



**Summary of the U.S. National
Research Council (NRC) Report:**

Human Biomonitoring for Environmental Chemicals

**This summary of the 215-page NRC Report prepared by BiomonitoringInfo.org,
an Internet resource on the nature and promise of biomonitoring.**

Summary prepared January 2008

Full NRC report available at <http://www.nap.edu/catalog/11700.html>

WHAT THE COMMITTEE ON BIOMONITORING WAS ASKED TO DO

In light of public interest about biomonitoring results and the public health significance of these results, the Congress requested that the National Research Council of the National Academies of Science undertake a study of the current situation and recommend what steps are needed to address public concerns and shed light on the current controversies. The National Research Council's Committee on Human Biomonitoring for Environmental Toxicants, consisting of experts in this area, was chosen to undertake the study. The study was funded by the Environmental Protection Agency (EPA) and the Centers for Disease Control and Prevention (CDC).

The Committee was asked to **(1)** review current biomonitoring practices and recommend ways to improve the interpretation and uses of human biomonitoring information, **(2)** suggest new research to help understand the uncertainties of biomonitoring, **(3)** recommend improvements in the ways biomonitoring is used to evaluate and explain health risks, and **(4)** recommend improvements in the tracking of changes in biomonitoring data that could affect public health.

Biomonitoring Defined

Biomonitoring is defined in the NRC report as "one method for assessing human exposure to chemicals by measuring the chemicals or their metabolites in human tissues or specimens, such as blood and urine."

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THE COMMITTEE'S EVALUATION OF THE CURRENT SITUATION

Identifying, controlling, and preventing human exposures to potentially harmful environmental chemicals are cornerstones of U.S. environmental health efforts, and biomonitoring is crucial for the success of these efforts.

Large scale population studies, such as those conducted by the Centers for Disease Control and Prevention (CDC), illustrate how such biomonitoring data can be useful. They have allowed scientists to:

- Identify chemicals found in the environment and in human tissues,
- Monitor changes in human exposure to those chemicals,
- Investigate the distribution of exposure among the general population.

However, the Committee's view is that: "In spite of its potential, tremendous challenges surround the use of biomonitoring, and our ability to generate biomonitoring data has exceeded our ability to interpret what the data mean to public health" (p. ix of the report).

For some chemicals (such as mercury and lead), the health risks and effects are well known; but for most of the chemicals currently measured, scientists, policy-makers and the public are just beginning to understand what the data mean.

In addition to the challenges in interpreting the data, the Committee pointed out that communicating results may be the most difficult challenge for biomonitoring. Communication is essential for the proper use of biomonitoring data, but there is no accepted standard for good biomonitoring communications.

RESEARCH AGENDA PROPOSED BY THE COMMITTEE

In light of the challenges in gathering, interpreting and communicating biomonitoring information, the Committee identified the types of research that are needed to address the critical knowledge gaps regarding possible public health risks from substances measured in biomonitoring studies. Their research recommendations focus not on specific chemicals but rather on methods that can be applied to the broader biomonitoring challenge.

Research Recommendations

Recommendation 1: Develop a coordinated strategy for population biomonitoring based on the potential for population exposure and public-health concerns.

Recommendation 2: Develop biomonitoring-based hazard and exposure assessments and public-health surveillance to interpret the risks posed by low-level exposure to environmental chemicals. Where possible, enhance existing exposure-assessment, human health, and laboratory animal studies with biomonitoring to improve the interpretation of these studies.

Recommendation 3: Develop individual, community, and population-based strategies for reporting results of biomonitoring studies.

Recommendation 4: Review the bioethical issues confronting the future of biomonitoring, including confidentiality, informed consent, reporting of results, and public-health or clinical follow-up.

Infrastructure Needs to Implement the Research Agenda

The Committee recognized that carrying out these recommendations would be difficult because the current scientific infrastructure for biomonitoring research is severely limited.

To remedy this situation, the Committee recommends that the nation should:

- Enhance laboratory capabilities
- Expand the scope and utility of CDC's biomonitoring data
- Maximize the use of collected human samples
- Foster international biomonitoring collaboration.



THE COMMITTEE'S CONCLUSIONS

Advances in biomonitoring provide a potentially powerful new lens for examining public exposures to chemicals. However, the full promise of this tool for improving the nation's public health is far from being realized. The unprecedented ability to measure minute concentrations has brought both new insights and challenges. Biomonitoring studies provide potentially valuable data for researchers, public-health officials, and the public for identifying human exposures, understanding trends, fostering public-health interventions, and validating environmental-health policies. However, there are many methodological, ethical, and communications challenges to biomonitoring.

SIGNIFICANCE OF THE REPORT

The Committee's report clearly lays out the current biomonitoring situation and identifies the strengths and limitations of the current data that are being collected. It also identifies the challenges that must be faced in interpreting and communicating the data as well as addressing significant ethical issues. Most importantly, the report provides a roadmap for meeting those challenges. This roadmap includes a number of research recommendations that will aid in the conduct and use of biomonitoring studies. The report also presents a systematic approach to interpreting the public-health implications of biomonitoring results and communicating the findings to the public. Carrying out the recommendations of the Committee will be very helpful in making decisions as to the significance of biomonitoring results and actions that may be taken to reduce any human risks identified with the help of such data.



For more information on biomonitoring please visit the www.BiomonitoringInfo.org website.