

P R E S I D E N T ' S C A N C E R P A N E L

NATIONAL CANCER PROGRAM

NATIONAL CANCER INSTITUTE

NATIONAL INSTITUTES OF HEALTH

DEPARTMENT OF HEALTH AND HUMAN SERVICES

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M.D., F.A.C.S.

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EXECUTIVE SECRETARY
ABBY B. SANDLER, PH.D.

Environmental Factors in Cancer December 4, 2008

The President's Cancer Panel held the third meeting in its 2008-2009 series, Environmental Factors in Cancer, on December 4, 2008 in Charleston, South Carolina. Participants were invited to address indoor/outdoor air pollution, water contamination and related cancer risk. Current research, knowledge gaps, and regulatory practices in this area were discussed.

The cancer risks from air pollution and contaminated water are poorly characterized and necessitate further research to accurately assess public health hazards. Factories, power plants, motor vehicles, and dry cleaners all emit chemicals and/or particulate matter **into the atmosphere**, posing a threat to both public and environmental health. One of the predominant air pollutants—**radon**—occurs naturally outdoors and is ranked as one of the **top four environmental risks** to the public by the U.S. Environmental Protection Agency (EPA). Radon gas becomes concentrated within the confines of buildings and homes; its decay products (**such as polonium 210**, which is also a contaminant found in tobacco smoke) may be responsible for **almost half of all lung cancers**. Drinking water also contains harmful contaminants—endocrine disruptors, excreted human hormones, pharmaceuticals, and nitrates pollute the rivers, lakes, and groundwater that supply drinking water for 42 percent of the U.S. population. The magnitude of air and water contaminants in our environment is shamefully exemplified by the observation that babies in the U.S. are being born “pre-polluted”—**a recent study found 34 known or suspected carcinogens in samples of fetal cord blood**.

Accurate assessment of water contaminants and air pollutants is important for better detection, diagnosis, and treatment of cancers related to exposure to these risks. Addressing “hot spots”—locations where emissions from specific sources may expose individuals and population groups to elevated risks of adverse health effects—will facilitate this assessment and consequently benefit the health of the entire public. **Other factors to consider in assessing risk include genetic susceptibility, which modifies the risk associated with exposure to pollution** (i.e., subgroups of the population are at higher risk); time of exposure; and **cumulative exposures** over a lifetime. Modern, lower-cost technologies that reflect new understandings of exposure to air and water pollutants, and related disease processes, are needed. For example, high-throughput methods used for drug development need to be applied to hazard discovery and risk assessment.

A more effective and integrated regulatory structure is also needed to mitigate health risks posed by air and water pollutants. Regulation is fragmented; multiple agencies at the Federal level currently set and enforce standards. Enforcement is not carried out uniformly, resulting in health disparities. There also appears to be a lack of will to mandate change. Radon is a known carcinogen, yet EPA's standard is a voluntary one and is set at an “action level” that is technology-based (i.e., the level to which current technology is able to reduce exposure), rather than health-based. Radon-resistant construction is available and could be required in the building of homes, and mitigation of existing risks could be accomplished through retrofit programs. It costs only one-third as much to build a home with radon-resistant construction than to retrofit an existing home. Some state governments have chosen to regulate themselves to protect their citizens, i.e., implementing lead-safe exposures in daycare centers.

Communicating the hazardous health effects of exposure to air pollutants and contaminated water to the public is especially important when existing regulation fails to offer protection. Advocates can help garner change. Given that the **United States has the highest cancer incidence rate in the world in people under the age of 65**, the public needs to be able to make informed personal health decisions while risk assessment and regulation is reformed.

The Panel will summarize findings and recommendations from this meeting along with the other meetings in the series in its 2008-2009 Annual Report to the President of the United States.