

# **3. PROGRAM OVERVIEW**

### 3.a. Summary of Program Activities, Highlights and Accomplishments

*Please provide a list of program highlights. This segment should provide a description of how EPHT activities have resulted or are expected to result in improved public health in your state or city. Please limit this portion to two (2) pages - Sections 4, 5, & 6 offer an opportunity to provide more detailed descriptions of various program activities.*

The overarching goal of the California Environmental Health Tracking Program is to work with data owners, data users, community organizations, and other stakeholders to build a state infrastructure for an EPHTN. This infrastructure would enable us to provide information on environmental hazards, exposures and environmentally-related disease to the public, community organizations, non-governmental agencies, governmental agencies, and policy makers in a timely, accessible, useful, understandable, transparent, and responsible manner. We identified 5 objectives that are fundamental to accomplishing this long-term goal. Our program activities during PY1-3 were largely geared toward achieving these objectives.

#### **Establishing relationships and building trust**

We have successfully developed a process in which our program can be responsive to stakeholder needs and concerns. Although the trust built is fragile and the process is still continuing, we have established a foundation for a responsive dialogue in which all participants can be heard and feel comfortable expressing opposing views. Some stakeholders with a history of disenfranchisement have reported that they feel part of our EPHT program and feel involved with the ongoing process of building an EPHTN in California. This accomplishment has been one of the most difficult of all our activities, but we have made progress due to the commitment to participatory approaches and the willingness of the participants to engage in this area. Similarly, with our state agency counterparts, we have successfully developed partnerships both within the Department of Health Services (DHS) and the California Environmental Protection Agency (Cal/EPA) which have increased trust and established a platform for further collaboration in the future.

#### **Developing program capacity to provide timely and accessible information for action**

We have successfully developed capacity to provide useful information for stakeholders by: (1) conducting comprehensive needs assessments of technical partners, local environmental and health agencies, tribes and tribal agencies, and NGOs/CBOs; (2) using a stakeholder process to determine stakeholder needs and what data would be useful; (3) assembling data and using epidemiologic methods to analyze, understand, and interpret them along with input from the stakeholders; (4) using emerging technologies/methods in geographic information systems (GIS), spatial statistics, and spatial analysis to integrate and visualize the data in efficient, useful and meaningful ways; and (5) using web-enabled information systems and mapping technologies to disseminate the data in a public-accessible manner.

**Increasing stakeholder capacity to access, use, and translate environmental public health tracking information into action**

We have enhanced stakeholder capacity in a number of specific ways: (1) awarding mini-grants for capacity demonstration projects and supporting capacity building workshops/trainings; (2) enabling education and two-way dialogue through advisory group meetings; (3) providing spatial and temporal linkage analyses; geocoding services; and environmental epidemiology technical assistance to state environmental and health agencies and academic partners; (4) partnering with a CBO to develop and disseminate community-specific environmental health information materials and conduct a stakeholder advisory process; and (5) partnering with an NGO to collaborate on enhancing web-enabled visualization and mapping tools. These activities have led us to conclude that, given the opportunity and resources, a broad range of stakeholders are interested in and capable of utilizing environmental and health data – especially at a local level. Continuing to build local capacity in these areas will enable stakeholders to better use information from currently available public health surveillance and environmental monitoring systems. Furthermore, these capacities will help stakeholders to take advantage of a future environmental health tracking network and become stronger partners in protecting and improving the health of Californians.

**Developing a state infrastructure for EPHT where environmental hazard/exposure and disease trends can be tracked and potentially linked to support population health research**

We have determined effective approaches for developing a state EPHTN infrastructure by assessing the needs and capacities of statewide data systems. Work accomplished and demonstrated by our program indicates that an enterprise spatial linkage architecture approach would be the most effective for developing state and national networks. This approach addresses several major hurdles to successfully implementing the network, including the reluctance of data providers to supply data and the need of stakeholders to request and receive integrated and linkable environmental health data in real time. Spatial linkage architecture allows tracking data providers, including disease registries and other surveillance systems, to share data while maintaining maximum control of their data resources. As important, enterprise spatial linkage allows environmental health data to be provided without compromising individual record confidentiality. Further, enterprise services such as centralized geocoding can assist data providers to enhance their systems not only for the benefit of their own internal use, but for the benefit of tracking stakeholders who require high quality spatially-enabled surveillance data. Successful development of the network, however, may be hampered by a lack of resources by the primary data owners (i.e. surveillance systems), as we observed during our work.

