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Introduction and Overview

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The series of papers contained in this issue of ENVIRONMENTAL HEALTH PERSPECTIVES was presented at a symposium sponsored by the National Institute of Environmental Health Sciences at their facility in Research Triangle Park, North Carolina, on October 27-28, 1981. The objective of the conference was to review the science base for evaluating health effects from human exposure to improperly disposed chemical wastes and to identify areas where new research efforts might be directed.

Concerns about the potential for chemical wastes to cause human health effects have come into sharper focus since the Love Canal, New York, problem in late 1978 (*1*). In 1979, a Subcommittee of the Committee to Coordinate Environmental and Related Programs of the U.S. Department of Health, Education and Welfare reviewed the scientific background for the alleged health effects of residents of the Love Canal area and outlined a strategy for such investigations (*2*). The review also noted a need for more sensitive tests that might be clinically applicable and the need for expansion of the toxicological information base regarding chemicals that might be present in waste dumps. Once the potential for human exposure to chemicals from a particular dump site becomes recognized, physicians are expected to answer questions about health effects. Another statement of the health questions related to this problem as well as a summary of this Conference and other related activities has recently appeared (*3,4*).

The first question that might be asked is whether or not the chemicals identified at a dump site are toxic to people. The answer here depends on available toxicity data. It was quickly learned from the Love Canal experience that many of the chemicals present in dumps are not "household names," they are not always end products of commercial processes but may in fact be the residuals of such processes or even intermediate or precursor substances. The continuing efforts of the National Toxicology Program (NTP) and perhaps test programs to be conducted by industry by its own activities will help fill this need. It is interesting in that of the nearly 300 chemicals identified at Love Canal by the New York State Department of Health and the U.S. Environmental Protection Agency, toxicology data were available on fewer than half, and for most of these the data were sparse. On the other hand, a review of the toxicology data on the chemicals found in a recent survey conducted by EPA over the past six months in a more restricted area, toxicologic data were available or are being developed on 79 out of 93 chemicals (more than 80% of the chemicals), and much of this new information is being provided by the NTP. The next need is to make these data available in a central data bank system. Not much new has been achieved in this direction in the past several years, but it is expected that the National Library of Medicine, through funds to be made available by Superfund, will enhance the development of a centralized data bank to include data on chemicals that are likely to be found at chemical disposal sites.

A major question that a later session of the conference addressed was the problem of mixtures. Chemical wastes are not disposed of in predictable combinations, and it is likely that changes occur on storage or movement in water or the ground. There is general agreement that the technology for assessing the toxicity of such mixtures is still at an early stage of development.

And then there is the problem of trying to assess what exposures people have actually had; what substances can be measured in tissues. As the potential for health effects from chemical exposure among residents at Love Canal was being evaluated (there are very few actual exposure data), it became increasingly clear that most Americans, regardless of where they live, already have a body burden of diverse chemicals from the environment. In order to make some judgment as to whether the exposure is increased, there is need to have good data on background exposures. The best informa-

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tion available about background levels is for heavy metals. But even for lead, where it is safe to say we know the most, there are still questions about what are minimum levels that produce health effects to susceptible populations. The most recent Health and Nutrition Examination Survey, perhaps more familiar to you as the HANES Survey conducted by the National Center for Health Statistics, has told us something about body burdens of pesticides but information about exposures to chlorinated hydrocarbons is sparse. We were recently telephoned by a physician from the midwest asking about whether a particular level of PCB in mother's milk was associated with any known disease. Of course, there is no answer to this at the present time, but these are the kinds of questions that are going to be asked with increasing frequency.

This conference addressed specific questions that need to be further studied to protect public health. We all hope there will be no more Love Canals, but we do know that there are many dump sites throughout the country where chemicals have been improperly disposed. As these are identified, the question will be asked whether these chemicals cause any specific illness. Populations who have the possibility of being exposed will want to know: Have I been exposed to toxic chemicals? What are the chances I will get cancer or some other health effect? And what can I do about it? Effects of chemicals are seldom specific. They usually have long latency periods, and the effects are often the most feared diseases, such as cancer and effects on reproductive performance or effects on the unborn or newborn infants. We need research studies designed to identify these health end points at their earliest possible stage, and we are dependent on the epidemiologist to assess these methods in human populations.

The topics selected for discussion as well as the selection of many of the participants for this conference followed a meeting with the Directors of the National Institute of Environmental Health Sciences University-based Environmental Health Science Centers in December 1980. In addition the Centers for Disease Control and one of the NIEHS Environmental Health Centers were asked to begin the program with brief descriptions of some of their experiences. Also, a presentation on the psychosocial aspects of the problem as well as some comments about legislative aspects have been included. It is becoming increasingly apparent that just the awareness of even possible exposure to potentially toxic chemicals from improperly disposed waste may create a significant psychosociopolitical and even economic impact.

In conclusion, it is intended that this series of papers will provide a summary of the current state-of-the-art regarding assessment of human health effects following possible exposure to chemicals from waste dumps.

REFERENCES

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2. Department of Health, Education and Welfare. Report of the Subcommittee on the Potential Health Effects of Toxic Chemical Dumps of the Subcommittee to Coordinate Environmental and Related Programs. National Institute of Environmental Health Sciences, Research Triangle Park, NC, April 1980.
3. Maugh, T. H. Just how hazardous are dumps? Science 215: 490-493 (1982).
4. Maugh, T. H. Biological markers for chemical exposure. Science 215: 643-647 (1982).