II. Description of the Environmental Public Health Indicators Project

Project Goal: Identify indicators of environmental hazards and health effects that a state health department can use to develop a comprehensive environmental public health program.

Objectives

- Incorporate noninfectious diseases into a national public health surveillance system.
- Identify program and policy needs.
- Bridge the gap between environmental protection and public health data and programs.

Proposed Uses

1) Enable surveillance of status and trends to

- prevent known or suspected adverse public health events associated with environmental exposures,
- detect new adverse health events associated with environmental exposures, and
- provide efficient and consistent reporting mechanism(s).

2) Track program goals and objectives

- aid in program and policy development, planning, and evaluation and support existing programs;
- guide research initiatives; and
- develop new program initiatives.

3) Build core environmental public health capacity with other agencies to provide services, programs, and research that help to sustain health.

Conceptual Framework

The organization of an indicator system is helpful for identifying types of indicators and the relation between types. Our indicators are organized into a Hazard -Exposure-Health Effect-Intervention structure, based on concepts from Thacker et al, which describes hazard, exposure, and outcome surveillance for environmental public health. [Thacker SB, Stroup DF, Parrish RG, Anderson HA. Surveillance in Environmental Public Health: Issues, Systems, and Sources. Am J Public Health 1996;86(5):633-8.] We adapted structural components and concepts from the Organisation for Economic Co-operation and Development=s Pressure-State-Response model for indicators of sustainable development and from the World Health Organization=s model, which identifies driving forces, pressures, states, exposures, effects, and actions for indicators of environmental protection and public health.

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Definitions

Environmental public health: Environmental public health focuses on the interrelations between people and their environment, promotes human health and well-being, and fosters a safe and healthful environment.

An **indicator** identifies and communicates a system's status. An **environmental public health indicator (EPHI)** provides information about a population's health status with respect to environmental factors. It can be used to assess health or a factor associated with health (i.e., risk factor, intervention) in a specified population through direct or indirect measures.

Topic of indicator: An indicator topic is a broad category under which indicators are organized. EPHI topics are based on Healthy People 2010 but the organizational structures of public health and environmental health programs were considered. As a result, topics may include pathways or sources (e.g., air, water), agents (e.g., lead, pesticides), or events (e.g., disasters, sentinel events) and may also overlap because of the complexity of environmental and public health laws and programs. An indicator, however, is generally included under only one topic, although it may be relevant to several.

Type of indicator: The type of an indicator describes how the indicator "fits" within the EPHI framework. An indicator will be categorized as a hazard, exposure, health effect, or intervention.

> **Hazard indicators:** Conditions or activities that identify the potential for exposure to a contaminant or hazardous condition.
>
> **Exposure indicators:** Biologic markers in tissue or fluid that identify the presence of a substance or combination of substances that could harm an individual.
>
> **Health effect indicators:** Diseases or conditions that identify an adverse effect from exposure to a known or suspected environmental hazard.
>
> **Intervention indicator:** Programs or official policies that minimize or prevent an environmental hazard, exposure, or health effect.

Tiers of indicators and their measures: The tier suggests the importance of the indicator and its measure with respect to policy or program considerations. Tiers include core, optional, and developmental measures. The initial assignment of an indicator may be subject to change as technologies or knowledge about the indicator change.

> **Core**: A core indicator or measure should be included in a state health department's basic environmental public health surveillance program. Measurements for these indicators may be available or could be made readily available. An indicator in the core tier must have at least one core measure and can have optional and developmental measures as well. Core indicators, endorsed in 2001 by the Council of State and Territorial Epidemiologists, have been identified for state health department use.

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Optional: An optional indicator or measure may be part of a basic environmental public health program for some states, depending on individual needs, priorities, and data availability. An indicator in the optional tier must have at least one optional measure but can also have developmental measures. When a core measure is identified, the indicator will change from optional to core.

Developmental: A developmental indicator or measure is one that may have environmental public health relevance, but the measurements either have not yet been established or pose significant interpretation challenges. An indicator in the developmental tier can have only developmental measures. If optional or core measures are identified, the indicator will be reclassified.

Attributes of an Ideal Indicator

- Measurable
- Trackable over time
- Based on demonstrated links between environment and health
- Useful and understood by diverse populations
- Informative to the public and to responsible agencies
- Tied to public health objectives
- Action-oriented
- Incorporated in clear-case definitions

Criteria for Nominating, Selecting, and Ranking Indicators

1) Classify the link between the proposed indicator and the public health issue, with preference given to direct measures.

2) Determine the public health effect of using the proposed indicator.

3) Evaluate the feasibility of the proposed indicator by using the following criteria:

- measurability,
- ability to be monitored over time,
- accessibility at different levels (e.g. state, county, municipality),
- accuracy (reliability, validity),
- sensitivity to changes in underlying factors, and
- timeliness

4) Assess the ability to incorporate the proposed indicator into public health interventions and environmental regulations.

5) Assign a tier on the basis of scientific validity, public health relevance, public concern, feasibility, public health capacity (resource needs), and the degree to which public health action can reduce exposures.

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Workgroups and Tasks

1) CDC/NCEH Workgroup

- Developed a conceptual framework and definitions.
- Determined the attributes of an ideal indicator.
- Established criteria to nominate, select, and rank indicators.
- Collaborated with the CSTE to create a steering committee.
- Staffed the steering committee and external workgroups.

2) CDC/CSTE Steering Committee

- Nominated environmental public health indicators.
- Offered an EPHI workshop for state public health epidemiologists.
- Recruited members for workgroups.

3) CDC/CSTE Workgroups

- Agreed upon a list of environmental public health topics and indicators.
- Identified measures and potential data sources for indicators.
- Determined tiers of the indicators and their measures.