**Creating a model for implementation of EPHT with a community-based participatory approach**

Through the Planning Consortium and pilot project activities, we have explored, utilized, and evaluated participatory approaches to establishing partnerships, presenting and discussing data, developing guiding principles, determining dissemination strategies, and planning program strategies. A community-based participatory approach allows for meaningful involvement

transforming advisors into collaborators. This transformation comes about via a continuous process of involving stakeholders in the initial identification of needs, problems, and methods; mutual decision-making on project development; and discussion and joint interpretation of findings and dissemination strategies. We realize that stakeholders that work in and are familiar with affected communities are best suited to address the specific needs and priorities of those communities. This approach increases communication, collaboration, and coordination among all partners, and establishes standards for responsiveness, transparency, and competency in EPHT programs to work to improve public health.

### 3.b. Collaboration/Partnership Activities

*Describe successful collaborations, partnerships, and provide examples of sustainable program activities resulting from these partnerships. Also list, in the appendix, internal/external partners that contribute or support the program.*

Collaboration and partnership activities are essential to creating an EPHTN. This is particularly true in an era during which diminishing public funds need to be increasingly leveraged with private foundation, environmental and environmental health groups, and private health care provider resources. For example, shared resources between health and environmental agencies are necessary to develop linkages with environmental and health data. We successfully developed partnerships and collaborations with non-governmental organizations, state environmental and health agencies, a private health care maintenance organization, the state Medicaid agency, the University of California, environmental justice groups, disease advocacy groups, and other community-based organizations. Many members of our advisory groups and the Planning Consortium came from grass-roots organizations and brought an appreciation of the social and economic issues connected to environmentally-related disease. Our advisors and collaborators advocated for a view of the environmental context of health encompassing both the physical and social environments, including patterns of economic development, crime, and access to health clinics, healthy foods, and green space. As our program and our partners went through this process, we explored partnerships with individuals and groups committed to environmental justice, community economic development, and access to quality health care, schools, and housing.

Notably, partnerships with two collaborators - the Pacific Institute, an independent, nonpartisan organization studying issues at the intersection of development, environment, and security, and the Urban Strategies Council, a community support and advocacy organization - were instrumental in developing collaborations and trust with local stakeholders. As part of our relationship with the Urban Strategies Council, we were presented with an opportunity to enhance their data warehouse and mapping service (<http://www.InfoAlamedaCounty.org>). We were able to add health tracking data for Alameda County, California describing asthma and adverse reproductive outcomes to geographically-referenced data on unemployment, poverty, overcrowding, homeownership, school locations, traffic volume-attributed roadways, and toxic sites. Maps that can be printed from this system are designed to provide a sustainable resource to community groups, agency stakeholders, and policy makers to inform changes in land-use decisions, housing developments, and even diesel-truck routes. Since these factors are among the root causes of environmental illness, we consider this work to be consistent with movement up the stream to address the foundations of ill health.

Our program's involvement with our partners has helped to broaden our view of environmental health issues and expand the ways in which people deal with them. For example, planning and transportation is increasingly becoming recognized as an environmental health issue. Our program has provided a forum for many stakeholder groups that traditionally may not have had a

voice in governmental and/or environmental health affairs; this has also contributed to the increased awareness and collaboration around environmental and public health issues.

We have developed information technology tools (such as web-based tools to return traffic exposure matrices from an address, centralized geocoding, etc.) which are publicly available and offer real benefit to agency and non-governmental stakeholders. During the course of our work, we have gained from the information and expertise of communities and public agencies while adding value and efficiency to their data resources, making them increasingly available and understandable for their purposes. We consider this “give and take” mode of operation to be fundamental for the future development of EPHT in general.

By providing real and valued services to our partners, we are solidifying relationships which are helping to build the foundations of a statewide EPHTN. The forging of relationships, facilitation of dialogue and collaboration, development of new knowledge and methods around research, and the support and involvement of a broad range of stakeholders are intended to combine to enable our program and our partners to secure funding and inform legislation. Ultimately, these efforts will address real environmental public health concerns and reduce environmentally-related chronic disease, which cause human suffering and cost California billions of dollars annually in health-related expenses.

For a complete list of our partners, please see APPENDIX A: Partners that Contribute to or Support the Program.

