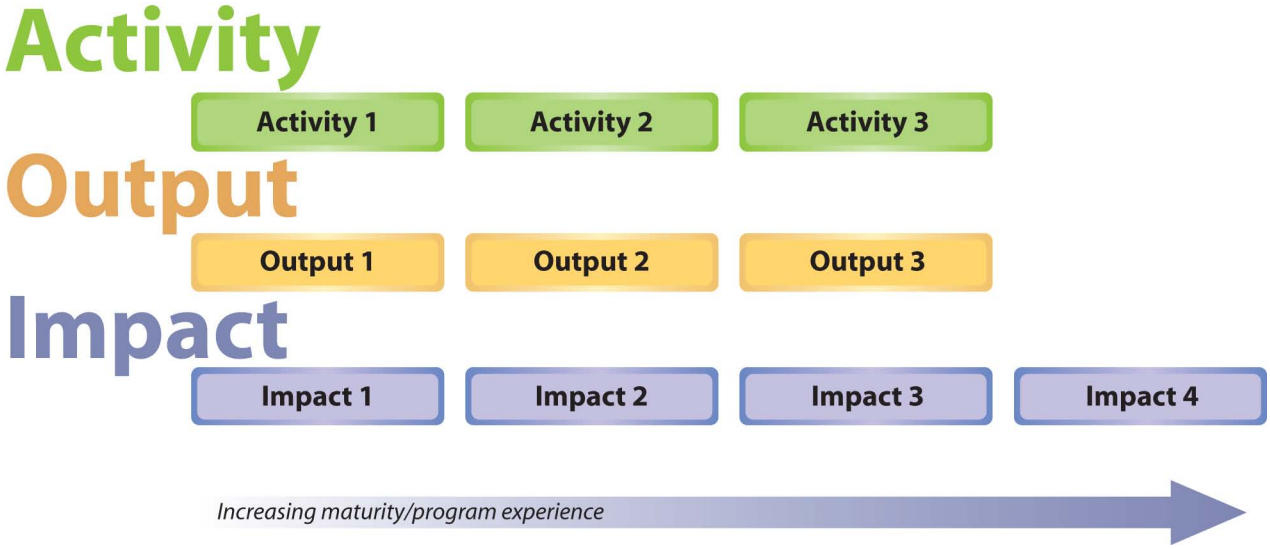
Logic Models

This Manual makes extensive use of logic models as an approach to developing metrics. A logic model "presents a plausible and sensible model of how the program will work under certain conditions to solve identified problems."[68] It is a framework for showing the relationship between the activities a project conducts and the ultimate impacts or outcomes it achieves. Logic models illustrate the key elements of a project, help identify the relationships between project activities and goals, and describe the intended impacts and how they can be measured. Perhaps most importantly, logic models are a tool for showing the cause-and-effect relationships between the project and its goals.[69]

There are many benefits of using a logic model. The process of developing program logic models may contribute to strategic planning by providing partners with a way to build consensus about a project's purpose and by identifying necessary resources. A completed logic model can be a useful tool to illustrate the project design and objectives for staff, partners, funders and decision-makers. The logic model can be used as a communication tool with both partners and parties external to the project. Finally, logic models can provide a framework for identifying metrics to measure project success as well as for identifying areas that need improvements. Such a framework can be used to develop an evaluation plan and provide feedback mechanisms for project leadership.

For simplicity (and to enable a greater focus on how to develop project metrics), the logic models described in Chapters 2 through 6 of this Manual have focused primarily on activities, outputs and impacts (Figure 7.1). However, logic models typically include several other components to further illustrate and describe various program processes and characteristics. In this section, we describe inputs, contextual factors and ultimate impacts, and we provide examples of how these elements may be useful for project planning and evaluation.

Figure 7.1 Format of the Logic Model Example Used in the PEPH Evaluation Metrics Manual



[68] McLaughlin JA, Jordan GB. 1999. Logic Models: A tool for telling your program's performance story. Eval Program Plann 22(1).

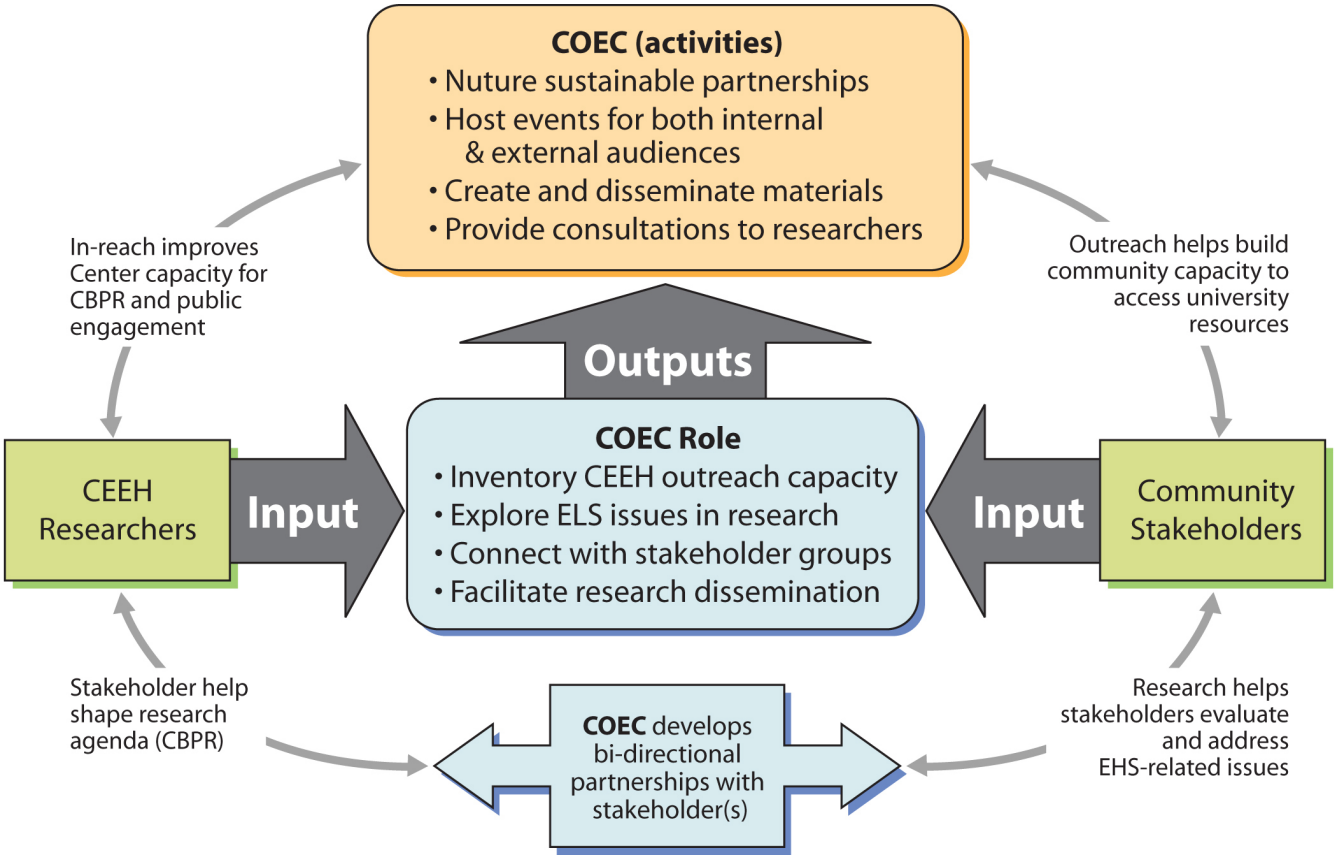
[69] Watson S. 2002. Learning from Logic Models in Out-of-School Time. Harvard Family Research Project. Available: *http://www.hfrp.org/evaluation/the-evaluation-exchange/issue-archive/evaluating-out-of-school-time/logic-models-in-out-of-school-time* [accessed 15 February 2012].

Inputs

Inputs encompass all of the assets available to partners to allow them to accomplish their project goals, and they include human, financial, organizational and community resources. Inputs can be tangible, such as a group of volunteers or grant funding, or intangible, such as a partnership. They can also be intellectual (ideas), material (equipment) and logistical (people's time). Lastly, inputs may include the major forces that influence the organization or program, such as the regulatory framework or political state of affairs. As an example, we provide the program logic model for the Community Outreach and Ethics Core (COEC) at the Center for Ecogenetics and Environmental Health (CEEH) at the University of Washington (see Figure 7.2).

