

INDUSTRIAL TOXINS AND THE COMMUNITY

The Role of the Occupational Physician in Controlling Industrial Toxins Outside the Working Environment

Maurice Johnson, MD

I appreciate the opportunity to talk with you about toxic chemicals in the environment and, more specifically, about the role the occupational physician plays in their identification and control. Let me say first, I think the physician's role in this regard has been a small one. As I see it, that is a regrettable situation and one that should be remedied. I hope we can spend a few minutes looking at the reasons why the occupational physician plays this limited role, and at some of the reasons why the physician should have a more substantive involvement in the control of chemical exposures outside the workplace.

I think it is obvious to everyone that the occupational physician has played a major part in the setting of safe standards for the workplace. A review of the literature on any of the common toxic chemicals to which workmen are exposed will inevitably demonstrate the intimate involvement physicians have had in the identification of hazardous working environments and in the establishment of safe levels of exposure and effective methods of control.

On the other hand, when one looks at the background data which supports many of our general environmental standards, one sees that the practicing occupational physician has had very little input into these determinations and that the major input has come from experts in other biological and social sciences. The epidemiologist, the toxicologist, the statistician, the chemist, and a host of others have played a much more important role.

It is, of course, true that considerations which are applicable to the workplace do not automatically extend to the general environment. Populations at risk are quite different. The occupational physician sees in the plant a selected group of employees who are by and large healthy. They usually spend not more than 8 hours each day in the working environment, and they have

substantial rest periods between exposures, which gives opportunities to recover from minor physiologic insults.

Exposures to which the general population are subjected are of quite a different nature. They may be 24 hours per day, 7 days per week, often year in and year out. They affect all age groups, from the infant to the very old, and expose not only the well population but those who suffer from a variety of acute and chronic diseases.

Given this disparity in exposed populations and the obvious need for different permissible levels of exposure to a toxic material, it is perhaps not surprising that many occupational physicians see the permissible exposure levels for compounds in the community as ridiculously low. Many who are concerned with community health see the levels which are permitted in the workplace as excessively high.

The recent case of vinyl chloride (VC) exposures, with which I am quite familiar, is a good example of this point. There is no question exposures in the workplace in years past were excessively high and resulted in a number of cases of angiosarcoma of the liver which, without doubt, can be attributed to vinyl chloride exposure.

About 60 such cases have been recorded in the world since the first cases were reported in 1974. These have been the results of exposures which date back as far as the beginning of the VC industry in about 1935. The levels to which these men were exposed are not well documented, but surely they were several parts per million, with occasional excursions into the thousands of parts per million.

During the years that these exposures were occurring, there was of course a release of vinyl chloride into the general environment around the plants, and there has been considerable effort to discover what the community exposure levels were and whether or not there was any resulting disease. The best estimates of the community levels in past years probably came from the U.S. Environmental Protection Agency (EPA) which estimated those levels to average 17 parts per billion.

Investigation of the population living around these plants has shown no excess of angiosarcoma of the liver and generally no

health effects that can be related to VC. Thus it appears that while past practices resulted in clearly hazardous in-plant exposures, they produced no discernible health effects in the community.

Today the permissible exposure level in the workplace has been reduced by regulation to 1 part per million and the emission standards promulgated by EPA last fall will reduce the level in the environment around the plant to about 2 parts per billion. Although there might be a few dissenting opinions, surely the overwhelming consensus among knowledgeable people is that the 1 ppm standard in the workplace very adequately protects against VC-induced disease. While we will probably see the results of past exposures producing health effects on workers for some years to come, I think we are all quite confident that VC is indeed being handled safely in the workplace today under current regulations.

In the matter of community exposures to VC, the situation is quite different. As I mentioned before, in 1976 EPA promulgated regulations which would lower the VC level in the community from 19 ppb--a level which has not been shown to have any adverse health effect at all--to 2 ppb, providing thereby a safety factor at least 8 times over a level which, as far as anyone can tell, was already perfectly safe.