## **4. SUMMARY OF KEY RECOMMENDATIONS**

## 4.a. Outreach, Education, and Capacity Building

### **Background**

It will take a considerable and concerted effort on the part of a variety of stakeholders to attain the EPHTN vision of healthy, informed communities. There is great potential for EPHT programs to facilitate that vision; however, achieving that potential will ultimately depend on the ability of stakeholders to effectively integrate and utilize information generated by an EPHTN to carry out public health functions and services.

Achieving the EPHTN vision will also require focus, commitment, and planning to understand and increase end-user capacity for utilizing and integrating EPHT information. Dissemination and availability of data/information, in and of themselves, are insufficient to initiate and facilitate stakeholder actions to prevent and control environmentally related diseases. It cannot be expected or assumed that information (no matter how valid the science and data are) will automatically lead to effective policies and actions. Information generated by an EPHTN will often be dense and complex. Stakeholders will need the capacity and resources to make sense of and effectively apply that information.

Various stakeholders (ranging from communities that are overburdened by diseases and environmental risk factors to local public health agencies) have limited resources/infrastructure and experience accessing or using data. When better equipped to understand and use environmental health information; however, they will become stronger partners in the pursuit of the EPHTN vision.

While much of the focus of EPHT has centered on enhancing the capacity and infrastructure to conduct surveillance, there has been less emphasis on increasing the knowledge, skills, and abilities of end-users of an EPHTN. Without dedicated efforts and resources towards closing the gap between environmental public health information and environmental public health practice – by increasing the capacity of end-users who can take action and create change – achieving the EPHTN vision of healthy, informed communities will be impossible.

### **Recommendations**

- One of the explicit goals of EPHT should be to increase stakeholder capacity to translate EPHT information into action (i.e. effectively utilize environmental public health information for public health functions such as assessment, research, intervention, policy development, advocacy, planning, evaluation, etc.).
- The National EPHTN should fund an Academic Center and/or a National Partner to facilitate this goal by assessing and increasing a broad range of stakeholders' understanding and use of EPHT information.

- Stakeholder outreach, education, and training elements should be a requirement for EPHT grantees. EPHT Programs must acquire appropriate staff and dedicate resources for outreach, education, and capacity building activities such as grants for CBOs/NGOs, tribes and tribal agencies, and local environmental and health departments. EPHT program should also allocate specific funding/resources towards the goal of increasing community and stakeholder capacity.
- EPHT programs should have robust dissemination and evaluation components. Included in these components should be the ability to:
  - Identify appropriate methods for making information useful for diverse audiences.
  - Initiate collaborations with multiple organizations to support active dissemination of environmental health information.
- EPHT programs should assess and evaluate the types of expertise, knowledge, and resources needed by various target audiences (e.g. policy makers, state and local public health agencies, advocacy groups, community leaders and advocates, health care providers, policy makers, tribes and tribal agencies, non-governmental organizations, etc.). This would be facilitated by multi-stakeholder participation in statewide advisory groups. Needs assessments should also be conducted periodically to continue to identify, characterize, and prioritize the information needs of the public, researchers, and the government.
- EPHT programs should identify and collaborate with other partners and stakeholders who can utilize EPHT information for public health functions (especially functions that may be limited for governmental agencies, e.g. advocacy and policy).
- EPHT programs should identify key points of leverage for environmental health planning, policy, and interventions and determine the most effective data and information relevant to those issues.

## 4.b. Policy, Advocacy, and Dissemination

### **Background**

There is an increasing need to communicate timely, accessible, and useful health and environmental information to support advocacy, policy, and the public's right to know. Meeting this need will require that data be compiled, interpreted, and disseminated in forms that facilitate action to improve health. While EPHT programs have emphasized the development of information technology capacity and data linkage, less attention has been directed toward identifying the entities that can take the action that can lead to health protection, to assessing their needs and interests for information and knowledge, and to taking steps to meet these needs in ways that are responsive.

At the same time, advocacy and policy change can support EPHT by improving quality and access to data and by promoting other tracking-related initiatives. EPHT programs need to partner with other EPHT stakeholders and collaborators to determine strategies for improving EPHT through advocacy and policy arenas.

