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SOCIAL CONTROVERSY AND THE DIOXIN QUESTION

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ABSTRACT

The dioxin controversy conforms to a model useful for analyzing "quality of life issues." Examination of scientific versus social, political, and legal issues reveals an extensive scientific data base for studying the dioxin controversy. It is apparent that the factors that presently drive this controversy are not based on scientific truth. The dominant role played by the media in keeping the dioxin controversy before the public is discussed.

INTRODUCTION

Health concerns involving dioxin, especially the 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), date from 1969 - 1970 and its contamination of Agent Orange, the military defoliant used in the Vietnam Conflict. Current interest is merely an extension and popularization of issues first publicized in 1970 and again in 1974. A large volume of toxicological data on 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) and 2,4-dichlorophenoxyacetic acid (2,4-D), the two herbicides in Agent Orange, were available during the final years of US involvement in Vietnam, but woefully inadequate toxicological and environmental data on TCDD precluded resolution of the issues. Although scientists recognized TCDD was acutely toxic and teratogenic (birth deforming) in laboratory animals, no studies were available on the effects of chronic long-term low-level exposures in lower mammalian species. Furthermore, numerous occupational exposures to TCDD were reported during the industrial production of trichlorophenol, but epidemiologic studies were not available despite documented exposures as early as 1949.

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Thus in an attempt to resolve the present controversy, scientists had to assess the long-term effects of exposure to TCDD either on the basis of existing data available from health studies of industrial populations or from studies of Vietnam veterans exposed to Agent Orange. Of course, one major assumption must be that US military personnel reporting health effects were probably exposed to Agent Orange and, hence, to TCDD. But, regardless of any reported health effects, a valid study must include examination of all facets of the controversy.

This requirement poses a dilemma because objective analysis depends on established criteria, but there are simply no models available for analyzing environmental health issues. In the absence of such models, examination of environmental crises involving other chemicals can provide a useful parallel for analyzing the dioxin controversy. For example, environmental contamination or "poisoning" episodes during the decade of the seventies involved similar chemicals, such as chlorinated insecticides (chlordane, DDT, and mirex), polychlorinated biphenyls (PCBs), and polybrominated biphenyls (PBBs). And, during the last few years, the Love Canal episode has received extensive publicity. Analysis of these episodes, including reports on PCBs by Hammond (5) and Culhane (3), reports on PBBs by Budd et al. (1), and Ember's (5) assessment of the Love Canal episode, reveals that these episodes share common characteristics. Apparently, the public perceives highly publicized environmental poisoning episodes as threats to the "quality of life," and, as a result of this perception, the episodes lead to a number of predictable events (see Table 1).

NATURE OF CONTROVERSIES

A controversy involving environmental contamination commonly begins with an episodic event, a specific instance of poisoning that arouses public and scientific concern. Such an event usually begins with contamination of animals, but its impact rapidly expands to include humans who may have inadvertently been exposed to the chemical. Frequently, improper use or disposal of the chemical precipitates the event (e.g., the PBB episode, 1).

Generally, only a few people or livestock are actually exposed to, or contaminated by, the chemical. This small population, however, is an inadequate sample for establishing cause and effect relationships. Nevertheless, concerned individuals respond to the event with lists of observed biological effects in animals and adverse physical symptoms in humans. In most instances, lay persons (including news reporters), local physicians, or biologists compile these lists, and they ultimately become indicators of

Table 1. Events and Characteristics of Environmental Poisoning Episodes That Define "Quality of Life" Controversies

Event/Characteristic	Brief Description
Episodic Event	An environmental incident involving poisoning of man and/or livestock
Inadequate Sample Size	Episodic events involve exposure of small populations of people and/or livestock
Inadequate Scientific Data	Reported symptoms and adverse health effects are inconsistent with scientific data.
Intense Media Response	Sensational reporting of the episodic event
Inadequate Government Response	The initial failure of government agencies to respond to public concerns
Special Interest Groups	A group of citizens joined by a common concern to manipulate public and political attitudes toward an episodic event or chemical
Initiation of Lawsuits	The threat of legal action in the absence of a satisfactory resolution of an episodic event
Advisory Groups	At the request of a lead agency, e.g., a state department of health, qualified representatives from all interested parties join in an advisory committee to coordinate research studies, review results, and offer recommendations for resolution of issues
Unsatisfactory Resolution	There are no satisfactory methods for appropriate resolution of "quality of life" controversies.
Congressionally-Mandated Action	Political action groups demand and obtain congressional action, usually in the form of mandated health studies.

adverse effects to people who feel that they or their animals have been "potentially" exposed to the chemical. Invariably, these lists are not consistent with accepted scientific data because the media and the public either confuse or misunderstand the concepts of dose, exposure, and chronic and acute effects. As a result, the public concludes that the scientific data are inadequate, and, in some instances (e.g., the Love Canal episode, (5), it may express an intense emotional reaction to the scientific data if it suspects that "contrary" data are wrong or even dishonest.

