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Global Health Matters Newsletter

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Trans-NIH group assesses response to climate change

By David Taylor

Climate change and its relationship to health research was the topic of a recent NIH meeting that brought together scientists from other federal agencies to share information and better coordinate efforts.

Climate change is a growing concern, given the eight-inch rise in sea level over the past 130 years, said Dr. David Easterling of the National Oceanic and Atmospheric Administration. “The combined land-ocean warming is very real,” he said, adding that a compilation of more than 1.6 billion daily observations has helped researchers refine climate models with significantly greater spatial resolution than a decade ago.

Others at the meeting, convened by Fogarty with the National Institute of Environmental Health Science and nine other institutes and centers, noted how climate change already affects human health. Dr. John Balbus, NIEHS senior advisor for public health, surveyed the pathways for that impact, citing that WHO attributed 160,000 deaths to climate change in the year 2000 alone, including deaths from malaria, malnutrition, diarrhea, flooding and heat waves.

To better understand these mechanisms, Balbus suggested NIH examine direct impacts on health; impacts on physical, chemical and biologic agents; and impacts on fundamental life support systems such as food and water.

Knowledge of mosquito populations and climate factors can help scientists predict disease outbreaks, such as in the case of Rift Valley Fever, according to Dr. Ken Linthicum of the U.S. Department of Agriculture. Climate and weather patterns were among several factors in the disease outbreaks, he said, but lives were saved by early warnings based on predictions made months ahead.

NIH Portfolio Analysis on Climate Change and Health

Total studies that in some way relate to climate change	1,357
> Directly relate to climate change	7
> Examine the climate variables on health	85
> Climate is likely an important factor but not explicitly addressed	706

- **Health impacts:** infectious diseases, respiratory diseases and asthma, heat stress, exposure to environmental toxins, trauma/injury and cancers
- **Exposure pathways:** extreme weather; UV radiation; pollution; water-borne, vector-borne and zoonotic diseases
- **Study types:** laboratory experiments, population studies, field ecology and mathematical modeling

21 NIH Institutes and Centers represented in these activities that were funded in 2008

Participants also spoke of the link between environmental stresses and mental health, as in the cases of floods, droughts and other disasters. Dr. Fran Norris of Dartmouth Medical School observed, “Mental health provides a window into community resilience” and can have pervasive effects on physical health and quality of life.

Effects on vulnerable populations, particularly in developing countries, surfaced as a major concern. In looking at the effects of heat waves and their health impact, Dr. Helene Margolis of UC-Davis said that the burden of

heat-related mortality and morbidity is huge and largely preventable.

In a comparison of historical patterns of mortality, Dr. Michael Greenstone, an economist at MIT, found a dramatically higher impact in India for each additional day over 90 degrees compared to the U.S. Further research could assess the effectiveness of adaptation and intervention strategies.

These and other research gaps were discussed following presentation of the current NIH portfolio on climate change research (see chart above) prepared by the Trans-NIH Working Group on Climate Change.

What emerged was awareness that research must address the wide variability of impacts in geographic terms and the chasm between global-scale studies and micro studies. Relationships between temperature and enteric diseases could be explored, for example: as temperatures rise, food-borne disease increases. There is a great need to translate the growing knowledge base about these interactions of climate variability and change and human health into policies, the group agreed. But much more research is needed to be able to do this with confidence.

Innovations in biostatistics for handling huge data sets are revolutionizing the capacity to handle global-scale data and downscale it to a level useful for medical science and public health, several speakers noted.

The NIH team pledged to continue to refine its analysis of the agency's climate change portfolio and to pursue issuing a notice in the *NIH Guide* to encourage researchers to submit climate-related research proposals under existing funding opportunities and to consider creating new ones.

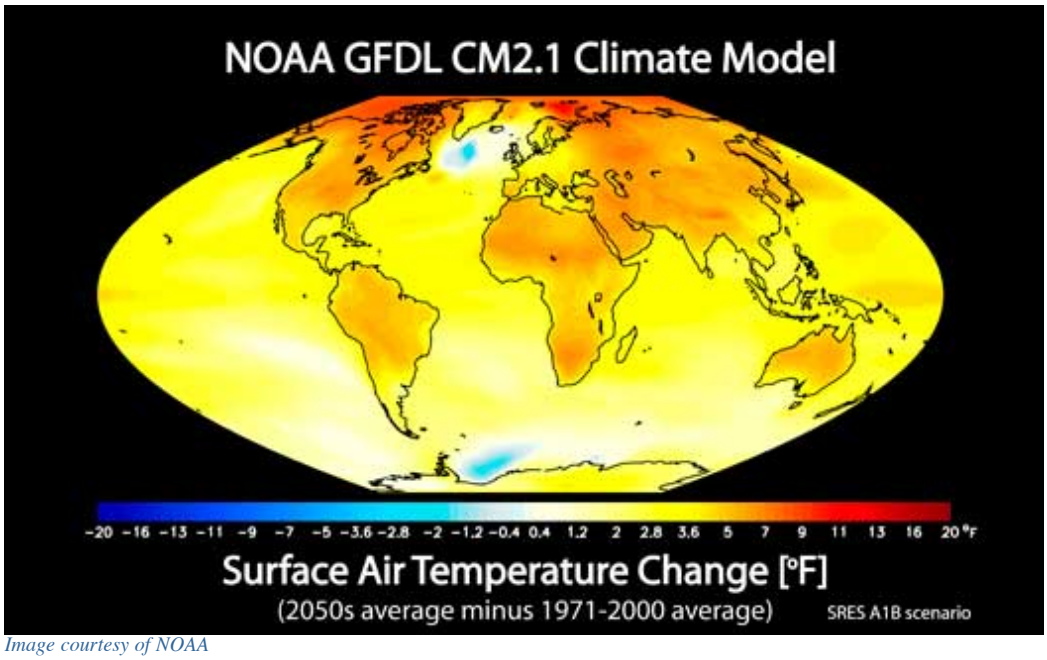

Image courtesy of NOAA

Based on conservative estimates of future emissions, NOAA's Geophysical Fluid Dynamics Laboratory model shows projected global warming, comparing surface air temperatures in 1971-2000 to what they might be in the mid-21st century.

Description: Map of the world showing the NOAA GFDL CM2.1 Climate Model. Map uses color to show the surface air temperature change in degrees Fahrenheit between the projected 2050s average, minus the 1971-2000 average. Color scale used to indicate temperature change: Dark blue -20; light blue -3; white 0; yellow 3; orange 7; red 20. Small patches of light blue south of Greenland and north of Antarctica. Most oceans, Antarctica and south pacific islands are yellow. Most of North American, South America, Africa, Europe, Asia, and Australia are light orange. Small patch of red directly north of Norway and Western Russia.