### **Recommendations**

#### **Activities to increase relevance of EPHT for policy and advocacy:**

- EPHT programs should ascertain information needs ahead of time and produce policy relevant findings including but not limited to facts about who is exposed and who is vulnerable, both of which are relevant to fairness.
- Entities that have authorities to take actions to address environmental health problems should be identified, and their information needs and interests assessed. These needs and issues should be specifically addressed in the design and implementation of an EPHTN.
- EPHT programs should identify and collaborate with other partners and stakeholders who can utilize EPHT information for advocacy and policy functions.
- EPHT programs should identify key points of leverage for environmental health planning, policy, and interventions and determine the most effective information that can affect those issues. Relevant data and training should be provided to appropriate stakeholders who can most effectively leverage information generated by an EPHTN.
- Protocols to investigate disease clusters should be developed by each EPHT program in partnership and with input from community groups, disease registries, and state and local health departments to meet community needs.

#### **Activities related to dissemination of EPHT information:**

- EPHT programs should identify appropriate methods for making information useful for diverse audiences.

- EPHT programs should collaborate with multiple organizations to support active dissemination of environmental health information.
- EPHT programs should be committed to disseminating information in a timely manner for use by communities, researchers, and the general public.
- Dissemination should only be limited to the extent necessary to protect the privacy and confidentiality of individuals.
- Information should be disseminated in a manner that makes it accessible, useful, and understandable to all audiences.
- EPHT grantees should continue to explore methods and evaluate efficacy for presenting, interpreting, and disseminating EPHT data to various target audiences.

**Activities to improve EPHT through policy and advocacy arenas:**

- EPHT programs and their partners should work with environmental agencies, legislators, and policy makers to establish mandates to better track chemical hazards, and to collect more complete and up-to-date information on currently mandated hazard tracking programs.
- EPHT programs should work more closely with local CBOs and national NGOs to develop strategies and implementation plans to secure funding sources and tracking-friendly state and national legislation.
- EPHT programs should provide surveillance system owners professional and timely evidence that demonstrate how data content and systems enhancements will simultaneously improve the usability of surveillance data and the capacity for EPHT.

## 4.c. Stakeholder Involvement, Participation, and Governance

### **Background**

Stakeholder involvement and participation is an ideal methodology for supporting tracking efforts because an inclusive approach is critical for identifying factors that influence collection and use of environmental health data, garnering support among data providers and users, creating effective working relationships, and generating successful projects.

A broad range of stakeholders is needed for the successful implementation of an EPHTN, including federal, state and local health and environmental agencies, tribal governments and agencies, environmental and environmental health groups, groups representing the interests of health effected individuals, community-based organizations, and other non-governmental organizations. These parties must all be represented in the governance structure.

In short, the success of EPHT will depend on the participation and support of a wide range of stakeholders. However, their support for EPHT will be determined by the usefulness of EPHT in carrying out their respective missions and their confidence in the abilities and intentions of the state and national EPHT programs. The usefulness of EPHT will be determined by how successful EPHT programs are in involving and engaging stakeholders and incorporating their input into the program's objectives. Stakeholders' level of confidence will also be determined by their familiarity with program activities and the responsiveness of the program to their input.

Meaningful involvement and participation among a broad base of stakeholders is critical for many reasons:

1. People who are more knowledgeable and connected to efforts can offer their expertise.
2. People who are involved want a stake in the outcome and will become advocates of the effort.
3. Upfront collaboration saves time and avoids wasted effort.
4. Mutual understanding and appreciation leads to effective working relationships and successful projects.
5. Meaningful involvement and participation facilitates better decisions and better implementation of plans.
6. Stakeholder participation guards against programs becoming too inwardly focused and aids decentralized decision making.
7. Stakeholders help to identify issues not addressed by the program staff.
8. Many stakeholder groups possess knowledge, expertise, influence, and connections that public programs, including EPHT programs, lack.
9. Some stakeholder groups take actions and affect policies in ways that no governmental entity can. They are powerful allies in utilizing EPHT information to serve policy and assist in the functions of public health.

