immunotoxic or health impacts. Nonetheless, they do show a pattern of immunotoxic effects consistent with the experimental evidence. The methodological weaknesses in these studies certainly do not exonerate pesticides as potential immunotoxicants.

Rather, they emphasize the need for further properly designed epidemiological research, which is the conclusion the WRI report drew from them.

The WRI report (2) recommended that an expanded epidemiological research program be designed and organized, and we are happy that the pesticide industry has agreed to participate in an international expert meeting that will consider the serious issues involved in designing such research. We hope that this meeting will stimulate and enable a program of field research in exposed and vulnerable populations.

The WRI report (2) recommended that immunotoxicity testing of pesticides, as a condition of registration, be strengthened to reflect improved immunological methods, a need with which the pesticide industry concurred. We are happy that in the United States the EPA has announced increased testing requirements. However, these requirements will not be applied to pesticides already registered or reregistered. We hope that the pesticide industry will also voluntarily carry out this expanded battery of immunotoxicity tests on products already on the market.

It is evident that the conditions for safe use and disposal of pesticides are not now being met in much of the world. In view of the serious risks this poses to vulnerable populations, including the possibility of reduced resistance to widespread and often communicable diseases, we hope that the pesticide industry will also cooperate actively in reducing unnecessary exposures.

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**Response**

Repetto and Baliga have cast our critique, both explicitly and implicitly, as the work of vested interests and, therefore, of questionable merit. That is unfortunate. Ad hominem criticism is a barrier to the exchange of scientific views. Nonetheless, we hope readers will benefit from the time we spent to obtain, translate, and critically review the many foreign references cited in the World Resources Institute (WRI) report (1).

Our assessment of these references, contrary to the conclusion in the WRI report (1), is that we do not find credible evidence that modern, widely used pesticides are causing immune dysfunction in millions of people. The toxicologic studies cited in the WRI report have questionable relevance to real world exposure scenarios. The epidemiologic studies that were cited either have severe methodologic weaknesses or did not find an effect for pesticides. The studies of the Inuit effects deserve special mention. The ongoing dietary studies mentioned by Repetto and Baliga have not linked otitis media with dietary pesticide exposure (2–4). These studies have focused on dioxins and polychlorinated biphenyls. Why imply that these studies (may) implicate pesticides? We made particular note of the study by Julien et al. (5) because it offered a plausible alternative hypothesis not mentioned in the WRI report: that the high prevalence of disease was associated with the change from a nomadic existence to a sedentary one. This explanation is consistent with the lesser disease prevalence among Cree Indians who share environmental factors with the Inuits.

Our assessment of the evidence does not mean that we oppose prudence in limiting pesticide exposure, that we oppose improvements in screening pesticides for possible immunologic effects, or that we oppose appropriate epidemiologic research. The admonition by Burrell, and our coauthor Flaherty, et al. (6)—published years before the WRI report—that “Pesticides should be considered presumptively immunotoxic...” reflects appropriate caution to minimize exposures to potential toxicants. Industry has been supportive of appropriate improvements in immunotoxic screening for pesticides, as evidenced by the collaboration of government and industry scientists to update EPA’s Toxic Substances Control Act immunotoxicity testing guidelines. The related Federal Register notice (7) cites the work of many industrial immunotoxicologists.

Finally, we support improved epidemiologic research on potential immunotoxic effects of pesticides, but this is a difficult area in which to conduct research. Methodologic difficulties, as evidenced in past studies, must be recognized in order to make progress. Repetto and Baliga’s characterization of our criticism notwithstanding, we hope our critique is helpful to scientists interested in this area of research.

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Repetto's Response to Acquavella

Contrary to John Acquavella’s assertion, my coauthor and I have responded directly to the substance of points made by the pesticide industry scientists in print and in person. We agree that ad hominem attacks restrict scientific discourse. Therefore, we think it regrettable that when our report was first published, the chief spokesman for the American Crop Protection Association, which organized this scientific critique, publicly impugned our motives and qualifications for undertaking the study. We also regret that senior officials of some of the pesticide manufacturing companies saw fit to address letters of complaint to members of the WRI’s board of directors about the study, seeking to influence our organizational policies and financing.

The report in question, *Pesticides and the Immune System: The Public Health Risks*, has been reviewed repeatedly by scientists and scientific organizations not linked to the pesticide industry, including the U.S. EPA, the World Health Organization, and the Netherlands Institute for Public Health and Environment. Their judgments differed dramatically from those expressed in the industry’s critique. Most recently, while this exchange has been under way, our report received an award in the British Medical Association’s 1997 Medical Book Competition after a peer-reviewed selection process. The report received High Commendation (2nd prize) in the public health category. The citation from the judges read as follows:

An excellent review of the literature on the immunotoxic effects of pesticides with informed speculative comment on the potential effects of biocidal agents in combination.

Essential reading for policymakers, it is well presented and should be of interest to many health professionals.

Why, we wonder, does the judgment of the medical profession of Great Britain differ so markedly from that of Aquavella and his colleagues? Our hope is that this exchange will stimulate readers of *Environmental Health Perspectives* to read the report for themselves and form their own conclusions. Copies of the report can be obtained through the WRI website (http://www.wri.org).

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Corrections and Clarifications

In the article by Calabrese et al. (Soil Ingestion: A Concern for Acute Toxicity in Children) published in *EHP* in Volume 105, Number 12, 1997, there was an error in the values for arsenic ingested from soil. Printed values were 2, 8, and 15 μg/kg; the correct ingested arsenic doses are 0.2, 0.8, and 0.15 μg/kg. This error appears on p. 1355 and in Table 1 on p. 1356.