



National Institutes of Health
National Cancer Institute
Bethesda, Maryland 20892

March 11, 2015

Councilmember Roger Berliner
100 Maryland Avenue
Rockville, MD 20850

Dear Representative Berliner:

Thank you for your inquiry concerning pesticides and health risk.

The mission of the National Cancer Institute (NCI) is to conduct and support research, training, health information dissemination, and other programs with respect to the cause, diagnosis, prevention, and treatment of cancer, rehabilitation from cancer, and the continuing care of cancer patients and the families of cancer patients. Although NCI is responsible for conducting research on pesticides, it is also a part of the mission of the National Institute of Environmental Health Sciences (NIEHS), who support research to discover how the environment affects people in order to promote healthier lives. The NIEHS research portfolio includes cancer and many other outcomes, such neurological, developmental and endocrine. The Environmental Protection Agency, the federal agency responsible for regulating pesticide use taking into account cancer as well as a panoply of other health effects. For example, NIEHS and EPA have supported birth cohort studies which estimate sources, pathways of in utero and postnatal pesticide exposures of children living in their communities.

Pesticides are a diverse group of chemicals used to control pests including unwanted plants, molds, and insects. Pesticides are widely used in agricultural, commercial and residential settings, and as a result pesticides and their metabolites are detectable at low concentrations in the urine of a majority of the U.S. population (Barr et al. 2004; 2005; 2010). While pesticides are broadly known to exert adverse toxic effects to humans following high-dose acute exposures; knowledge about chronic low-dose adverse effects from exposure to specific pesticides is more limited. Assessing the health effects of specific pesticides has included a combination of laboratory studies on rodents and human epidemiological studies. Although the majority of pesticides currently registered for use in the United States are neither overly genotoxic nor carcinogenic in rodent studies, results from epidemiological studies of human cancer exposed to pesticides have shown mixed results.

The National Toxicology Program (NTP) of the NIH, and the International Agency for Research on Cancer (IARC), a component of the World Health Organization, are perhaps the two most respected scientific organizations conducting independent scientific review of the evidence for carcinogenicity of human exposures. These reviews include both the toxicologic and epidemiologic evidence for the carcinogenicity of pesticides, reviews that are periodically updated. The last such systematic review by the IARC was over 20 years ago. At that time, arsenical pesticides and dioxin (a contaminant of some herbicides) were the only two pesticides they classified as human carcinogens. However, they also indicated their opinion that "occupational exposures in spraying and application of non-arsenical insecticides" as a group could be classified as probable human carcinogens. Since a substantial body of evidence has accumulated since this report, the IARC is currently empanelling several review groups to comprehensively update this evaluation of pesticides. The NTP is an ongoing evaluation that is frequently updated. Over time, they have assessed 506 pesticides and listed 21 as "probable human carcinogens", but have listed 141 as "possible, suggestive or likely". It should be noted that the 506 includes all pesticides, not only those for home or garden use, and also includes those used in the past, but not currently.

With this absence of definitive information on the carcinogenicity of specific pesticides, in the United States the Environmental Protection Agency has adopted a strategy to minimize non-occupational exposures to pesticides by discouraging the use of longer-lasting and broad-spectrum pesticides. The lipophilic, bioaccumulative organochlorine (OC) insecticides that were widely used in the mid-20th century were first replaced by organophosphates (OP), and have now been replaced by carbamates and pyrethroids because these compounds are more environmentally labile and do not accumulate in the food chain to the same extent as the OCs and OPs. Pyrethroids insecticides and carbamate insecticides and herbicides are generally metabolized and eliminated from the body within 24-48 hours as water soluble metabolites in urine. This policy has resulted in lower OC and OP exposures among the general public (Barr et al. 2004; 2005; 2010). Many widely-used phenoxy herbicides are also eliminated from the body within 24-48 hours.

Recent scientific advances suggest that we may be able to accelerate progress in clarifying the carcinogenicity of pesticides, as well as other chemicals and biologic agents. The revolution in molecular science over the last 20 years has given us new understanding of biology, and a set of tools to answer questions that have previously eluded us. Indeed, application of these tools in interdisciplinary studies of highly exposed human populations has recently produced hypotheses about the potential carcinogenicity of several pesticides. At this point they are simply findings that need to be tested and replicated by others to identify those with public health applications, but the NCI and other biomedical research groups world-wide are actively involved in using the new molecular science investigating the human epidemiology and the multiple

mechanisms that may be involved in pesticide-mediated carcinogenesis. However, until a more comprehensive scientific understanding of pesticide-carcinogenesis is achieved, balancing the potential, albeit uncertain, carcinogenic risk with the perceived benefits derived from the use of pesticides remains a public policy judgment rather than a strictly scientific one.

A nationwide use-reduction policy for pesticides has not yet been adopted in the United States because the scientific data concerning the carcinogenicity of specific pesticides has not been judged to be sufficient, the net benefit to health was unclear, and the economic impact was disproportionately large for some groups within the population. However, in several European countries, including Sweden, Denmark, the Netherlands, a use-reduction policy has been implemented as a precautionary measure until more definitive scientific evidence becomes available. The result in these European countries has been a substantially diminished exposure overall.

NCI scientists provide the results of their research to the public, the scientific community, and regulatory agencies. Because decisions about use of pesticides involve complex decisions involving weighing perceived risks and benefits based on local community values, as mentioned above, NCI scientists do not typically weigh in on regulatory or public policy decisions. Thus, we respectfully decline the invitation to provide testimony at the upcoming hearing.

Sincerely yours,

Stephen J Chanock, M.D.
Director
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cc:

Dr. Harold Varmus
Dr. Linda Birnbaum
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