

Report 13: Global Environmental Change and Human Health

Convener: Howard Frumkin

Brief History: This group considered macro-scale global environmental changes, including climate change, ecosystem changes, biodiversity loss, depletion of resources such as water, land, and fossil fuels, all with respect to human health. Most of the focus was on climate change.

Recommendations:

Paradigm shift

- NIEHS should orient its portfolio toward the biggest environmental contributors to the burden of disease both domestically and globally. By this measure global environmental change, including global climate change, needs to be a top priority for the Institute. The soon-to-be-released Global Burden of Disease study should help inform this targeting.
- NIEHS should balance the traditional focus on reductionist, mechanistic biomedical research with a complementary focus on synthetic, systems-based science, incorporating ecosystem ecology, earth sciences, veterinary medicine, and other fields. The One Health paradigm should be useful here.

Institutional actions

- NIEHS should take leadership within the Federal government in research on human health aspects of global environmental change. There is a pressing need for this research, and no other agency is positioned to lead it.
- NIEHS should partner with other agencies to plan, fund, and support needed research. This will help leverage both funds and scientific expertise.
- NIEHS should build a dedicated program within the Institute that would drive research on global environmental change and human health, rather than simply assign bits of this work to various existing activities.
- NIEHS should identify and utilize the expertise of existing scientific staff, but should also make a substantial investment in adding expertise in fields now under-represented, such as ecology, hydrology, modeling, and others.
- NIEHS should create a network of academic Centers of Excellence on Global Environmental Change and Human Health, akin to the Children's Environmental Health Research Centers. These Centers should be highly interdisciplinary, and funding should be long-term to assure sustainability. The Centers should focus on both research and training. NIEHS should collaborate with other agencies to co-fund these Centers.

- Similarly, NIEHS should collaborate with other agencies, such as EPA, NOAA, and the Department of the Interior, to support health components of research supported by those agencies. Efforts such as the regional networks carrying out the national climate assessment should include a health component, which NIEHS should support.
- There is a pressing need for capacity-building both within NIEHS and extramurally, both domestically and internationally. The Centers of Excellence mentioned above should place strong emphasis on training multidisciplinary scientists, and should engage in international collaboration to that end. NIEHS should utilize other existing and innovative training mechanisms to support capacity-building in global environmental change and human health.

Research priorities

- NIEHS should prioritize its research investments in global environmental change and health, since not every important topic can be covered. Focus will help assure impact. There have been several recent efforts to identify research agendas, some supported by NIEHS; these can be a starting point for priority setting.
- Key research priorities include identifying and quantifying the impacts of global environmental change on health, developing methods such as modeling and forecasting, and identifying healthy approaches to both mitigation and adaptation. Translational science in this context means a focus on practical applications of science to adaptation and mitigation measures; these deserve substantial support.
- An important part of the scientific agenda in global environmental change and human health is the development of indicators, to provide useful information about environmental factors, associated human health impacts, and trends over time. NIEHS should support the development, testing, and use of such indicators.
- As sustainability assumes a larger place on the national agenda, NIEHS should support research that will yield decision support for the healthiest approaches to sustainability.

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