In this example, environmental health researchers and community members are the human resource inputs. The model highlights the role that leveraging and capacity building can play in a PEPH project, demonstrating how leveraging community partners and CEEH researchers can lead to increased community and CEEH capacity. The methods outlined in Chapters 3 and 6 on leveraging and capacity building provide more information about assessing and gathering initial inputs, as well as building upon existing resources.

Figure 7.2 Logic Model of the Community Outreach and Ethics Core (COEC) at the University of Washington[70]



[70] Center for Ecogenetics and Environmental Health (CEEH) at the University of Washington. 2010. CEEH Outreach. Available: *http://depts.washington.edu/ceeh/community_ceeh.html* [accessed 16 December 2011].

Contextual factors

Contextual factors describe the economic, social and political environment that might influence the implementation or the impacts of the program and are beyond the control of the program staff. Examples of contextual factors include a disease outbreak, a storm that disrupts data collection, election results and state or federal budget reductions. While program staff cannot control contextual factors, they can anticipate, plan for and adapt to them.[71]

Ultimate impacts

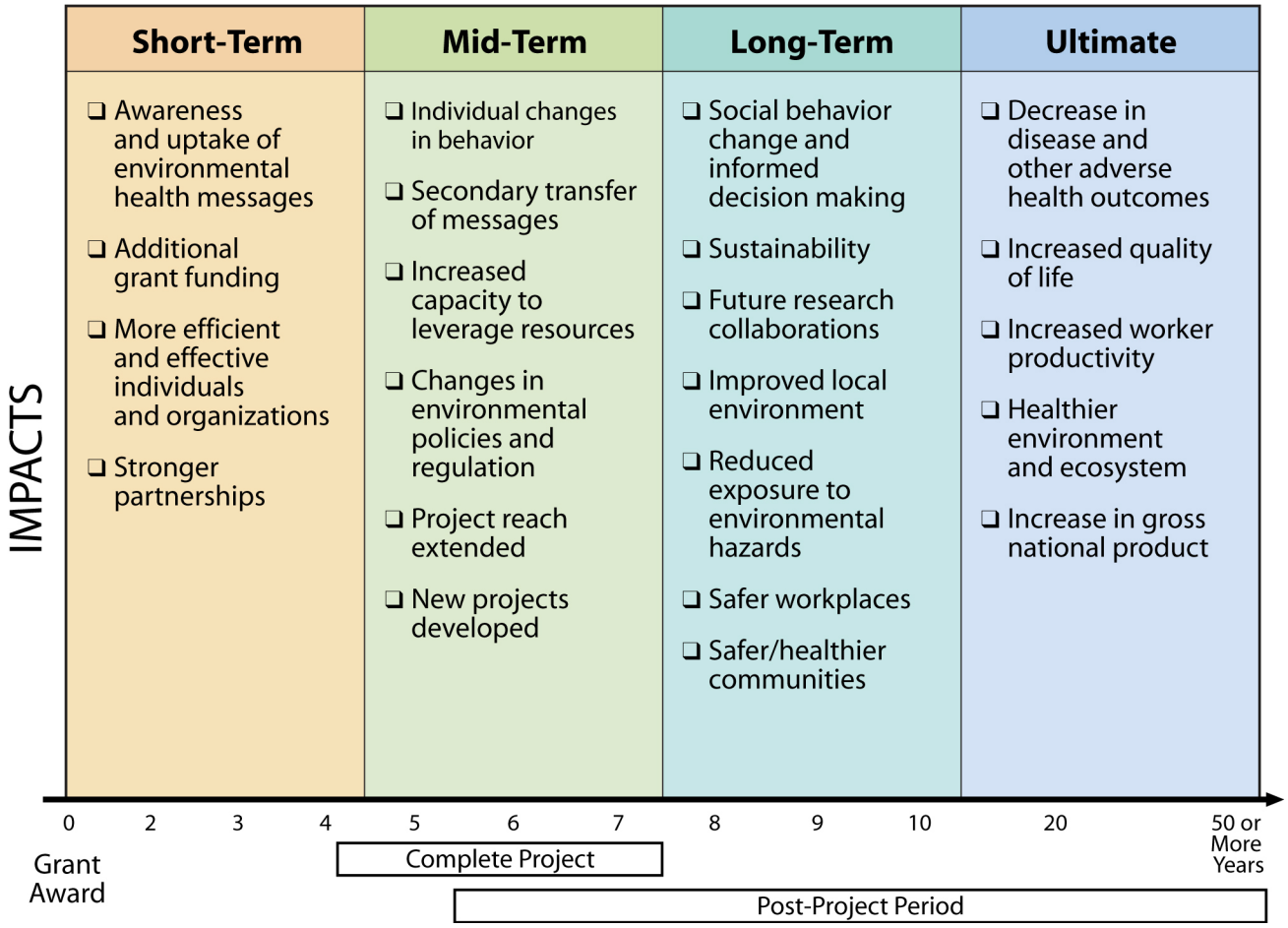
Ultimate impacts refer to the future societal change grantees hope to achieve with a project. These are sometimes called long-term outcomes or impacts and can appear decades after project activities have begun. They generally fall into two categories: 1) improved human health and well-being and 2) benefit to the economy. The ultimate impacts on human health and well-being of a PEPH project could include a decrease in disease or other adverse health outcomes associated with environmental health agents. A decrease in adverse environmental health hazards and illness may ultimately benefit the economy through a reduction in work and school absences, improvement in worker productivity and a decline in health care costs. The target population could also reap the ecological benefits of a healthier environment and ecosystem. Figure 7.3 shows possible impacts stemming from a PEPH project grant in the short-term, mid-term, long-term and ultimate time frames.

Arrows

Other important features of logic models that are not included in our simplified version are the arrows that show the interactions between the various components of the logic model. The direction and flow of the arrows can be adapted to reflect the unique characteristics of each program.

[71] Centers for Disease Control and Prevention (CDC). 1999. Framework for program evaluation in public health. MMWR 48(RR-11). Available: *http://www.cdc.gov/mmwr/pdf/rr/rr4811.pdf* [accessed 16 December 2011].

Figure 7.3 Project Evaluation Timeline Showing Examples of Short-term, Mid-term, Long-term and Ultimate Impacts[72]



Use of Logic Models at NIEHS

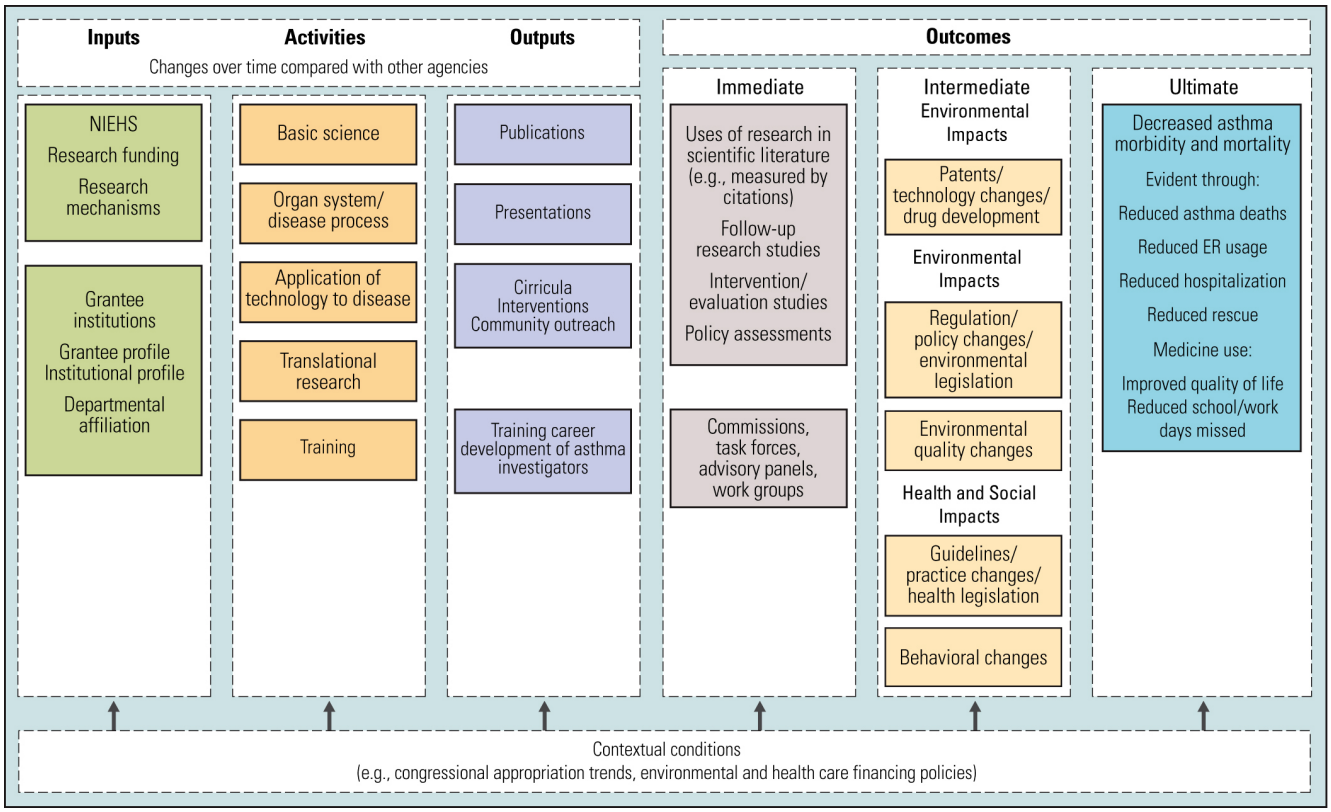
In recent years, NIEHS has been using logic models to examine the long-term impacts of its investments in research grants. For example, a major effort to evaluate the long-term impacts of the NIEHS Asthma research portfolio was conducted from 1975 to 2005.[73,74,75] A complex logic model was developed for this purpose (Figure 7.4). This model illustrates the link between NIEHS-funded activities and outputs, with the intended ultimate outcome of decreased asthma morbidity and mortality. It also highlights immediate outcomes, such as task forces, and intermediate outcomes, such as drug development. Contextual conditions (e.g. healthcare financing policies) are presented across the bottom of the figure as possible influences on inputs, activities, outputs and outcomes.