10. Some stakeholder groups are the gateways to the public and play a vital role in disseminating information.

## **Recommendations**

- In order to fully integrate partners in a meaningful way into EPHT programs, a consortium or other entity should have a genuine role in the decision making process, along with the principal investigator or program manager and other relevant officials. This consortium should include representatives from federal, state and local health and environmental agencies, tribal governments and agencies, data system owners, environmental and environmental health groups, groups representing the interests of health affected individuals, community-based organizations, and other non-governmental organizations. The consortium should have an EPHT program co-chair and a non-governmental co-chair. The consortium should advise EPHT programs on tracking priorities, methods, and implementation. Additionally, the consortium’s role should go beyond an advisory function to include decision-making authority that is shared with the principal investigator.
- EPHT programs should collaborate on a case-by-case basis with data system owners. Cooperative agreements should be formulated to facilitate the mutual goal of improving data quality, timeliness, and completeness and of enhancing electronic-based data sharing mechanisms.
- EPHT programs should have a set of guiding principles (see APPENDIX B: Guiding Principles for a working draft of guiding principles for our program) which mandates that scientific data should be collected, developed, and disseminated in an ethical, impartial, and trustworthy manner.
- The Precautionary Principle should be one of the guiding principles of EPHT programs. An explicit function of EPHT should be to support precautionary measures when an “activity raises threats of harm to human health or the environment, even if some cause and effect relationships are not fully established scientifically. In this context the proponent of an activity, rather than the public, should bear the burden of proof.” See APPENDIX C: Wingspread Statement on the Precautionary Principle.
- EPHT programs should conduct their programs using the model of community participation and principles based on communities’ right to know regarding local exposures and hazards. Principles of community participation include community identification of concerns and partnerships with communities to plan and collaborate on projects with common goals, democratic decision-making, joint efforts, shared resources, collective outcomes, and mutual benefits.
- EPHT programs should be given a requirement, similar to those in RFPs issued by the National Institute of Environmental Health Sciences and the National Center on Minority Health and Health Disparities, to include community partners as co-applicants and that all partners have close interaction and shared responsibility.
- Both the health and environmental agencies should be required to be formal co-investigators on the implementation RFP for EPHT. Resources should be dedicated to both agencies.
- Rationales supporting decisions about program activities, directions, and priorities should be available in a manner that is transparent and intelligible at all levels – federal, state, and local.

**CALIFORNIA ENVIRONMENTAL HEALTH TRACKING PROGRAM**

The way that tracking projects are funded and managed should not pose a real or apparent conflict of interest for public health professionals.

## 4.d. Environmental Justice

### **Background**

California's environmental justice (EJ) advocacy groups have a long history of leadership and have played a prominent role in the EJ movement. EJ communities bring to bear knowledge, expertise, and experiences that are essential to environmental health programs, policies, and initiatives. Therefore, various state and local agencies in California working to address environmental health issues are starting to make representatives from EJ communities explicit stakeholders early in the projects they undertake. In doing so, these agencies are benefiting tremendously, not only in efforts related to environmental health and EJ, but also in other aspects of the work of their respective agencies.

Historically, the meaningful involvement of EJ communities in environmental health issues and decision-making processes has not been actively sought nor encouraged by governmental agencies in California. In recent years; however, various state and local agencies (health, environment, transportation, planning, etc.) have recognized the need for and value of an EJ voice. Many agencies now realize that issues and activities related to EJ are something that they cannot be insular about. Even agency staff with the best intentions cannot accurately represent EJ constituents' experiences and expertise.

In California, representatives of EJ communities have demonstrated great interest and have been very active participants in EPHT. Their involvement has been invaluable in various components of our program including: pilot projects, outreach and training activities, information dissemination, collaborations, and overall program planning and development.

There is clearly a connection between EJ and EPHT, and they are based on many shared principles. Furthermore, there are specific needs, issues, and perspectives related to EPHT that are unique to EJ. EPHT offers great potential to support the EJ movement and vice versa; however, achieving this potential will ultimately depend on the involvement, participation, and support of EJ communities in the design and implementation of an EPHT Network – at the national, state, and local levels. The success and utility of EPHT hinges on the involvement and support EJ communities.

EJ and EPHT, in and of themselves, are conceptually complex. Identifying common goals, exploring relationships, clarifying expectations and limitations, identifying opportunities, and addressing EJ issues within the scope of EPHT are all long and challenging processes. We have begun to collaborate with EJ communities, other non-governmental organizations, and public agencies to begin these endeavors.

### **EJ RELATED ACTIVITIES AND PROGRESS BY CEHTP**

We have begun to address EJ issues first and foremost by listening to and learning from representatives of EJ communities. Through close collaboration with representatives from EJ

communities, we have begun to integrate EJ into our work. Below are some examples of how we have applied EJ priorities and recommendations.

