A Crisis of Community Anxiety and Mistrust: The Medfly Eradication Project in Santa Clara County, California, 1981–82

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Abstract: Public anxiety of near panic proportions was created by the announcement of a plan to commence aerial application of malathion bait over a large urban area in California for the eradication of the Mediterranean fruit fly within four days. A risk assessment had reported the project entailed no significant risk to health but environmentalist groups and the media ignored the report. We describe the successful measures taken by State health workers to counteract the anxiety which itself constituted a serious public health problem.

The most important measure was the rapid convening of a Health Advisory Committee composed of recognized experts and local professionals and leaders to provide an authoritative, respected and sympathetic voice to deal with the community's concerns. These experiences may be of value to other communities facing unwarranted anxiety over perceived environmental hazards. (*Am J Public Health* 1990; 80:1301–1304.)

Introduction

In the past two decades numerous public health "crisis" situations have arisen caused by local environmental contamination. Examples include Love Canal, Three Mile Island, the polybrominated biphenyl contamination of the food chain in Michigan, and the dioxin soil contamination in Times Beach, Missouri. While the severity of health risk varied greatly among these and similar episodes, a major component in all of them was a high level of public anxiety, sometimes out of proportion to the actual health hazard. This anxiety was generally fueled by mistrust and anger directed toward governmental agencies that were frequently perceived as arrogant in their disregard of the public's apprehension; the public anxiety was often exacerbated by media attention and misinformation.

In some episodes, mistrust and resentment has persisted for years, long after the health hazard has ceased to exist. The social and psychological factors involved, the nature of public perception of environmental threat, and the role of the media have been reviewed by Schwartz, *et al.*, and others.[1–3]

In these crisis situations anxiety itself can become a health risk.[2–4] Providing honest and objective information and allaying unfounded fears and misperceptions becomes an urgent public health task.[5] This article describes an approach to this public health problem that worked well in a situation of rapidly mounting public anxiety and mistrust: the 1981 program to eradicate the Mediterranean fruit fly (Medfly) in Santa Clara County, California, by the aerial application of pesticidal bait over a largely urban area with 1.2 million inhabitants—the "Medfly Project."

Background

In June 1980, several Mediterranean fruit flies were found in Santa Clara County. Agriculturists asserted that this pest could cause major economic and environmental effects if it became established in California. Pest control staff of the US Department of Agriculture (USDA) and California Department of Food and Agriculture (CDFA) embarked on a local small scale eradication program which received little media attention or public notice.

By late November 1980, the Medfly infestation was becoming more widespread and control efforts were failing. The project officials decided to shift to an aerial pesticide application program and scheduled a press conference on December 3, at which they planned to announce the details of their plan. There was no prior consultation with state or local public health or environmental agencies.

The program as announced was for six weekly applications of a malathion bait mixture consisting of one part malathion to four parts Staley's corn protein bait. The plan was to spray this viscous material from an altitude of 500 feet in daylight hours using World War II vintage DC-3 aircraft. The application rate would be 2.4 ounces of malathion per acre, in droplets averaging 800 microns in diameter. No public announcement was made regarding health hazards or safety.

There was vigorous public opposition to the eradication plan on both environmental and health groups. The media devoted considerable attention to the story and local public officials expressed concern. The environmental epidemiology unit of the California Department of Health Services (CDHS) commenced a health risk assessment of the proposed aerial application project.

The assessment involved a rapid, relatively comprehensive literature search and consultation with governmental and academic groups engaged in toxicology research. The information was then analyzed from a conservative (i.e., health-biased) viewpoint and the assessment report was released on December 15.[6]

There was extensive scientific literature on malathion, one of the most common home and garden pesticides. Human exposure studies had clearly established a very low degree of acute toxicity. Reported cases of acute illness and deaths in Pakistan from exposure to malathion were determined to be the result of a concentrated malathion product of European origin containing a high level of toxic isomers; and extraordinary degrees of dermal exposure to untrained, unprotected applicators.