[72] Adapted from, Ruegg, R. 1999. Assessment of the ATP. In: The Advanced Technology Program, Challenges and Opportunity. Washington, DC: National Academy Press. 19.

[73] Engel-Cox J, Van Houten B, Phelps J, Rose S. 2008. Conceptual model of comprehensive research metrics for improved human health and environment. *Environ Health Perspect* 116(5): 583-92. Available: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2367676/?tool=pubmed [accessed 16 December 2011].

[74] Orians CE, Abed J, Drew CH, Rose SW, Cohen JH, Phelps J. 2009. Scientific and public health impacts of the NIEHS extramural asthma research program: Insights from primary data. Res Evaluat 18(5):375-385.

Figure 7.4 NIEHS Asthma Research Portfolio Logic Model[75]



The NIEHS Worker Education and Training Program (NIEHS WETP) also uses a logic model to describe its program, including the outputs and impacts the project expects to see from grantees (Figure 7.5). The WETP program provides occupational safety and health training to workers who handle hazardous materials or respond to emergency releases of hazardous materials. There are five training programs:

- The Hazardous Waste Worker Training Program provides model occupational safety and health training for workers who are or may be engaged in activities related to hazardous waste removal, containment or chemical emergency response.
- The Minority Worker Training Program focuses on delivering comprehensive training to disadvantaged inner city young adults in order to prepare them for employment in the fields of environmental restoration and hazardous materials.
- The NIEHS/Department of Energy (DOE) Nuclear Worker Training Program trains workers engaged in environmental restoration, waste treatment and emergency response at sites in the DOE's nuclear weapons complex.

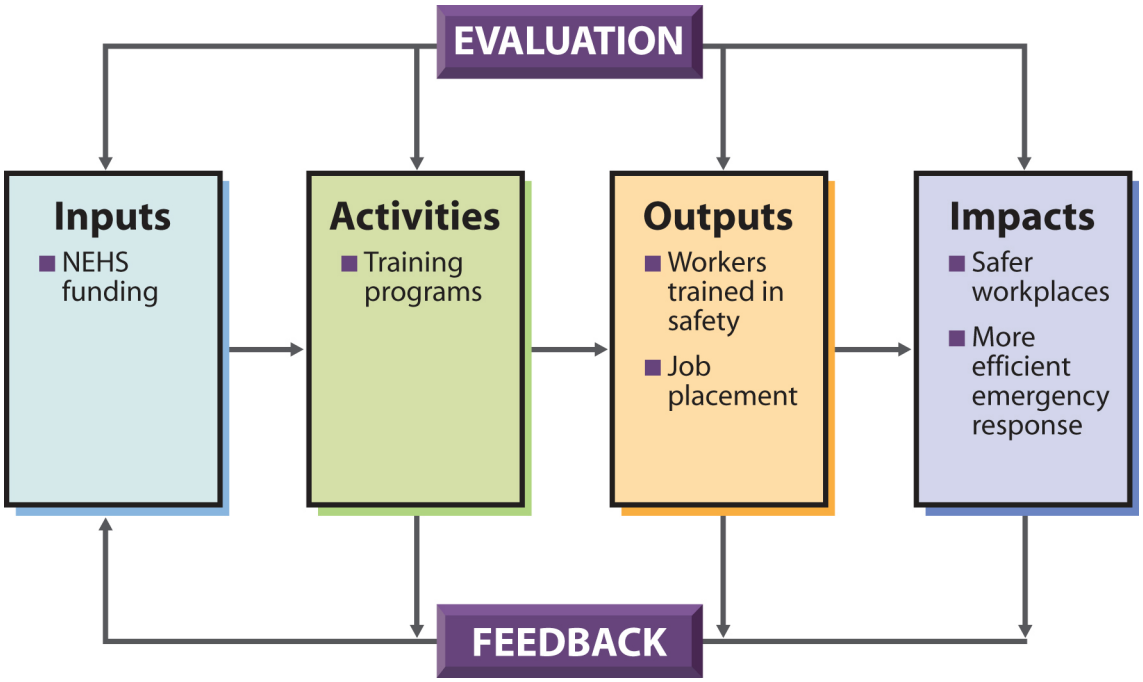
[75] Liebow E, Phelps J, Van Houten B, Rose S, Orians C, Cohen J, et al. 2009. Toward the assessment of scientific and public health impacts of the National Institute of Environmental Health Sciences Extramural Asthma Research Program using available data. *Environ Health Perspect* 117(7). Available: *http://www.ehponline.org/ambra-doi-resolver/10.1289/ehp.0800476* [accessed 15 February 2012].

- The Hazmat Disaster Preparedness Training Program enhances the safety and health training of current hazardous materials workers and chemical responders and augments prevention and preparedness efforts in a wide variety of high-risk settings.
- The Advanced Training Technology Program focuses on the development of training products for health and safety training for hazardous materials workers, emergency responders and skilled support personnel.

Nonprofit training centers perform the actual training with the help of a NIEHS grant, but NIEHS WETP evaluates each of the five overall programs. To assess their progress, the WETP program conducts annual evaluations focusing on training and job placement as key indicators of success, and it publishes the results. NIEHS uses evaluation to ensure that the independent training centers are achieving their intended outputs and impacts.

To see examples of evaluation reports from WETP training programs, visit:
http://tools.niehs.nih.gov/wetp/index.cfm?id=92

Figure 7.5 NIEHS WETP's Logic Model of its Evaluation of Inputs, Activities, Outputs and Impacts



Types of Evaluation

Grantees may conduct evaluations for a variety of reasons. Different types of evaluations can be used to answer different types of questions.[76] The descriptions below provide an overview of four of the primary types of evaluations.

PROCESS EVALUATION

This form of evaluation assesses the extent to which a program is operating as it was intended. It typically assesses program activities' conformance to statutory and regulatory requirements, program design and professional standards or customer expectations.

OUTCOME EVALUATION

This form of evaluation assesses the extent to which a program achieves its outcome-oriented objectives. It focuses on outputs and outcomes (including unintended effects) to judge program effectiveness but may also assess program process to understand how outcomes are produced.

IMPACT EVALUATION

Impact evaluation is a form of outcome evaluation that assesses the net effect of a program by comparing program outcomes with an estimate of what would have happened in the absence of the program. This form of evaluation is employed to isolate the program's contribution to achievement of its objectives when external factors are known to influence the program's outcomes.

COST-BENEFIT AND COST-EFFECTIVENESS ANALYSES

These analyses compare a program's outputs or outcomes with the costs (resources expended) to produce them. When applied to existing programs, they are also considered a form of program evaluation. Cost-effectiveness analysis assesses the cost of meeting a single goal or objective and can be used to identify the least costly alternative for meeting that goal. Cost-benefit analysis aims to identify all relevant costs and benefits, usually expressed in dollar terms.

