

INDUSTRIAL TOXINS AND THE COMMUNITY

Introductory Comments

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It may seem odd for a meeting concerned with worker health to include a session on community health. Worker and community health, however, form a single spectrum which it is well to consider as a whole, particularly in relation to toxin exposures of industrial origin. Conceptually, the two areas are distinguished mostly by potential differences in dose and in mode of toxic exposure. Potential health effects as well as sources of exposure remain much the same, with industrial control measures often having the effect of protecting both groups at the same time.

Dealing with community exposure problems, however, may be a more difficult, complex, and frustrating task than dealing with comparable worker exposures. Again, it is dose and mode of exposure that underlie these difficulties, rather than fundamental differences in pathologic mechanisms or methodologic approach. Let me briefly illustrate how such problems affect community studies using as an example the recent Kepone exposure episode in Hopewell, Virginia. The four presentations that follow will expand on many of these same points.

The Kepone contamination incident involved a small chemical plant which exclusively produced the chlorinated hydrocarbon insecticide, Kepone, over a 17-month period (March 1974 through July 1975). Very few production safeguards were employed in the plant's operation, resulting in extensive worker exposure to the chemical, as well as unchecked environmental contamination outside the plant. Health effects in workers have included neurologic abnormalities and sterility. When the incident came to public health attention in July 1974, simultaneous studies of worker and community health effects were undertaken.

DOSE OF EXPOSURE

Studies involved various groups of people exposed in different ways outside the plant, as well as current and former plant workers. In the vicinity of the plant, varying degrees of environmental contaminations were demonstrated, largely the result of airborne Kepone-laden dust from the plant. Main attention focused on a general population survey of persons living within a mile radius of the plant. Survey workers measured serum Kepone levels and asked questions about potential health effects, primarily neurologic. Also studied were workers formerly engaged in Kepone production at a nearby Allied Chemical Company facility, persons employed in unrelated businesses located close to the contaminated plant, workers at the local sewage treatment facility where the plant discharged Kepone waste, and members of the families of workers at the plant.

Neurologic illness attributable to Kepone was found only in current or former workers at the chemical plant (76 of 133 persons, 57%) with no such cases being found in any other group. Kepone, however, was detectable in all groups, although in distinctly higher levels in chemical workers, especially in workers with presumably Kepone-related illnesses.

Table 1. Blood Kepone levels in different exposed population groups, Hopewell, Va.

	No. tested	No. positive (%)	Range*	Mean*
Chemical plant workers				
Ill	57	57 (100)	0.009-11.8	2.53
Not ill	49	48 (99)	0.003- 4.1	0.60
Families of workers	32	30 (94)	0.003- 0.39	0.10
Allied chemical workers	39	30 (77)	0.003- 0.45	0.06
Neighborhood workers	39	25 (64)	0.003- 0.031	0.010
Sewage workers	10	6 (60)	0.004- 0.014	0.008
Hopewell residents	214	40 (19)	0.005- 0.033	0.011

*Parts per million

While these findings suggest that only relatively high levels of Kepone cause illness, the negative clinical findings in groups outside the contaminated plant are only superficially reassuring,

given the crude clinical measures available and concern that Kepone exposure may involve delayed health effects, such as cancer, where dose relationships are as yet undetermined. As in other community health studies, negative results do not provide a final answer, although they may represent the best that the art allows. In the meantime, toxin absorption outside the workplace has been documented.

MODE OF EXPOSURE

In addition to dust pollution in the vicinity of the plant, Kepone was also discharged in large amounts into the city sewage system, finding its way ultimately into the James River, where it has been taken up by the aquatic food chain. Given the relative non-degradability of the compound, the situation poses a persistent problem in environmental contamination that has no easy solution. It means that in contrast to workers whose exposure was mostly from the single source of Kepone production, community exposure has involved not only contact with airborne Kepone dust, but also ingestion of Kepone in seafood. It also emphasizes that the community problem is more diffuse and hence more difficult to assess and control than the worker problem, where exposure was concentrated at one discrete location.

Because of these difficulties, and because the one community health survey involving persons near the plant produced negative results, no broader study of potential community health effects has been undertaken. Instead, public health efforts have focused on continued environmental monitoring and control of contaminated seafood sources.

In this manner, problems posed by dose and mode of exposure have made the community health problem in relation to Kepone difficult to assess and manage satisfactorily. In all such situations, of course, difficulties in public health management are often magnified and at times distorted by the public attention they arouse, as well as by economic and political repercussions. While similar reactions accompany worker health problems, such forces can be particularly prominent in the less easily defined setting of potential community health effects. Problems of this sort will be discussed by several of the speakers to follow, each representing a rather different viewpoint on this complex public health subject.

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