

Appendix

DEPARTMENT OF HEALTH AND HUMAN SERVICES

National Cancer Institute (NCI)

National Eye Institute (NEI)

National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)

National Institute of Environmental Health Sciences (NIEHS)



Principal Areas of Focus

Four National Institutes of Health (NIH) institutes support research on the health effects of ultraviolet (UV) and near-UV radiation. Their principal objectives include an increased understanding of the effects of UV and near-UV radiation exposure on target organs (e.g., eyes, skin, immune system) and of the molecular changes that lead to these effects, and the development of strategies to prevent the initiation or promotion of disease before it is clinically defined. In addition, NIEHS supports research on the health effects of chlorofluorocarbon replacement chemicals, including studies on the metabolism and toxicity of hydrofluorocarbons and halogenated hydrocarbons. HHS [NIH and the Centers for Disease Control and Prevention (CDC)] also conducts research related to other impacts of global change on human health, including renewed concern about infectious diseases whose incidence could be affected by environmental change. In addition, NIH sponsors a program to assess the impact of population change on the physical environment and to account for effects of the physical environment on population change.

Program Highlights for FY 2004 and FY 2005

The NIEHS program supports grants and intramural projects that investigate the effects of UV exposure on the immune system, aging process, sensitive tissues such as the retina and skin, and methods to reduce these harmful effects. Other projects involve the comparison of the mutagenic potential in bacteria of UV and near-UV radiation at levels found in natural sunlight and at levels anticipated with a 15% depletion of stratospheric ozone. Several projects supported by NIEHS are investigating molecular changes in DNA that lead to aberrations and mutations in human tissue, rodents, fruit flies, and bacteria, and the variety of ways these organisms repair damage to DNA resulting from UV exposure.

NEI supports studies on the impacts of UV radiation on the eye (retinal damage as well as corneal capacity). A major initiative is underway to determine how and why eye cataract develops and to search for ways to prevent or slow the progression of cataract, an age-related eye disease that affects 17-20 million people globally. This project is investigating the role of UV-B radiation, which has been implicated as a specific risk factor in cataract development. Another important area of research is the understanding of certain detoxification systems in the eye and how they combat damage from UV-B radiation. The goal of this effort is to identify drugs that might have therapeutic or preventative applications.

NCI is supporting a wide range of studies to characterize the etiology, biology, immunology, and pathology of a variety of changes in the skin (morphological effects that might precede skin cancer), including photoaging, non-melanoma skin cancers, and melanoma caused by exposure to UV radiation.

Other research is exploring UV-induced immunosuppression, which is critical to the development of UV-induced skin tumors, and the cellular and molecular basis for the genetic predisposition to UV-B induced skin cancer in people with Basal Cell Nevus Syndrome.

NIAMS supports basic and clinical research on the effect of UV-A and UV-B radiation on skin.

Related Research

In addition to research areas designated as part of the CCSP budget, HHS agencies conduct other research relevant to the overall CCSP program.

Climatic models have indicated that a possible result of global climate change would be an increase in the number and intensity of heat waves impacting the U.S. population. The CDC Division of Environmental Hazards and Health Effects conducts intramural research to investigate morbidity and mortality associated with exposure to excess heat. Key program components include conducting epidemiologic investigations on heat-related mortality and morbidity, providing technical assistance to municipal agencies in the development of Heat Emergency Response Plans aimed at reducing the public health impact of heat waves, and publishing an annual summary of heat-related mortality in the United States. CDC's scientists provided technical advice and support to the French Ministry of Health in responding to the massive heat wave that struck Europe in August 2003 and have identified critical components for effective response plans that will be published in FY 2004.

Renewed concern about emerging and re-emerging infectious diseases has prompted increased attention to a variety of diseases whose incidence would be affected by environmental change. CDC's Division of Vector-Borne Infectious Diseases is currently collaborating on studies to outline adaptation measures for vector-borne infectious diseases that may be affected by climate change. Its Guatemala field station is studying the impact that adverse climatological events, such as El Niño and Hurricane Gilbert, have had on the transmission dynamics of malaria and other diseases. These catastrophic events create tremendous changes that can simultaneously create new vector habitat, reduce the levels of sanitation, and overwhelm the ability of public health systems to respond.