[76] U.S. Government Accountability Office (GAO). 2011. Performance measurement and evaluation. GAO 11-646SP. Available: *http://www.gao.gov/new.items/d11646sp.pdf* [accessed 15 February 2012].

Planning an Evaluation

After identifying the intended activities, outputs and impacts of a program, grantees should have the information necessary to begin planning an effective program evaluation. An evaluation plan provides a formal opportunity for grantees to document the steps they will take to conduct a program evaluation.

An evaluation plan typically includes descriptions of the following:

- Purpose of program
- Partner assessment
- Evaluation goals
- Evaluation questions
- Data collection plans
- Data analysis plans
- Dissemination and reporting activities
- Other evaluation products
- Timeline and budget
- Staff responsible for each evaluation activity

In the next section, we provide more details about data collection, data analysis, and reporting and dissemination.

For sample evaluation plans, check out the following sources:
http://managementhelp.org/evaluatn/chklist.htm
http://www.epa.gov/evaluate/pdf/evalworksheet.pdf
http://www.wmich.edu/evalctr/wp-content/uploads/2010/05/plans_operations1.pdf

Data collection

Data can be categorized as either qualitative or quantitative. Qualitative data are descriptions of the characteristics of that which is being analyzed. Qualitative data are often collected in open-ended questions, feedback surveys or summary reports. Qualitative data provide valuable and insightful data but can be difficult to compare, reproduce and generalize. Quantitative data are numerical or statistical values used to express the quantities of a variable. This type of data is relatively easy to store and manage and can be generalized and reproduced, but it usually fails to provide a complete picture of a program.

A mixed-methods approach that combines quantitative and qualitative data can provide a more complete picture of a program.

When conducting an evaluation, partners can use different types of evidence: logs and documents directly associated with their project, data gathered from community members or other participants, research from external sources and environmental and health data. Some examples of data sources for each type of evidence are presented below (see Table 7.1). Data collection can be performed by partners or obtained from external sources. For example, partners can personally gather health data on the incidence of a particular disease in their community or obtain external government statistics from the Centers for Disease Control and Prevention (CDC). Likewise, community members can conduct their own environmental study or use data collected by other organizations, such as the Environmental Protection Agency (EPA), National Institute for Occupational Safety and Health (NIOSH), etc.

Data analysis

Data analysis plans provide an opportunity for grantees to think about what methods they are going to use to answer the evaluation questions. Content analysis, social network analysis and bibliometric analyses are methods grantees can use to organize and understand qualitative data. Often basic spreadsheet and word-processing software are all that is needed to conduct qualitative analyses. However, specialized qualitative analysis software such as Atlas.ti and NVivo are available to help organize and code data. Qualitative data can be analyzed on a case-study basis where each subject is analyzed and understood on its own, or by grouping similar "subjects" together.

For a list of currently available software and links to developer websites, see American Evaluation Association, "Qualitative Software," **http://www.eval.org/Resources/QDA.asp**.

See also U.S. General Accounting Office (GAO), "Quantitative Data Analysis: *An Introduction," Report to Program Evaluation and Methodology Division*, May 1992, **http://www.gao.gov/special.pubs/pe10111.pdf**.

Table 7.1 Examples of Data Sources for Evaluations

Type of Data Sources	Examples of Data Sources
Project Logs	Lists of partners/attendees at meetings Activity reports Meeting summaries Video and tape recordings
Project Documents	Study questions Logic model Project plan Quarterly/annual reports Governance agreements/documents Budget documents Educational products from project
Data Collected during Project	Diaries or field notes Forms Surveys Interviews Anecdotal evidence/stories Observations Behavioral data
Research from External Sources	Official records Letters Newspaper accounts Published data Ethnographies Oral histories
Environmental	Exposure to environmental toxins Water quality data Air quality data
Health	Incidence/prevalence of diseases or injuries Health-related behavior, knowledge and skills

Quantitative analysis describes any method for organizing or understanding numerical data. Examples of quantitative analysis methods include:

- Descriptive statistics
- Linear models
- Correlations and regressions
- Return on investments

As with qualitative analysis, a basic spreadsheet program is all that is needed to answer most quantitative evaluation questions. However, software such as SAS, SPSS, and STATA are useful for conducting more complex statistical analyses.

Metrics in Action 7.2 provides an example from a PEPH program that incorporates both qualitative and quantitative data analysis.

Metrics in Action 7.2: The **University of Texas Medical Branch-Galveston (UTMB) Center to Eliminate Health Disparities**, in conjunction with NIEHS COEC and the Community In-Power Development Association, Inc. (CIDA) of Port Arthur, Texas, uses data analysis to develop and apply a cumulative risk framework to address the community's environmental justice concerns. The Center partners initially focused on merging environmental and social determinants of health into a single, integrated assessment. Researchers used the following data sources:

- Census data
- Aggregated Texas Department of State Health Services health data
- EPA Toxics Release Inventory and Texas Commission on Environmental Quality monitoring data
- Occupational Safety and Health Administration (OSHA) safety data
- Documentation of industrial accidents, explosions and flaring

Children playing in municipal park next to chemical refineries in Port Arthur, Texas. *Photo by H. Kelley*

- Results of community symptom surveys, community interviews, focus groups and arts-based popular education and communication interventions
- Maps of key indicators of environmental and social risk using a geographic information system and community-mapping workshops

Initial results show that multiple stressors and health disparities disproportionately affect West Port Arthur, and residents in this area are exposed to significant cumulative risk burdens. The use of both qualitative and quantitative data analysis allowed the Center researchers to accurately map a range of indicators of the community's overall risk burden.

For more information on the Center to Eliminate Health Disparities, visit: http://www.utmb.edu/cehd/.

Reporting and dissemination

Evaluation findings can support actions to improve PEPH projects by identifying strengths and weaknesses or suggesting modifications to underlying organizational systems. Demonstrating the effectiveness of a PEPH project via an evaluation can result in improved accountability, quality control or increased project scope or funding. Evaluations can lead to the generation of new and enhanced knowledge and theories specifically for environmental public health, or more broadly for human and organizational development. Finally, evaluation findings can inspire policy changes affecting a population far beyond the original scope of the PEPH project.

Once the project has been evaluated, it is important to consider what to do with the findings. PEPH partners might want to ensure that the use of the evaluation is consistent with the original purpose of the project.[77] For example, if partners choose to evaluate the impact an education program has had on different community groups, they could share their findings not just with the funding agency, but also with those very community groups. This could end up furthering the original program goal of education while disseminating the results. Sharing results could also lead to the improvement of projects other than the one under direct evaluation.[78] In planning to share evaluation results, partners can ask:

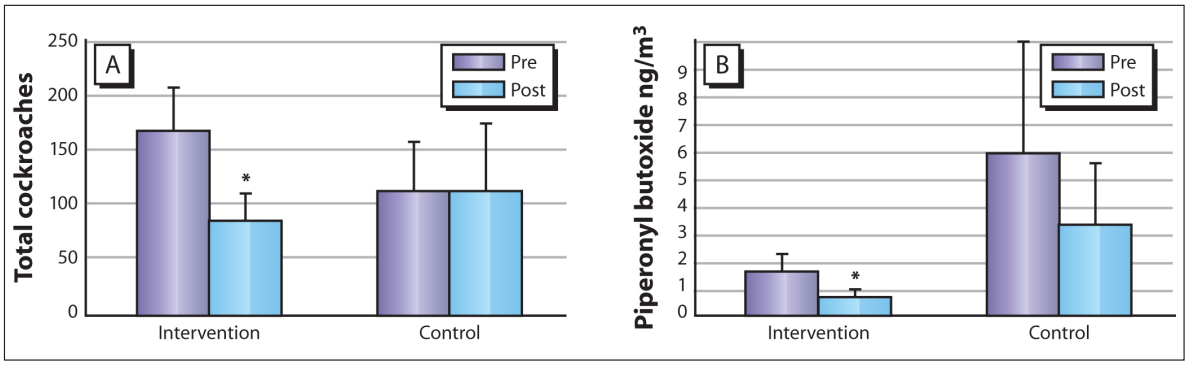
- What did partners learn from the project evaluation?
- Who might be interested in these results?
- How should the project's accomplishments be reported?
- How can the partners use these results to improve the program? Do the partners need to change project activities and objectives?
- How can the partners use the results to secure additional funding?
- How would the partners use these results to assess impacts over a longer time frame?
- What cultural or confidentiality issues do the partners need to address?

