

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

NATIONAL CANCER PROGRAM

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DEPARTMENT OF HEALTH AND HUMAN SERVICES

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## **Environmental Factors in Cancer October 21, 2008**

The President's Cancer Panel held the second meeting in its 2008-2009 series on *Environmental Factors in Cancer* on October 21, 2008 in Indianapolis, Indiana. Participants addressed agricultural exposures to potentially toxic chemicals and related cancer risk. Current research, knowledge gaps, and regulatory practices in this area were discussed.

Exposure to pesticides and other chemicals used in agricultural production is an encompassing public health concern; based on data from the National Health and Nutrition Examination Survey (NHANES), it has been posited that everyone in the United States is exposed directly or indirectly to pesticides. These exposures can occur by breathing contaminated air, eating produce containing pesticide residues, and drinking water intermittently contaminated with pesticides and other agricultural chemicals. Many pesticides are known endocrine disruptors, and several in common use are known to cause mammary tumors in animals. The International Agency for Research on Cancer has concluded that some substances used in pesticides are known, probable, or possible human carcinogens. While the state of knowledge linking pesticides and carcinogens is still immature, the ubiquitous nature of pesticides and herbicides used in agriculture necessitates consideration of a precautionary approach to public exposure<sup>1</sup>.

Unlike occupational and industrial exposures (where exposures are usually at higher doses in a discrete set of workers) it is more difficult to measure and identify relationships between environmental exposures and cancer risk in the general population. To correlate pesticides with human carcinogenicity requires both biological plausibility and epidemiological evidence of exposure. Difficulties in establishing this causal relationship result from the mix of risk factors—environmental, workplace, lifestyle—that people are exposed to over a lifetime. Additionally, many pesticide agents are non-genotoxic, making it harder to demonstrate harm or a risk of developing cancer. It has been shown that active metabolites from agricultural chemical exposure can be found in certain human tissues long after the primary chemical compound is no longer detectable. This type of biologic monitoring is vital in providing intermediate endpoints to characterize potentially toxic exposures. In addition, existing environmental databases and Geographic Information Systems are valuable tools to improve the quality of epidemiological exposure assessment. Evaluating agricultural exposures in children is another means to assess risk. Children have higher susceptibility and shorter latency periods for disease, so they are a subpopulation that especially warrants greater public concern. Regulation of potentially harmful chemical exposures in children would also result in regulation for adults.

Groups at greatest risk of adverse health effects from pesticides are those handling “restricted use” pesticides (i.e., seasonal farm workers), many of whom lack training in the safe use, storage, and disposal of chemicals. Populations residing near crops to which pesticides and herbicides are applied are also at higher risk. These populations are typically poor, underserved, and lack education about the health risks of exposure. In addition to better enforcement of existing public health regulations, grassroots efforts are needed to provide education and training to these high-risk groups and help them advocate for their own protection.

The current regulatory system is flawed. Pesticide registration is based on industry data and the process relies on a cost-benefit analysis—matters of human health are weighed against the economic interests of industry. Without ample “proof”

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<sup>1</sup> An example of a precautionary principle would be, “When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause-and-effect relationships are not fully established scientifically.” [Canadian Cancer Society]

of harm, it is difficult to create laws to regulate chemicals, and existing regulations are sporadically enforced. The use of pesticides and herbicides in agriculture largely remains an economic and political issue; viable alternatives such as the use of organic farming exist. This alternative benefits farmers, consumers, and the environment—it enhances soil structures, requires less water and conserves biodiversity. Organic farming has been proven to be economically sustainable and is consistent with a precautionary approach to protecting human safety first.

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