While this would seem to me to provide more than ample protection for the community, not everyone shared this view. Indeed, the Environmental Defense Fund (EDF) sued the EPA in an effort to force a further reduction in the permissible VC emissions from plants. I don't want to dwell today on the futility of the proposal made by EDF, although I should note for the sake of completeness that only a small portion of the VC monomer which escapes from a manufacturing plant does so via the exhaust stacks and that reducing the permissible amount by one-half, as EDF has suggested, will reduce community levels by less than 1 ppb and will of course have no resultant health effects whatsoever.

It is at precisely this point that I think the occupational physician can and should play a much more important role, and I think there are several reasons why he is especially well qualified to do this. First, the physician has a good knowledge of the health effects which can be reasonably attributed to the chemical and the scientific background on which to judge whether or not there is a threat to the community's health.

Second, the occupational physician is thoroughly familiar, and deals every day, with the dose response relationship and thus can recognize that depending on dose, the same material can be a poison, a medicine, or have no effect. This seems to be a concept that is very difficult for the general public to accept, although it is one we all use regularly. For example, if we have a headache, we take 2 aspirin tablets; we don't take half a tablet, because we know that would be ineffective; we don't take 20 tablets, because we know we would at least have an upset stomach; and we don't take 200 because we know this might well be fatal. We take the 2 aspirin tablets with considerable confidence they will relieve the headache without significant side effects.

Another contribution the physician can make to the selection of suitable community levels for toxic materials is based on the fact that his training and daily experience allow him to be comfortable with the best compromise in the given situation, as opposed to the ideal solution to a problem. For example, if a patient has acute appendicitis, the best solution to the problem is for the inflammation to spontaneously subside. However, in the real world that does not happen, and the physician must then advise his patient in choosing between a variety of alternatives which carry varying risks. When the physician recommends surgical removal of the appendix, he believes this is the best recommendation and is not disquieted by the fact that there are anesthetic accidents, wound infections, pulmonary emboli, and a host of other complications which represent real, although remote, hazards. I think that our society has not been able to deal with this problem of risk-benefit relationships in environmental matters. We don't seem to have a problem with risks and benefits in setting highway speed limits, but we are very uncomfortable with the thought that we could permit an environmental exposure which might pose even the smallest risk. I think the occupational physician is in a unique position to bring a sense of balance into these considerations and to help set standards that are prudent, yet reasonable.

Perhaps one of the reasons occupational physicians have not been more active in these environmental affairs is that they don't always involve only weighing one health problem versus another, but that often there are social and economic considerations which must go into the equation. I think that occupational physicians are somewhat reluctant to speak out in these circumstances, although surely in the modern practice of medicine, as with the

changes that are being proposed, socioeconomic considerations are very much in the minds of physicians as they make daily decisions.

Let me go back to my illustration of the appendectomy with its remote possibility of complications. If a young, generally health patient presents acute appendicitis and a routine appendectomy is performed, we expect the patient to go from the recovery room back to the general surgical service. We do not expect the physician to assign this patient to an intensive care unit for 2-3 days. This is not to say that the nursing care on an intensive care ward is not better. It clearly is. The fact is that we recognize the probability of complications benefiting from such expensive nursing care are so remote that it is not justifiable.

I think the time has come when, in the area of environmental health problems, occupational physicians must begin to take a similarly forthright stand. We cannot ever prove that a given environment is totally safe, but we can establish that some levels of environmental contamination with toxic materials are so unlikely to cause health problems that the results are acceptable.

Most of what I said today reflects my personal position, but I do feel strongly that the occupational physician must expand his concern beyond the plant and take an active part in considering safe levels of community exposures. I think the occupational physician not only has a clear contribution to make, but also has a clear obligation to make it.

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Division of Technical Services
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NIOSH Project Officer: Loren L. Hatch, DO, PhD
Principal Investigators: Theodore C. Doege, M.D.,
Robert H. Wheeler, M.S.

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