- Our first priority was to focus on approaches related to early and meaningful participation, achieving common understanding, and building trust and relationships without which other progress would have been unattainable.
- We have included EJ representatives in various program components and advisory groups, provided forums for participation and sharing of knowledge, and developed relationships. EJ constituents have had opportunities for direct participation in the development of program priorities, activities, and products.
- We are developing criteria, protocols, and mechanisms for program transparency and accountability, stakeholder participation, and responsible research. We are also working to build community and cultural competency and to create EJ awareness among program staff and other stakeholders.
- We are working to increase stakeholder capacity to better understand, access, and utilize environmental health information through targeted workshops for EJ leaders and advocates, dissemination of materials and tools, investment in communities through mini-grant programs; and contribution to the development of sustainability among EJ organizations.
- We are working to incorporate EJ priorities and recommendations into grant development/applications. In addition, we continue to seek funding to enable the application and integration of EJ priorities and recommendations (e.g. community-based participatory research grants) in public health activities.
- We are working to ensure that the development and dissemination of data meet the needs of EJ communities. Through the Pilot Projects, we are developing methods/approaches and producing information that facilitates decision making and action. Examples include: information about health disparities, maps showing indicators of disease at a community-level resolution, maps showing economic costs of disease, and an interactive web-interface for data/information access.
- We are working to improve the collaboration, coordination, and communication with inter and intra-governmental agencies, including Cal/EPA, on environmental justice and environmental health issues. These include efforts to improve integration and collaboration of EPHT activities with the Cal/EPA EJ pilot projects.

## **EJ FRAMEWORK**

The following draft framework – a broad set of core values that could serve as a foundation for EPHT – has been proposed by our Planning Consortium.

- Acknowledge the right of all individuals to be protected from environmental and ecological degradation, and environmental and ecological harm.
- Adopt a public health model based on the Precautionary Principle.
- Facilitate community right-to-know provisions.
- Allow disparate impact and statistical weight (i.e. an “effect” test as opposed to “intent”) to infer discrimination and injustices.

## **Recommendations**

One of the explicit goals of EPHT programs should be to institutionalize EJ into EPHT. EPHT programs at the local, state, and national levels must develop and implement a strategy (including framework, mission, policies, outcomes, and activities) toward this goal.

Below are major categories, along with select examples of EJ priorities and recommendations identified for EPHT programs at all levels (local, state, and national) and for various types of agencies (environmental, health, academic, etc.). They are based on feedback and recommendations shared by a wide range of stakeholders at various venues and processes including Planning Consortium discussions, Pilot Project meetings, stakeholder needs assessment activities, and a workshop for EJ leaders and advocates.

### **MEANINGFUL INVOLVEMENT**

- EPHT programs should ensure that EJ, grassroots, and community representatives are explicit, early, and primary collaborators having a direct voice in EPHT at all levels (local, state, and national). This process of early and meaningful involvement is consistent with EJ principles, public health principles, the California SB702 Expert Working Group recommendations, EPA policies, and the Pew Environmental Health Commission’s report, which noted, “It is paramount that the Network [EPHT] be grounded in community groups so that local concerns are adequately addressed in the design of the system, that tracking data is readily accessible and that this information is useful for local level activities.”
- Build processes and mechanisms for meaningful community involvement and participation in the planning and implementation of an EPHTN.
- Ensure that EJ stakeholder involvement is an explicit, mandatory component of state, local, and academic grant applications for the National EPHT Branch.
- Fund an organization with primarily EJ constituents to be a National EPHT Partner – similar to other constituency groups (e.g. NACCHO for local health officials, CSTE for state epidemiologists, PSR for physicians, etc.).
- Encourage two-way communication in which EPHT programs learn about EJ and EJ representatives learn about EPHT to work toward common understanding and goals.

### **MEANINGFUL DATA/INFORMATION**

- Data collection must enable the identification of environmental injustices.
- Data/information must be accessible and relevant (understandable, timely, localized) to individual communities.
- An EPHTN must adopt broad, multilevel approaches toward assessing environmental health status and better integrate and relate to broader determinants of health. For example: a community might need information on how construction in urban infill development, greenfield rural housing expansion, and the economic growth of goods movement affect neighborhood air quality.

- An EPHTN must consider how to examine multiple exposures, long-term exposures, cumulative impacts, and synergistic effects as well as to relate EPHT data to social, economic, and community vulnerability indicators.
- EPHT data/information and approaches should support the Precautionary Principle (prevention/elimination of the threat before harm occurs).
- Communities must be involved in the planning of data collection processes. Data collected in communities should be returned to the community in accessible and understandable formats while maintaining privacy and confidentiality.
- EPHT must ensure that data do no harm (that is, they should not have the potential to “blame the victim”, discriminate against vulnerable populations or impacted communities, invalidate community knowledge and expertise, or hinder precautionary actions).
- Data should be a tool and a means for programs rather than a goal.
- EPHT programs should build community capacity (to collect, access, analyze, interpret, and utilize data for action).