Numerous studies had shown malathion to have no mutagenic or teratological effects.[7,8] Developmental defects had been described in chick embryos. These findings were no

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longer considered pertinent to mammalian embryology but were cited by project opponents as evidence of teratologic potential. Cancer bioassays by the National Cancer Institute (NCI) had been performed twice on both rats and mice and were interpreted as negative.[9] However, a pathologist associated with a laboratory that performed studies under contract to NCI claimed in an unpublished report that the interpretation of the two sets of studies was incorrect and that malathion should be classified as a carcinogen.[10]

The CDHS evaluation found that the exposures involved in the proposed eradication project presented no risk of acute toxic effects nor of mutagenic or adverse reproductive effects. With regard to carcinogenicity the assessment made a worst-case assumption that the uncorroborated interpretation of the carcinogenicity of malathion was correct. CDHS staff then made a series of further worst-case assumptions each adding one or more orders of magnitude to the risk; yet they still arrived at the conclusion that the malathion bait application posed no significant cancer risk to the exposed population.

The CDHS report explicitly recognized the presence and importance of public anxiety and recommended that "maximum effort should be made to inform the public of the details of the operation and to invite and answer questions." It called for "the development of a careful risk/benefit evaluation with input from appropriate authorities in both health and environmental protection." It pointed out that there should be "widespread use of the media concerning the times of aerial application . . . as well as the avoidance of unnecessary human exposure." It stated that the greatest health risk could be from the "low-flying planes and the possibility of a crash in an urban area."[6] The report also recommended ongoing analysis of the malathion supply for the presence of more toxic impurities and breakdown products and monitoring of the droplet size to ensure that it was well above the respirable range. All these recommendations were accepted and agreed to by the CDFA.

The CDHS evaluation was greeted with strong criticism by opponents of the Medfly eradication project. Little attention was paid to the fact that actual human exposure to malathion would be extremely low because of the form and manner and rate of its application, i.e., that the extremely low dose precluded the occurrence of toxicity. Instead, criticism was based on issues such as the "carcinogenicity" of malathion, its alleged reproductive and teratogenic effects, its relationship to chemical warfare nerve gas, and its toxic effect on bees and fish. These criticisms were augmented by the arguments of those who opposed pest eradication programs in principle and favored the use of biological control methods. Overall, there was the feeling of distrust of governmental agencies and of agribusiness and their excessive reliance on pesticides. The county board of supervisors and the city councils of 13 cities passed resolutions or ordinances against the aerial application project.

The controversy subsided slightly when the Medfly project managers decided under the direction of California Governor Edmund G. Brown, Jr. to defer aerial spraying and to rely instead on an intensified program of fruit-stripping, ground spraying of infested locations, and release of sterile flies for biological control. This decision was prompted by two factors: the widespread public opposition, and the opinion of university entomologists that malathion bait would have little effect on the Medfly in winter when the insect existed largely in pupal form in the soil.

Some risk/benefit discussion continued during the winter of 1981. Of public health importance was the recognition that if the eradication project did not succeed and if widespread Medfly infestation were to occur, California agriculture would increase its already extensive use of highly toxic pesticides. Also, before California produce could be sent to other states or exported it would have to be fumigated with ethylene dibromide (EDB), a highly toxic material, a potent animal carcinogen, and a sperm toxin.[11] Use of EDB would present a special hazard to agricultural workers and unacceptable residues could remain on agricultural produce.

The Crisis

In June of 1981, the situation changed dramatically. After months of apparent successful eradication, large numbers of fertile flies began to appear in the monitoring traps. On July 10, the USDA announced that unless the aerial application program was instituted, all California produce would be quarantined. Governor Brown felt he had no choice but to comply and the aerial application was scheduled to begin on July 14. Public concern about possible long-term effects of malathion exposure was rapidly rekindled by environmental and legal action groups and publicized by the media. The faculty of one department at a prestigious university medical school issued statements indicating the likelihood of adverse health effects and strongly opposing the project.[12]

The public perception was that of agricultural "crop dusters" swooping over their homes and drenching them with pesticide. The fact that the material was to be applied as bait, in small amounts (2.4 ounces per acre), from a considerable height, and in viscous droplet form was not part of the perception. As a result, when the decision to begin the aerial program was announced on July 10 (now using helicopters flying at night instead of old bombers by day), the community was in a near state of panic. On several days virtually the entire first section of the *San Jose Mercury News* and the *San Francisco Chronicle* were devoted to stories about the project. The Red Cross set up several relocation shelters outside the spray area, particularly for pregnant women. Local officials sought injunctions; environmentalist groups held daily rallies; and some individuals declared they would shoot down the helicopters.

