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Executive Summary

The Chesapeake Bay has a profound effect on all who reside in the 64,000 square miles of the watershed. More than just an ecological treasure, the Bay has also shaped historical development patterns for homes, industry, agriculture, and transportation. It is a driver of the regional economy, a food source, and receiver of waste waters. From the time when the first settlers arrived on the shores of the Chesapeake Bay in 1603, increased population growth and development within the region have led to continual degradation of the once pristine waterway. Human beings have played a critical role in altering the basic physical, chemical, and biological systems within the Chesapeake Bay and its watershed, and these shifts may ultimately be putting human health at risk.

The Chesapeake Bay Health Indicators Project is part of the ongoing efforts of the Center for a Livable Future (CLF) of the Johns Hopkins Bloomberg School of Public Health and the Chesapeake Bay Foundation to preserve and improve both the human health and the ecological health of populations living in and around the Chesapeake Bay watershed through improved recognition of the linkage between the quality of the environment and the protection of public health.

In the last decade despite significant advancements in the assessing and monitoring of environmental quality, less progress has been made in assessing the relationship between the state of the ecological environment and its impact on human health. The first ecological assessment of the Chesapeake Bay's "health" was completed with the signing of the Chesapeake Bay Agreement in 1983. Since the Chesapeake Bay Agreement was signed, monitoring of these ecological indicators of the Chesapeake Bay has continued, paving the way for better policy decisions and actions taken for the protection of the Bay's fragile ecosystem. However, a parallel set of indicators aimed at tracking risks to the human population within the ecosystem is lacking.

The *State of the Bay Report*, an annual report card measuring environmental quality of the Bay prepared by the Chesapeake Bay Foundation, was the impetus for developing a similar report card for population health. There is a need to develop an equivalent public health tool for tracking the human health impacts of environmental degradation throughout the watershed.

The goals of this project were to examine the relationship between adverse conditions in the ecological environment and health of the human population and to develop a pilot set of regional public health indicators. This paper presents an overview of health and ecological stressors in the Chesapeake Bay region and three case examples of environmental public health indicators that represent major challenges both to the ecology of the watershed and to human health.

Key Findings: An examination of pilot indicators underscores the link between the ecology of the Chesapeake Bay Watershed and the health of its inhabitants. The watershed has been impacted by pollutants that present both acute and chronic health risks.

Pilot indicators examined include measures of:

- **Drinking water protection**—Total trihalomethanes (TTHMs) in public drinking water supplies;
- **Microbial risks in surface waters**—Fecal coliform contamination at bathing beaches and in recreational and urban waterways; and
- **Persistent toxic pollutants**—Mercury and PCB contaminant levels in fish tissue.

These public health indicators can provide a foundation for tracking threats and strengthening efforts to protect and preserve the Bay. While there is still much to learn about the links between human health and the environment, the health of the Bay is vital to the health of the people. It must be emphasized that no immediate threats to public health were revealed through the case examples. At the same time, these indicators underscore the need for continued diligence in protecting and preserving the watershed and recognizing the linkages between human health and the environment. This has been a pilot investigation and these indicators offer only a small sample of potential public health indicators for the region. In the future, measures such as these may be part of a national tracking network of indicators to measure environmental progress, identify emerging hazards, shape research, and strengthen the scientific basis for environmental and health policies.

Case examples of potential environmental public health indicators in the Chesapeake Bay region demonstrate that tracking public health threats over time may be feasible and practical. Within the state of Maryland, there are a number of well-conducted ongoing monitoring efforts that can serve as the foundation for the development of environmental public health indicators. Gaps in these programs highlight several areas for future expansion. Better integration and use of these resources will improve the environmental and public health applications of indicators, and provide new insights into the link between the ecological environment and human health.

The time is right to begin developing Environmental Public Health Indicators (EPHI) for the Chesapeake Bay region. A national momentum for Environmental public health tracking is building and it may become the cornerstone of future environmental health practices. This pilot investigation serves as the first step in developing a public health report card for the Chesapeake Bay. It is hoped that lessons learned from this project will serve as the basis for future expanded efforts on the state and national level. Based on these findings, the following recommendations are presented as next steps to build upon this pilot investigation:

1) Assess information needs to assure effective coverage of the watershed and to meet the data needs of state and county health agencies and environmental officials.

Environmental and health officials should identify additional health and environmental

data that is needed to address and prevent emerging public health risks related to environmental quality.

2) Expand the list of indicators to include a broader range of contaminants, additional exposure pathways, and improved measures of population exposure levels.

Indicators could be expanded to include other drinking water contaminants, private well sampling, additional indicators for pathogens, and more direct measurement of actual population exposure levels.

3) Enhance reporting of public health outcomes, such as waterborne and food-borne outbreaks to assure early problem recognition and to safeguard public health.

Improved outbreak surveillance could be developed in order to enhance prevention programs and complement current national efforts to improve identification of emerging population health threats.

4) Coordinate efforts with the EPA Environmental Indicators Initiative and the CDC National Environmental Public Health Tracking Networkⁱ.

These developing national programs may provide opportunities for comparisons with national baseline data, uniform national reporting strategies, and enhanced resources for the development of a national network of environmental public health indicators.

5) Develop a formal strategy for systematic regular reporting of the pilot public health indicators through a public health report card for the Bay region.

This should complement ecological reporting efforts and include mapping and enhanced communication efforts to increase public awareness and provide appropriate public health perspectives regarding potential risks.

The Chesapeake Bay is the region's defining natural resource. Improved tracking of sources of pollution, exposures, and health effects is an essential component of an integrated approach to protecting the Bay and protecting the public's health.

ⁱ Additional information available from the National Centers for Disease Control National Center for Environmental Health at: <http://www.cdc.gov/nceh/tracking/>