#### ACCOUNTABILITY

- EPHT programs should build community and EJ competency among governmental stakeholders.
- EPHT programs should increase communication, collaboration, and coordination among public agencies in both the health and environmental sectors. Increase communication, collaboration, and coordination between public agencies and EJ workgroups/committees.
- EPHT programs should develop an EJ framework to guide EPHT standards for responsiveness, transparency, competency, and collaboration.
- EPHT programs should partner with EJ representatives to explore, characterize, and communicate relationships between EJ and EPHT and to delineate the scope of EJ issues that EPHT can affect.

## 4.e. Network Infrastructure

### Background

Emerging technologies present opportunities for improving disease surveillance, exposure assessment, and pollution and disease prevention. Our information technology and analytical teams have worked to apply emerging technologies to compile, enhance and transform data to produce scientifically valid and personally relevant information on environmental exposures and disease trends. This work has included:

- Collaborating with environmental protection and other public agencies to track geographically-related hazards.
- Collaborating with public and private sector health organizations to document geographically-resolved disease trends.
- Creating an infrastructure where environmental exposure information can be linked to disease information to support population health research.

Our planning efforts identified quite early that, relative to data system owners who collect and maintain primary environmental and health surveillance data, our program has no jurisdiction in the centralization and the subsequent dissemination of that same environmental and health information. At the same time, timely and efficient access to high quality environmental health data that are appropriate for answering environmental health questions is persistently elusive given the capacity and resources of EPHT stakeholders. Our program was responsible for establishing collaborative relationships with primary reporting agencies, identifying resources, capacity, and areas where their data collection efforts and systems can be improved, and assisting the data system owners in achieving the concurrent goal of gaining stakeholders' access to environmental health information and honoring the mandates of all agencies involved in that process.

Spatial linkage architecture (as outlined in Section 5.g - Recipient Activity g: Increasing Capacity to Implement EPHT on p99 and detailed in the 120 day report) allows tracking data providers, including disease registries and other surveillance systems, to share data while maintaining maximum control over their data resources. As important, enterprise spatial linkage is very attractive to stakeholders, including those with limited technical expertise, as linked environmental health data could be provided in the most timely and accurate manner, without compromising individual record confidentiality. Further, enterprise services such as centralized geocoding can assist data providers to enhance their systems not only for the benefit of their own internal use, but for the benefit of tracking stakeholders who require high quality spatially-enabled surveillance data.

## **Recommendations**

- A major function of EPHT Programs should be to encourage/support data system owners to be compliant with the national data sharing initiatives (i.e. NEIEN and PHIN). EPHT programs should encourage, assist, collaborate, and identify funding mechanisms for environmental and health surveillance system owners to implement the specifications prescribed by the National Environmental Information Exchange Network (NEIEN) and the Public Health Information Network (PHIN).
- An EPHTN should utilize an enterprise spatial linkage architecture approach for the network. This approach addresses several major hurdles in successfully implementing the network, including the reluctance of data providers to supply data and the need of stakeholders to be able to request and receive integrated/linked environmental health data in real time.
- A standard model for data content and object-oriented interfaces that encompass the domain of linked environmental and health events in space and time should be cooperatively developed and adopted by the SND.
- EPHT programs should be required to develop data sharing agreements and temporal/spatial linkage methodologies with their health and environmental agency counterparts.

## 4.f. Research and Epidemiology

### Background

Epidemiologic methods continue to be developed, enhancing our understanding of the association between environmental exposures and disease. Our analytic staff, with backgrounds in medicine, toxicology, and epidemiology, has applied such methods to appraise, interpret and synthesize evidence related to exposure and disease.

As we move toward implementation of an EPHTN, it is important to re-examine and carefully consider our goals and approaches in light of our experiences over the last three years. We need to critically assess how we are defining environmental health and its determinants, what models we are using to understand the relationships that we are trying to understand and act upon and how to ensure that our efforts are as well focused as they possibly can be.

We know that the causes of human disease are multifactorial, resulting from a mixture of factors including those of the physical environment. These interact with other factors in important ways that affect the health of populations, and EPHT provides us with an opportunity to examine these interactions more systematically. To date, the definition and scope of environmental hazards and environmental exposures for EPHT has been limited to chemical and physical pollutants/toxins.