Of course, the episodic event is "news," and, as such, it always attracts the local news media. Initial coverage of the event usually contains many inaccuracies and reflects a highly emotional orientation. In providing the coverage, the media compare the list of symptoms of a given episodic event to symptoms from other similar events in the past or in some other community. The intensity and duration of coverage depend on the magnitude or nature of the episode and on the number of people or animals exposed to "environmental poisoning." The media response is further characterized by articles in major newspapers or on the evening news, and these articles are usually followed by other articles containing "sensational" stories in popular magazines (e.g., Time, Reader's Digest, Family Circle, Playboy, and Penthouse). Culmination of the intense and frequently inaccurate campaign is marked by television documentaries usually prepared to highlight significant events or chemicals. For example, "A Plague on Our Children" was televised nationwide on 2 October 1979 by the Public Broadcasting System in its "NOVA" series and focused on PCBs, TCDD, 2,4,5-T, and the Love Canal. The Council for Agricultural Science and Technology (CAST, 2) reviewed this documentary and concluded:

The program was overloaded with interviews with emotional laymen whose uneducated opinions about health hazards related to chemicals would be expected to induce a similar emotional response in the viewer.

Following the episodic event and intense media coverage, numerous local, state, and federal agencies provide immediate but definitive responses to the stories. Personnel in these agencies are rarely knowledgeable about the chemicals or the incidents, but, after cursory reviews of available information and telephone calls to local scientists, physicians, or other "experts," they release tentative responses to implied or direct charges of official ineptitude. Frequently, the media and the public view these efforts as inadequate government behavior and label the concerned agency as "unresponsive."

In concluding that the government is unresponsive, concerned citizens form special interest groups and usually solicit the services of their own "experts." Media coverage and inquiries to elected government officials prompt public hearings on the episodic event, the tragedies suffered by the "victims," and reports by the scientific community and government officials. The impact of special interest groups on public attitudes and the behavior of government officials has been described by Ember (5). For example, the Love Canal Homeowners Association, a special interest group, launched a separate epidemiologic study of the Love Canal "at risk" population and subsequently used data derived from the study to elicit responses from a number of federal agencies and even a US district court.

Failure to resolve the controversy or to compensate the victims of the episodic event soon leads to lawsuits against the company responsible for the event, for production of the chemical, or for both activities. The real purpose of the lawsuits is to verify the concern of the individuals. Since the complex nature of the issues precludes their immediate appearance on court dockets, lawsuits are always pending.

Many government agencies, special interest groups, academic and research institutions, and concerned citizens become involved in various facets of the chemical episode. To minimize the confusion associated with so many "players," the lead government agency, usually a state health department, appoints an advisory group to insure maximum collection and review of all relevant data. The composition of this group must reflect the credentials of "qualified" people representing major players and various government agencies involved in the episode. One major function of the advisory group is to offer recommendations that will assist the lead agency in resolving the issues.

With the possible exception of bans on some of the chlorinated insecticides, the government and the scientific community have satisfactorily resolved very few episodes stemming from environmental poisoning. But, even in the ban on DDT, dispassionate scientific data took second place to emotional concerns in the legal resolution of the issue (4). These controversies generally remain unresolved because there simply is no satisfactory mechanism for treating opposing points of view in complex "quality of life" issues. The result has been an increasing public fear of artificial chemicals in the environment and lack of confidence in the ability or willingness of government and science to resolve problems related to their use

or disposal. Thus, unsatisfactory resolution is still another unique characteristic of controversies stemming from environmental poisoning episodes.

When it is perceived by the public and special interest groups that the resolution of a specific controversy is not probable, or cannot be done in a timely manner, the final recourse is to solicit congressionally-mandated action. This action may take the form of a mandated scientific review, additional health studies, or presumptive compensation. In any case, it is an expression by the political system that is intended to reflect concern for the victims of the episodic event.

DISCUSSION

Obviously, the characteristics that distinguish environmental poisoning episodes from other environmental issues are a combination of scientific, social, political, and legal factors. If a controversy is based on a preponderance of scientific concerns and these concerns cannot be resolved to the satisfaction of the media and the public, then one can reasonably conclude that scientific issues drive the controversy. In this instance, reasonable answers to key scientific questions should lead to satisfactory resolution of the controversy. On the other hand, sufficient scientific data may permit definitive answers to questions related to public health, but they may not resolve the initial controversy. In such instances, one must conclude that social, political, or legal issues drive the controversy. Obviously, all key scientific questions can never be answered to the complete satisfaction of all parties, and the same is true for social, political, and legal concerns. Thus, short-term studies involving relatively small expenditures of resources might be feasible to enhance the existing scientific data base. On the other hand, a reasonably complete data base for making decisions in the present or immediate future may not justify long-term studies (years) requiring major outlays of dollars and manpower.

The ten characteristics discussed in the above model apply in varying degrees to all controversies based on environmental poisoning episodes. Like other controversies, the dioxin controversy can be examined in the framework of this model. The analysis begins with an evaluation of the episodic event and traces its evolution to a full-blown controversy. It is difficult to identify a specific episodic event for dioxin, although the horse arena deaths in Missouri in 1972 and the Seveso, Italy, Dioxin Episode of 1976 aroused the public's awareness of dioxin. Nevertheless, it is probable that dioxin-contaminated Agent Orange used in South Vietnam repre-

sents the major episodic event, especially as it relates to the intense publicity given to dioxin, Agent Orange, and the Vietnam veteran in March 1978.