[77] Frechtling J. 2002. The 2002 User Friendly Handbook for Project Evaluation. Arlington, VA: The National Science Foundation, Division of Research, Evaluation, and Communication. 71-2. Available: *http://www.nsf.gov/pubs/2002/nsf02057/nsf02057.pdf* [accessed 16 December 2011].

[78] Barnes, H, Jordan G. 2006. EERE Guide for Managing General Program Evaluation Studies: Getting the Information You Need. Office of Energy Efficiency and Renewable Energy (EERE), Office of Planning, Budget and Analysis. 57. Available: *http://www1.eere.energy.gov/ba/pba/pdfs/evaluation_mgmt_guide_final_2006.pdf* [accessed 16 December 2011].

Metrics in Action 7.3: Researchers at the **Columbia Center for Children's Environmental Health (CCCEH)** evaluated the effectiveness of using integrated pest management (IPM) to reduce both pest infestation (cockroaches) and insecticide exposure after documenting widespread exposure to insecticides among pregnant inner-city women in Harlem, New York. The IPM program uses a variety of methods, including professional cleaning, sealing of pest entry points, application of low-toxicity pesticides and education. The evaluation revealed that pest levels significantly decreased in the IPM intervention households, but not in the control households. Likewise, levels of pyrethroid insecticides in indoor air samples were significantly lower in intervention households than in control households (Figure 7.6). Furthermore, researchers detected the presence of insecticides in blood samples of mothers in the control group, but not in the IPM intervention group. The evaluation successfully demonstrated the effectiveness of using IPM to reduce pest infestation and insecticide exposure during pregnancy. The researchers then published their results in *Environmental Health Perspectives* to disseminate the findings to the academic community. They also educated the residents of Harlem on the risks of pesticides for pregnant women and ways to mitigate these risks using IPM. By reporting the results of their evaluation and performing outreach, the CCCEH shared its best practices with others.

Figure 7.6 Cockroach Infestation Levels (left: A) and the Use of Piperonyl Butoxide (right: B) in 2-Week Integrated Air Samples



For more information about the CCCEH, visit: http://www.cumc.columbia.edu/dept/mailman/ccceh.

Additional Resources

The intent of this chapter is to provide a broad overview of evaluation practice, but it is by no means comprehensive. See Appendix 4 for additional resources and publications concerning:

- General program evaluations
- Environmental health and health program evaluations
- Logic models
- Evaluation tools
- Process evaluations
- Outcome evaluations
- Online databases

Chapter 8:
Appendices

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Appendix 1: Methodology

A team of program staff in the Division of Extramural Research and Training at NIEHS worked closely with the Science and Technology Policy Institute (STPI) to develop the Partnerships for Environmental Public Health Evaluation Metrics Manual.

In 2008, the National Institute of Environmental Health Sciences (NIEHS) created PEPH as a network to promote greater interaction among grantees with a common focus on environmental public health. Grantees who are considered part of the PEPH program received funding from 17 different funding mechanisms or opportunities:

- Breast Cancer and the Environment Research Program (BCERP)
- Centers for Children's Environmental Health and Disease Prevention Research
- Centers for Population Health and Health Disparities
- Environmental Health Sciences Core Centers
- Environmental Justice Program (EJ)
- Obesity and the Built Environment
- Research to Action (R2A)
- Superfund Basic Research Program (SRP)
- Worker Education and Training Program (WETP)
- American Reinvestment and Recovery Act (ARRA): STEM Education
- ARRA: Capacity Building
- ARRA: Community-linked Infrastructure
- Ethical, Legal, and Social Implications of Genomic Research
- NIH Partners in Research
- Community Participation Research Targeting the Medically Underserved
- Community Participation in Research
- Understanding and Promoting Health Literacy

We reviewed these programs and identified five cross-cutting program areas:

(1) Partnerships

(2) Leveraging

(3) Products and dissemination

(4) Education and training

(5) Capacity building for communities, researchers, health care professionals and decision-makers

In 2009 and 2010, the team conducted literature reviews on these five program areas to identify metrics that have been used to evaluate them. Materials reviewed included NIEHS program documents, journal articles and evaluation manuals, as well as grantee websites, documents, and outreach and engagement materials.

The STPI team then developed standard interview protocols around partnerships, communication and capacity building and conducted a series of interviews and focus groups with NIEHS staff and PEPH grantees. NIEHS identified nine potential respondents with a broad spectrum of programmatic experience (see Appendices 2 and 3). The team worked together to develop logic models for each of the program areas. Based on the literature reviews, grantee materials and input, we identified evaluation metrics for each activity, output and impact listed, as well as common strategies grantees can use to collect relevant data for the metrics. Almost every metric also includes a narrative that illustrates the "metric in action," a real world example of how a grantee measured a specific activity, output or impact.

In October 2010, the NIEHS published the draft Manual on the PEPH website. Throughout the fall and winter NIEHS staff presented the draft Manual at grantee meetings, scientific meetings, invited sessions and webinars (see list below). We sought comments from a wide range of stakeholders including grantees, federal and state government agencies, public health practitioners, and other NIH institutes. We estimate that over 350 individuals participated in the sessions. During the and Summer and Fall of 2011, comments received were discussed and incorporated into the final version of the Manual.

Outreach venues Meeting at which NIEHS staff presented the Manual:

- Superfund Grantee meeting (October, 2010)
- Worker training program meeting (October 2010)
- P30 Core Centers meeting (October 2010)
- Children's Centers meeting (October 2010)
- Breast Cancer and the Environment Research Centers Grantee meeting (November 2010)
- American Evaluation Association Annual Meeting (November 2010)
- Society for Risk Analysis Annual Meeting (December 2010)
- NIEHS/EPA/Public Launch (January 2011)
- Association of State and Territorial Health Officials, Environmental Health Director's Monthly Call (January 2011)
- NCI Evaluation Special Interest Group (January 2011)
- NIAID Evaluation Seminar (January 2011)
- PEPH Grantee Webinar (January 2011)
- NIH-wide Evaluation Special Interest Group (February 2011)
- NIAID Evaluation Work Group (February 2011)
- EPA Webinar (February and March 2011)
- NAEHS Council (February 2011)
- CDC Evaluation Workgroup (February 2011)

Appendix 2: NIEHS Staff Discussants and Discussion Dates

Anderson, Beth, Program Analyst, Superfund Research Program, Division of Extramural Research and Training, NIEHS; August 11, 2009.

Beard, Sharon D., Industrial Hygienist, Worker Education and Training Program, Division of Extramural Research and Training, NIEHS; August 13, 2009.

Collman, Gwen, Interim Director, Division of Extramural Research and Training, NIEHS; September 9, 2009.

Dilworth, Caroline, Health Science Administrator, Susceptibility and Population Health Branch, Division of Extramural Research and Training, NIEHS; August 19, 2009.

Gray, Kimberly, Program Administrator, Susceptibility and Population Health Branch, Division of Extramural Research and Training, NIEHS; September 18, 2009.

Humble, Michael, Health Science Administrator, Cellular, Organ Systems, and Pathobiology Branch, Division of Extramural Research and Training, NIEHS; September 9, 2009.

Lawler, Cindy, Program Administrator, Cellular, Organ Systems, and Pathobiology Branch, Division of Extramural Research and Training, NIEHS; September 3, 2009.

O'Fallon, Liam, Program Administrator, Susceptibility and Population Health Branch, Division of Extramural Research and Training, NIEHS; August 28, 2009.

Appendix 3: Subject Expert Discussants and Discussion Dates

Anderson, Henry; State Health Official, Wisconsin Division of Public Health, Department of Health Services; November 30, 2009.

Brody, Julia; Executive Director, Silent Spring Institute; November 10, 2009.

Carpenter, Hillary; Division of Environmental Health, Minnesota Department of Health; November 20, 2009.

Fryer-Edwards, Kelly; Associate Professor, Department of Bioethics and Humanities at the University of Washington School of Medicine; November 20, 2009.

Gray, Kathleen; Director, Environmental Resource Program, UNC-Chapel Hill; November 19, 2009.

Hricko, Andrea; Associate Professor of Clinical Preventive Medicine, University of Southern California; November 19, 2009.

Israel, Barbara; Professor, Department of Health Behavior and Health Education, University of Michigan; November 23, 2009.