The definition of environmental health cited by the Pew Commission<sup>1</sup> reflects a broader view: *"Environmental health comprises those aspects of human health, including quality of life, that are determined by interaction with physical, biological, and social factors in the environment. It also refers to the theory and practice of assessing, correcting and preventing those factors in the environment that may adversely affect the health of present and future generations."*

The scope and definition of environment and environmental health vary between communities, organizations, and cultures. For the vast majority of stakeholders, the environment is the combination of social, cultural, and external physical conditions affecting the experiences of an individual or community (and therefore, their health). With the exception of groups that focus primarily on specific diseases or chemical/physical agents, most stakeholders (including tribes, local public health agencies, and community-based organizations) take this broader approach to understanding and addressing environmental health issues.

While stakeholders have acknowledged the importance of tracking the limited set of factors identified as relevant to EPHT, they have also expressed concerns about the limitations of focusing solely on downstream indicators. Communities as well as the academic and governmental sectors have clearly demonstrated the efficacy of broader approaches. Examining such approaches within EPHT would be an important step in this direction. Some examples of models that may be appropriate to examine include:

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<sup>1</sup> Adapted by the Pew Environmental Health Commission, May 1999.

- The Multiple Exposures Multiple Effects (MEME) model (<http://www.who.int/ceh/indicators/indicconcept/en/>),
- The Driving-Forces-Pressures-State-Exposure-Effect-Action (DPSEEA) framework ([http://www.euro.who.int/EHindicators/Indicators/20030527\\_2](http://www.euro.who.int/EHindicators/Indicators/20030527_2)),
- The Exposure-Disease-Stress Framework for Environmental Health Disparities (<http://ehp.niehs.nih.gov/members/2004/7074/7074.html#thes>), and
- The PRECEDE-PROCEED model (<http://www.nci.nih.gov/aboutnci/oc/theory-at-a-glance/page7>).

While many stakeholders are aware that the EPHT mandate/scope may be limited to tracking diseases and pollutants/toxins, they are relying on EPHT to assess how it can integrate with and relate to other relevant data, information, and indicators, and to also examine and increase its role in the larger context of public health.

## **Recommendations**

- Implementation funding should be provided to collaborate with communities and environmental agencies to collect, synthesize, and integrate environmental hazard and environmentally-related disease information, including development of real-time surveillance systems, development or enhancement of disease registries, and spatial/temporal integration of environmental and health data.
- EPHT Programs should work with environmental agencies to collect information on small but important toxic emitters, such as dry cleaners and gas stations.
- Funds for implementing primary data collection, including biomonitoring, should be allowed in the implementation cycle. Biomonitoring components should be required to have community involvement in the planning, data collection, and dissemination processes, and results and interpretation should be required to be reported to all participants.
- Interdisciplinary staff is required for successful EPHT programs. This includes expertise in epidemiology, toxicology, medicine, community health, environmental science, health education, emerging information technologies and geographic information systems, and health policy.
- EPHT Programs should develop analytical tools to predict cumulative exposure to geographically-related hazards, as well as develop and evaluate methods for examining multiple exposures, long-term exposures, cumulative impacts, synergistic effects, and vulnerable populations.
- EPHT Programs should identify hypotheses about relationships between environmental exposures and disease trends.
- EPHT Programs should develop techniques for making health outcome tracking information available in a manner that supports the program evaluation and the public's right to know while protecting confidentially.
- One of the goals of EPHT should be to identify and ultimately adopt broad, multilevel approaches for assessing environmental health status that are consistent with a broader effort

to define and address population determinants of health, as has been recommended by the Institute of Medicine<sup>2</sup>.

- EPHT Programs should examine how relevant data, information and indicators, such as data from other sectors, neighborhood indicators, economic data, land-use data, etc. can inform and integrate with EPHT and vice versa. Some of the concepts from Health Impact Assessment may be useful.
- EPHT Programs should consider methods to relate environmental health tracking to social, economic, and other community vulnerability indicators. Examine driving forces and pressures related to environmental hazards and exposures as well as the social contexts in which they operate.

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<sup>2</sup> THE FUTURE OF THE PUBLIC'S HEALTH in the 21st Century, Committee on Assuring the Health of the Public in the 21st Century, Board on Health Promotion and Disease Prevention, INSTITUTE OF MEDICINE OF THE NATIONAL ACADEMIES