Table 2 describes the dioxin controversy as applied to the criteria for assessing environmental health issues. Public and private perceptions of controversial issues are manifested as fear of the unknown, such as the risk associated with a poisonous chemical in the environment. The public does not always react to that fear in proportion to the seriousness of the threatened harm. This is particularly true of "quality of life" issues in which determination of risk involves value choices. Positions taken by the media and the courts may be independent of scientific consensus regarding the actual risk. The media response to this issue deserves some additional examples.

INTENSE MEDIA CAMPAIGN

Station WBBM, a television affiliate of the Columbia Broadcasting System in Chicago, Illinois, aired a special report in March 1978 on the subject, "Agent Orange: Vietnam's Deadly Fog." This film reviewed a number of past environmental episodes allegedly involving 2,4,5,-T and TCDD. Kurtis (7), the WBBM reporter, compared symptoms described by some Vietnam veterans in the Chicago area with the symptoms identified in past "poisoning" episodes. Veterans shown in the film claimed that they had been sprayed with Agent Orange during combat operations in South Vietnam. Kurtis concluded his documentary with these statements:

Officially the Veterans Administration is denying the claims of poisoning by Agent Orange. Their scientists simply feel there isn't any evidence to link defoliation with human problems. But after researching this report and listening to the recommendations of the leading dioxin scientists in the country, we feel there is a need for immediate testing of all Vietnam veterans who handled Agent Orange or went into sprayed areas. Not only for the sake of those who have told us of their symptoms but for the countless others whose lives and whose children's lives could be blighted by the dioxin poison in Agent Orange.

Wade (8) recently reviewed many of these articles and wrote that the "whole passel" of apprehensions "may have nothing to do with Agent Orange in scientific fact, but is grounded in other problems affecting the Vietnam veteran population and has been launched into celebrity by a self-generating series of press and television stories." He observed further:

In favor of the latter hypothesis, it may be noted that the first large batch of veterans' complaints about Agent Orange emerged in 1978 from Chicago shortly after the showing there of a television

Table 2. The Dioxin Controversy as Applied to the Criteria for Assessing Environmental Health Issues

Event/Characteristic	Brief Description
Episodic Event	The use of Dioxin (TCDD) contaminated Agent Orange, 1965-1970, in the Vietnam Conflict
Inadequate Sample Size	No satisfactory Exposure Index has been developed for Epidemiologic "studies". Industry populations exposed to TCDD small.
Inadequate Scientific Data	Little or no data available on the toxicity of TCDD (e.g., teratogenesis or carcinogenesis) at the time of Agent Orange use in Vietnam.
Intense Media Response	Most intense media coverage began in March 1978 with WBBM broadcast of "Agent Orange: Vietnams Deadly Fog."
Inadequate Government Response	Department of Defense and Veterans Administration did not respond to the Veterans' concerns over Agent Orange and dioxin until 1978. Initial response limited to establishment of the Agent Orange Registry.
Special Interest Groups	Vietnam Veterans have not only lobbied the traditional veterans organizations (e.g., American Legion) but have also founded Vietnam Veterans of America and Agent Orange International. These two latter groups have Agent Orange as major issue.
Initiation of Lawsuits	Following more than 5 years of legal maneuvering, an out-of-court settlement for \$180 million occurred in 1984 between 7 chemical companies (all had been producers of Agent Orange) and Vietnam veterans as a class.
Advisory Groups	The Veterans Administration and many individual states chartered Advisory Groups to provide guidance for the establishment of programs. In 1981, the Federal government formed the 12-Agency Agent Orange Working Group.
Unsatisfactory Resolution	Despite the success of the above litigation action, veterans have been unsuccessful in obtaining compensation for dioxin exposure from the Federal government.
Congressionally-Mandated Action	In December 1979, Public Law 96-151 required the conduct of epidemiologic studies of Vietnam veterans. In November 1981, Public Law 97-72 authorized the Veterans Administration to provide eligible veterans medical care and treatment for illness possibly related to Agent Orange/Dioxin exposure. In October 1984, Public Law 98-542 was enacted that required VA to compensate veterans or their survivors for disabilities or death related by sound scientific and medical evidence to dioxin exposure.

documentary about the herbicide's possible effects on health. The idea spread like wildfire among veterans' groups; here at last was a tangible cause for all their discontents. Each claim filed generated more newspaper stories which generated further claims, until the present fervid atmosphere had been created.

CONCLUSION

Neither the government nor the scientific community has resolved the numerous environmental, medical, and political issues surrounding the dioxin controversy. Unfortunately, Federal Agency positions on the hazards associated with dioxin are either not well defined or not uniformly accepted, thus perpetuating the controversy. The scientific community must continue to conduct valid research on pertinent environmental and health-related issues to provide a reliable basis for appropriate decision making.

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