Kiefer, Matt; Prevention and Intervention Core Leader, Pacific Northwest Agricultural Safety and Health Center; November 10, 2009.

Kyle, Amy; School of Public Heath, University of California Berkeley; November 18, 2009.

Lewis, Johnnye; Director, Community Outreach and Education Program, University of New Mexico; November 10, 2009.

McCauley, Linda; Dean, Emory University Nell Hodgson Woodruff School of Nursing; November 20, 2009.

McQuiston, Thomas; Tony Mazzocchi Center for Health, Safety and Environmental Education; November 17, 2009.

Miller, Pamela; Director, Alaska Community Action on Toxics (ACAT); November 20, 2009.

Mirer, Frank; Associate Professor, Environmental and Occupational Health Sciences, City University of New York, Hunter School; November 20, 2009.

Osterberg, David; Associate Clinical Professor, Department of Occupational and Environmental Health, University of Iowa; November 20, 2009.

Sattler, Barbara; Professor, University of Maryland School of Nursing; December 2, 2009.

Serrell, Nancy; Director of Outreach, Dartmouth College; November 17, 2009.

Slatin, Craig; Associate Professor and Department Chair, Community Health and Sustainability, University of Massachusetts Lowell; December 1, 2009.

Wilson, Omega; President, West End Revitalization Association, November 16, 2009.

Wilson, Sacoby; Assistant Research Professor Institute for Families in Society, University of South Carolina; November 23, 2009.

Witherspoon, Nsedu; Executive Director, Children's Environmental Health Network (CEHN); November 23, 2009.

Wright, Beverly; Director, Deep South Center on Environmental Justice, Dillard University; December 3, 2009.

Appendix 4: Additional Evaluation Resources

The references in this appendix provide further information on the topics discussed in the Partnerships for Environmental Public Health Evaluation Metrics Manual. Sections include:

- General program evaluation
- Environmental health and health program evaluation
- Logic modeling
- Evaluation tools
- Process evaluation
- Impact/outcomes evaluation
- Online databases
- Partnership and coalition assessment resources
- Capacity building resources
- Bibliometric analyses

This list of references is meant to be informative, not prescriptive, and it does not preclude the use of other resources. NIEHS is interested in keeping the list of resources as current and complete as possible. Any suggestions for additional resources are greatly appreciated and should be sent to *peph@nieh.nih.gov*.

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Appendix 6: List of Examples by Chapter

Chapter	Section	Example	Organization	PEPH Program
2: Partnerships	Activity 1: Identify partners	2.1	University of Cincinnati	Research to Action
2: Partnerships	Activity 2: Build relationships with partners	2.2	Alaska Community Action on Toxics: Quarterly Board Meetings	Environmental Justice
2: Partnerships	N/A	N/A	University of Kentucky Kentucky Research Consortium for Energy and Environment	Superfund Research Program
2: Partnerships	Activity 3: Involve partners	2.3	Marine Resources for Future Generations	EHS Core Centers COEC
2: Partnerships	Activity 4: Communicate clearly with partners	2.4	The Silent Spring Institute	Environmental Justice
2: Partnerships	Output 1: Multi-directional communication with partners	2.5	Deep South Center for Environmental Justice: Communiversity	Worker Education and Training Program
2: Partnerships	Output 3: Translation of scientific findings among partners	2.6	Superfund Research Translation Core at University of California, Berkeley	Superfund Research Program
2: Partnerships	Output 4: Community involvement in research	2.7	Together for Agricultural Safety Project	CBPR
2: Partnerships	Impact 2: Increased awareness of issues and research processes	2.8	University of New Mexico Community Outreach and Education Program	EHS Core Centers COEC
2: Partnerships	Impact 3: Expanded research collaborations	2.9	Detroit Community-Academic Urban Research Center	Children's EH Centers
2: Partnerships	Case Study	Case Study	Community Environmental Health Program of the University of New Mexico	EHS Core Centers COEC

Chapter	Section	Example	Organization	PEPH Program
3: Leveraging	Activity 1: Leveraging infrastructure and funding	3.1	International Chemical Workers Union Council Center for Worker Health and Safety Education	Worker Education and Training Program
3: Leveraging	Activity 1: Leveraging infrastructure and funding	3.2	West Harlem Environmental Action	Environmental Justice
3: Leveraging	Output 1: Raised awareness and interest	3.3	West End Revitalization Association	Partners in Research
3: Leveraging	Output 2: Increased project scope	3.4	Somerville Immigrant Worker Health Project	Environmental Justice
3: Leveraging	Impact 1: Broader reach	3.5	Environmental Health Coalition Clean Air for Barrio Children's Health	Environmental Justice
3: Leveraging	Impact 3: Sustainability	3.6	Children's Environmental Health Network	Not affiliated
3: Leveraging	Case Study	Case Study	Environmental Health Sciences Core at the University of Southern California	EHS Core Centers: COEC
4: Products and Dissemination	Activity 2: Develop message content and format	4.1	Dartmouth Toxic Metals Research Program's Research and Translation Core	Superfund Research Program
4: Products and Dissemination	Activity 3: Disseminate messages	4.2	Southern California Environmental Health Sciences Center Community Outreach and Education Program	EHS Core Center: COEC
4: Products and Dissemination	Output 1: Findings communicated in various products	4.3	University of California, San Diego's Superfund Research Program	Superfund Research Program
4: Products and Dissemination	Output 1: Findings communicated in various products	4.4	Bay Area Breast Cancer and the Environment Research Center/ Zero Breast Cancer	Breast Cancer and the Environment
4: Products and Dissemination	Output 2: Access to messages	4.5	Outreach Core and Research Translation Core of Duke University Superfund Research Center	Superfund Research Program

Chapter	Section	Example	Organization	PEPH Program
4: Products and Dissemination	Output 3: Multi-directional communication and engaged partners	4.6	Aberdeen Area Tribal Chairman's Health Board and University of Iowa Environmental Health Sciences Research Center	EHS Core Centers COEC
4: Products and Dissemination	Impact 1: Awareness of messages	4.7	The Michigan State University Breast Cancer and Environment Research Center	Breast Cancer and the Environment
4: Products and Dissemination	Impact 2: Ability to act on messages	4.8	Alaska Community Action on Toxics	Environmental Justice
4: Products and Dissemination	Impact 3: Communication of messages to others	4.9	University of Cincinnati Center for Environmental Genetics	EHS Core Centers COEC
4: Products and Dissemination	Case Study	Case Study	Asian Communities for Reproductive Justice	Environmental Justice
5: Education and Training	Activity 1: Identify training needs	5.1	Society for Occupational and Environmental Health	Not affiliated
5: Education and Training	Activity 2: Develop and test programs and materials	5.2	American Federation of State, County and Municipal Employees	Worker Education and Training Program
5: Education and Training	Activity 3: Conduct training programs	5.3	Brownfield's Minority Worker Training Program: Increasing Awareness on the Worksite	Worker Education and Training Program
5: Education and Training	Activity 3: Conduct training programs	5.4	Western Region Universities Consortium	Worker Education and Training Program
5: Education and Training	Activity 4: Revise approach, program or materials as needed	5.5	Hazardous Materials Training and Research Institute	Worker Education and Training Program
5: Education and Training	Output 1: Training curricula or programs	5.6	Baylor College of Medicine	Science Education
5: Education and Training	Output 2: Training materials	5.7	The Community Outreach and Education Core (COEC) at Wayne State University	EHS Core Center: COEC
5: Education and Training	Output 3: Trained individuals	5.8	Laborers International Union of North America	Worker Education and Training Program

Chapter	Section	Example	Organization	PEPH Program
5: Education and Training	Impact 1: Knowledge of issues	5.9	Fox Chase Cancer Center and Mount Sinai School of Medicine: Breast Cancer and the Environment Research Center's Community Outreach and Translation Core	Breast Cancer and the Environment
5: Education and Training	Impact 3: Safer workplace	5.10	Center for Construction Research and Training	Worker Education and Training Program
5: Education and Training	Impact 3: Safer workplace	5.11	SEIU Education and Support Fund	Worker Education and Training Program
6: Capacity Building	Activity 1: Assess resources, knowledge and skills	6.1	Promoting the Occupational Health of Indigenous Farmworkers Project	Environmental Justice
6: Capacity Building	Activity 2: Build organizational capacity	6.2	University of Texas at El Paso	EHS Core Center: COEC
6: Capacity Building	Activity 3: Obtain and build physical and communication infrastructure	6.3	Superfund Research Program	Superfund Research Program
6: Capacity Building	Activity 4: Build knowledge and skills	6.4	Deep South Center for Environmental Justice	Worker Education and Training Program
6: Capacity Building	Output 1: Stronger individuals	6.5	University of Washington Center for Ecogenetics and Environmental Health	EHS Core Center: COEC, PEPH Supplement
6: Capacity Building	Output 2: Stronger organizations	6.6	Concerned Citizens of Tillery	Environmental Justice
6: Capacity Building	Impact 1: More effective and efficient individuals, organizations and projects	6.7	University of Texas Medical Branch-Galveston Center to Eliminate Health Disparities	Partners with the UTMB EHS Core Center COEC
6: Capacity Building	Impact 2: Empowered partners	6.8	The Brown University Superfund Research Program	Superfund Research Program

Chapter	Section	Example	Organization	PEPH Program
6: Capacity Building	Impact 3: Changes in environmental health policies and regulations	6.9	Occidental College Center for Food and Justice	Environmental Justice
6: Capacity Building	Impact 4: Project sustainability	6.10	Seattle Partners for Healthy Communities	Environmental Justice, Community-Based Participatory Research
6: Capacity Building	Case Study	Case Study	Swinomish Indian Tribal Community	EHS Core Centers COEC
7: Evaluation	Evaluation example	7.1	Detroit Community-Academic Urban Research Center	Community Based Participatory Research
7: Evaluation	Evaluation example	7.2	University of Texas Medical Branch-Galveston Center to Eliminate Health Disparities	Partners with the UTMB EHS Core Center COEC
7: Evaluation	Evaluation example	7.3	Columbia Center for Children's Environmental Health	Children's EH Centers

Appendix 7: List of Acronyms

APHA:	American Public Health Association
API:	Asian and Pacific Islander
ATSDR:	Agency for Toxic Substances and Disease Registry
BCERC:	Breast Cancer Environmental Research Centers
CAB:	Community Advisory Board
CABCH:	Clean Air for Barrio Children's Health
CBO:	Community-based organization
CBPR:	Community-based participatory research
CCCEH:	Columbia Center for Children's Environmental Health
CDC:	Centers for Disease Control and Prevention
COEC:	Community Outreach and Education Core
COEP:	Community Outreach and Engagement Program
COTC:	Community Outreach and Translation Core
DOT:	Department of Transportation
EJ:	Environmental Justice
EPA:	Environmental Protection Agency
HAZWOPER:	Hazardous Waste Operations and Emergency Response
HHS:	U.S. Department of Health and Human Services
IPM:	Integrated Pest Management
IRB:	Institutional Review Board
IRB:	Institutional Review Board
MWTP:	Minority Worker Training Program
NCI:	National Cancer Institute
NGO:	Non-governmental organization
NIAID:	National Institute of Allergy and Infectious Diseases
NIEHS:	National Institute of Environmental Health Sciences
NIH:	National Institutes of Health
NIOSH:	National Institute for Occupational Safety and Health
NTP:	National Toxicology Program
PCBs:	Polychlorinated biphenyls
PCDFs:	Polychlorinated dibenzofurans
PEPH:	Partnerships for Environmental Public Health
R2A:	PEPH Research to Action Grantees
RTC:	Research Translation Core
SRP:	Superfund Research Program
WETP:	Worker Education and Training Program

Appendix 8: Sample Memorandum of Understanding

(available online at: *http://depts.washington.edu/ccph/pdf_files/MOU10.pdf*)

In Chapter 2, we discussed the how a Memorandum of Understanding might help groups clarify the roles and responsibilities of each partner. Below is a sample Memorandum of Understanding that provides the goals of the group, and documents the roles and responsibilities of each of the partners.

MEMORANDUM OF UNDERSTANDING FOR THE
COMMUNITY ORGANIZING PART OF
COMMUNITY ACTION AGAINST ASTHMA
1-22-01

This is a Memorandum of Understanding between the University of Michigan School of Public Health, Detroiters's Working for Environmental Justice (DWEJ), the Detroit Hispanic Development Corporation (DHDC) and Warren Conner Development Coalition (WCDC). For the purposes of this Memorandum, these agencies will be called "host agencies." This Memorandum of Understanding sets forth the working relationship of these organizations including their roles and responsibilities as a part of their involvement in the community organizing part of Community Action Against Asthma, hereafter called CAAA.

Philosophy/Principles: Throughout the term of this partnership, these partner organizations agree to abide by the philosophy and principles spelled out in the Detroit Community Academic Urban Research Center's "Community-Based Public Health Research Principles" adopted on July 24, 1996, agreed upon by the Community Action Against Asthma Steering Committee on December 16, 1998, and listed here:

1. Community-based research projects need to be consistent with the overall objectives of the Detroit Community-Academic Urban Research Center (URC.) These objectives include an emphasis on the local relevance of public health problems and an examination of the social, economic, and cultural conditions that influence health status and the ways in which these affect life-style, behavior, and community decision-making.

2. The purpose of community-based research projects is to enhance our understanding of issues affecting the community and to develop, implement and evaluate, as appropriate, plans of action that will address those issues in ways that benefit the community.

3. Community-based research projects are designed in ways which enhance the capacity of the community-based participants in the process.

4. Representatives of community-based organizations, public health agencies, health care organizations, and educational institutions are involved as appropriate in all major phases of the research process, e.g., defining the problem, developing the data collection plan, gathering data, using the results, interpreting, sharing and disseminating the results, and developing, implementing and evaluating plans of action to address the issues identified by the research.

5. Community-based research is conducted in a way that strengthens collaboration among community-based organizations, public health agencies, health care organizations, and educational institutions.

6. Community-based research projects produce, interpret and disseminate the findings to community members in clear language respectful to the community and in ways which will be useful for developing plans that will benefit the community.

7. Community-based research projects are conducted according to the norms of partnership: mutual respect; recognition of the knowledge, expertise, and resource capacities of the participants in the process; and open communication.

8. Community-based research projects follow the policies set forth by the sponsoring organization regarding ownership of the data and output of the research (policies to be shared with participants in advance). Any publications resulting from the research will acknowledge the contribution of participants, who will be consulted with prior to submission of materials and, as appropriate, will be invited to collaborate as co-authors. In addition, following the rules of confidentiality of data and the procedures referred to below (Item #9), participants will jointly agree on who has access to the research data and where the data will be physically located.

9. Community-based research projects adhere to the human subjects review process standards and procedures as set forth by the sponsoring organization; for example, for the University of Michigan these procedures are found in the Report of the national commission for the Protection of Human Subjects of Biomedical and Behavioral Research, entitled "Ethical Principles and Guidelines for the Protection of Human Subjects of Research" (the "Belmont Report").

Adapted from Schulz, AJ, Israel, BA, Selig, S, and Bayer, I. 1997. Development and Implementation of Principles for Community-Based Research in Public Health. Journal of Community Practice.

Program Objectives to be Accomplished: The following are specific aims and objectives as stated in the grant as it was funded. CONEH refers to the community organizing activities of CAAA.

Specific Aim 1: To identify, prioritize and translate the relevant findings of the current CAAA data collection activities, together with proposed, additional CONEH data collection activities, to guide the implementation and evaluation of an expanded, community-wide intervention.

Objective 1: To identify specific sources of particulate matter (PM) and their association with childhood asthma severity.

Objective 2: To identify and prioritize the relevant findings of the CAAA project to guide the CONEH.

Objective 3: To translate the priority areas selected into intervention action plans to guide the CONEH.

Specific Aim 2: To conduct and evaluate a multi-level community-based intervention in order to reduce exposure to physical environmental and psychosocial environmental stressors associated with asthma severity and exacerbations, and to strengthen protective factors (e.g., social support, community capacity) that may modify the effects of these stressors.

Objective 1: To identify and engage existing community-based organizations, groups, institutions and agencies in an Inter-Organizational Network to address identified priorities.

Objective 2: To reduce identified physical environmental and psychosocial environmental stressors through community organizing intervention activities.

Objective 3: TTo strengthen neighborhood protective factors, such as social support and community capacity, through community organizing intervention activities.

Objective 4: To increase the capacity of organizations involved in the I.N. to work collectively to reduce physical and psychosocial environmental health hazards and strengthen protective factors associated with asthma.

Specific Aim 3: To examine whether the conducted multi-level, community-based intervention enhances the effect of an intensive household intervention on the health and well being of children with asthma and their caregivers.

Specific Aim 4: To increase community awareness and knowledge of factors associated with the environment and asthma through the dissemination of research findings to community residents in ways that are understandable and beneficial to the community.

Dates for this Memorandum of Understanding: The grant project period is from 9-18-2000 to 7-31-2005. This memorandum is intended to cover the entire grant period.

Responsibilities of the University of Michigan, School of Public Health:

1. Actively support the CAAA partnership.
2. Participate in the CAAA partnership through membership in the Steering Committee. Communicate with the Steering Committee members regarding administrative and programmatic issues related to the community organizing project in Detroit.
3. Provide overall program oversight.
4. Collect data, conduct preliminary analyses of existing and new data, and provide feedback to all partners and to staff as appropriate.
5. Provide financial and programmatic reports to the funder, NIEHS (National Institute of Environmental Health Sciences.
6. Serve as a point of contact with NIEHS.
7. Assist in the staff hiring process.
8. Develop and conduct an orientation to the project for partners and staff.
9. Work with the community organizers and administrative assistant in planning and conducting community forums.
10. Provide co-supervision of community organizing staff with each of the host organizations.
11. Serve as the fiduciary agent for this project. Pay the bills, dispense funds (see "Financial Arrangement" for more details).
12. Assist in providing resources and technical assistance in activities supporting the design and implementation of assessment, data collection, and evaluation systems.
13. Assist in the dissemination of results to the community.
14. Ensure that there is ongoing communication between the host organizations and the University of Michigan by sharing information regularly and frequently.

Responsibilities of Detroiters Working for Environmental Justice:

1. Actively support the CAAA partnership.
2. Participate in the CAAA partnership through membership in the Steering Committee. Communicate with the Steering Committee members regarding administrative and programmatic issues related to the community organizing project in Detroit.
3. Develop and conduct an orientation to DHDC for all community organizing staff.
4. Provide co-supervision of Neighborhood Community Organizer housed in DHDC with the University of Michigan School of Public Health.
5. Provide office space for staff assigned to DHDC.
6. Facilitate communication and linkages between DHDC and other community organizations and groups.
7. Provide 10% of a staff person's time to serve as the "Host Agency Liaison." The responsibilities of this person will include:
   - Participating in the hiring of the community organizing staff using a process to be approved by the CAAA Steering Committee;
   - Participating in an orientation to the overall community organizing project;
   - Providing an orientation and integration of Neighborhood Community Organizer to the organization;
   - Providing co-supervision of the Neighborhood Community Organizer. This would include day-to-day supervision to ensure attendance and adherence to the agency's policies, and oversight and assistance in his or her conduct of day to day job responsibilities as per the job descriptions.
8. Assist in providing resources and technical assistance in activities supporting the design and implementation of assessment, data collection, and evaluation systems.
9. Meet deadlines to ensure that the reporting process for the grant is a timely one.
10. Participate in the process of analyzing and translating the data collected to guide the efforts of the community organizers.
11. At all times, assure that the community organizers are carrying out their responsibility to focus on the community, with the goal of seeking ongoing, continuous input from the community.
12. Assist in the dissemination of results to the community.
13. Ensure that there is ongoing communication between the host organizations and the University of Michigan by sharing information regularly and frequently.
14. Provide necessary training on an ongoing basis to community organizing staff and Administrative Assistant.

Responsibilities of Detroit Hispanic Development Corporation:

1. Actively support the CAAA partnership.
2. Participate in the CAAA partnership through membership in the Steering Committee. Communicate with the Steering Committee members regarding administrative and programmatic issues related to the community organizing project in Detroit.
3. Develop and conduct an orientation to DHDC for all community organizing staff.
4. Provide co-supervision of Neighborhood Community Organizer housed in DHDC with the University of Michigan School of Public Health.
5. Provide office space for staff assigned to DHDC.
6. Facilitate communication and linkages between DHDC and other community organizations and groups.
7. Provide 10% of a staff person's time to serve as the "Host Agency Liaison." The responsibilities of this person will include:
   - Participating in the hiring of the community organizing staff using a process to be approved by the CAAA Steering Committee;
   - Participating in an orientation to the overall community organizing project;
   - Providing an orientation and integration of Neighborhood Community Organizer to the organization;
   - Providing co-supervision of the Neighborhood Community Organizer. This would include day-to-day supervision to ensure attendance and adherence to the agency's policies, and oversight and assistance in his or her conduct of day to day job responsibilities as per the job descriptions.
8. Assist in providing resources and technical assistance in activities supporting the design and implementation of assessment, data collection, and evaluation systems.
9. Meet deadlines to ensure that the reporting process for the grant is a timely one.
10. Participate in the process of analyzing and translating the data collected to guide the efforts of the community organizers.
11. At all times, assure that the community organizers are carrying out their responsibility to focus on the community, with the goal of seeking ongoing, continuous input from the community.
12. Assist in the dissemination of results to the community.
13. Ensure that there is ongoing communication between the host organization by sharing information regularly and frequently.
14. Provide necessary training on an ongoing basis to community organizing staff.

Responsibilities of Warren Conner Development Coalition:

1. Actively support the CAAA partnership.
2. Participate in the CAAA partnership through membership in the Steering Committee. Communicate with the Steering Committee members regarding administrative and programmatic issues related to the community organizing project in Detroit.
3. Develop and conduct an orientation to WCDC for all community organizing staff.
4. Provide co-supervision of Neighborhood Community Organizer housed at WCDC with the University of Michigan School of Public Health.
5. Provide office space for staff assigned to WCDC.
6. Facilitate communication and linkages between WCDC and other community organizations and groups.
7. Provide 10% of a staff person's time to serve as the "Host Agency Liaison." The responsibilities of this person will include:
   - Participating in the hiring of the community organizing staff using a process to be approved by the CAAA Steering Committee;
   - Participating in an orientation to the overall community organizing project;
   - Providing an orientation and integration of Neighborhood Community Organizer to the organization;
   - Providing co-supervision of the Neighborhood Community Organizer. This would include day-to-day supervision to ensure attendance and adherence to the agency's policies, and oversight and assistance in his or her conduct of day to day job responsibilities as per the job descriptions.
8. Assist in providing resources and technical assistance in activities supporting the design and implementation of assessment, data collection, and evaluation systems.
9. Meet deadlines to ensure that the reporting process for the grant is a timely one.
10. Participate in the process of analyzing and translating the data collected to guide the efforts of the community organizers.
11. At all times, assure that the community organizers are carrying out their responsibility to focus on the community, with the goal of seeking ongoing, continuous input from the community.
12. Assist in the dissemination of results to the community.
13. Ensure that there is ongoing communication between the host organization by sharing information regularly and frequently.
14. Provide necessary training on an ongoing basis to community organizing staff.

Financial Arrangements:

Each of the community partners involved in the Community Organizing part of CAAA: DWEJ, DHDC, and WCDC will receive funds from The University of Michigan, School of Public Health for services rendered as host agencies, as a part of this agreement. For year one, each agency will received $13,000. There will be a slight increase each year (e.g., $13,200 for year two, $13,408 for year three). These funds are for community field costs, which include:

Liaison – 10% x 3 locations $15,000

Facilities Rental x 3 locations $9,000

Community Organizing Activities x 3 locations $11,100

Field Office Supplies $1,200

Copying, printing $900

Telephone $1,200

Postage, express mail $600

Total Community Field Costs $39,000 divided by three = $13,000 each

To obtain the funding, after staff is hired, each agency will submit an invoice for the first six months of the first year, or $6,500. An invoice for the second six months will be submitted five months later. It will take approximately one month from the time the University of Michigan receives the invoice for it to be processed and for the agencies to receive the funding. Agencies do not need to keep a detailed track of the expenditures as a part of this agreement.

The University of Michigan School of Public Health will also provide a computer at a cost of no more than $2500 for each of the four staff persons hired.

Memorandum of Understanding Amendments:

The agreement shall be renewed annually by the signatories.

Termination of Memorandum of Understanding:

This agreement may be terminated by either party provided not less than thirty days (30) written notice of intent to terminate is given and an opportunity for prior consultation is provided.

In the event of termination, accounts shall be reconciled as of the date of termination.

Signatures:

This Memorandum of Understanding is entered into on _____ (date)

(signatures)

_____ (for the University of Michigan, School of Public Health)

_____ (for Detroiters Working for Environmental Justice)

_____ (for Detroit Hispanic Development Corporation)

_____ (for Warren Conner Development Coalition)

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Partnerships for Environmental Public Health

Evaluation Metrics Manual

National Institute of Environmental Health Sciences

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