Public health personnel, when given radio or television time to try to alleviate public anxiety, were generally followed on the air by attorneys or women holding infants indicating they did not believe these "experts" and that they planned to get out of town. Statements from state or federal agriculture officials about the low risk of health effects were greeted with skepticism by a community quick to point out "conflict of interest." The agricultural agencies in charge of the program at its inception had virtually ignored public anxiety about possible health effects. It was apparent that the public would not accept their assurances. At this point the Governor asked the Director of CDHS, Beverlee A. Myers, to intervene.

Public Health Intervention

Public health officials had hitherto not been involved in the policy formation or operation of the eradication project. Despite this, it was apparent that, given the level of distrust in the community, mere assurances from another state agency were unlikely to calm the mounting clamor. Director Myers, recognizing the precipitous and emergency nature of the situation, outlined two main facets of the problem. One immediate requirement, with the onset of spraying only three

days away, was to provide a mechanism for responding to requests for information from thousands of almost terror-stricken people. A more basic but equally urgent need was to provide an immediate substitute for the "cacophony of voices"; to put in place an authoritative, respected and sympathetic voice to deal with the community's concerns; to play the role of convener, on an emergency basis, of a body to provide such a voice.

To meet the emergency need, nearly 40 CDHS personnel were dispatched to staff a quickly organized phone bank operating around the clock at the county health department. In addition the Santa Clara County Medical Society was thoroughly briefed and its resources enlisted to provide medical information concerning the project to health professionals and to the public.

Director Myers, acting with the assistance of the county medical society, immediately convened an expert "Medfly Health Advisory Committee" and arranged for it to meet the following day.

The members of the committee were chosen with care and included:

- Noted academic physicians, including two who had been in prominent opposition to the aerial application program;
- Respected community clinicians from the local area, including nurses, obstetricians, pediatricians, and psychiatrists;
- Local public health and environmental health officials;
- Respected scientists including geneticists, experts in mutagenesis, and toxicologists.

The committee was staffed by CDHS physicians and met for many hours beginning July 11. Its first task was to review the extant literature on malathion, to scrutinize carefully the proposed eradication program, and to examine the possible health consequences of failure to eradicate the Medfly. They were able to reach unanimous consensus that the aerial application project posed no threat to public health.

In the first week the committee did the following:

- It rewrote a health information bulletin for the public and concluded unanimously with the statement, "The major health impact of the program may well be from unwarranted public anxiety." In addition, it approved an explanatory letter to physicians explaining the program and outlining the toxicology of malathion in the unlikely event of a poisoning.
- Members of the committee made numerous media appearances voicing their concern about the public over-reaction and asserting their "third-party" view of the program. The committee also oversaw implementation of a "Health Hot-Line" for persons seeking telephone information about the effects of the chemical. The hot-line received over 8,000 calls in the first week of the program.
- The committee directed that studies be performed to ascertain whether there were any acute health impacts from the program and then established the scope of these studies as definitively as possible.

In addition the committee was charged to:

- Identify the realistic health concerns that existed about the use of the malathion bait application and to hold the public agencies involved in the program accountable for those concerns in an ongoing manner.
- Provide the channel for health information to the health professions and to the public.
- Make recommendations for measures to mitigate both any potential health impact and the public's concerns and to recommend appropriate and suitable long-term studies as indicated.

Subcommittees were formed to examine which studies on long-term health effects should be recommended. They reached the unanimous conclusion that although no long-term effects of the spraying could be expected, programs should be instituted to provide reassurance to the public (and long-term public health benefit) as follows:

- Extension of the newly authorized California Birth Defects Monitoring Program to the counties in the spray area. This was recommended as a long-term service to the community that would produce some answers concerning the possible teratogenicity of malathion as applied and would also provide the continuing long-term benefit of a monitoring mechanism to deal with other epidemiologic questions related to birth defects in the Bay Area.
- A special in-depth study of a sample of all pregnancies in the spray area and in a control area to discern adverse effects. The committee recognized that toxic reproductive effects were more likely to be manifested as increased fetal wastage than as an overall increase in birth defects.
- Incorporation of Santa Clara County into the San Francisco Bay Area cancer registry, which already encompassed five other counties on the Bay.

The committee recommended adequate funding for each of these projects. They publicly and aggressively alerted the Governor and the Legislature to these perceived needs and were eventually successful on all three accounts.

The Outcome

The success of the CDHS intervention was clearly demonstrable. The Red Cross evacuation shelters had been set up to accommodate over a thousand people. Fewer than 100 showed up the first night of the aerial application. After a few days the shelters were closed as demand disappeared. The press and electronic media limited alarmist stories and instead began to feature releases from the Health Advisory Committee. Editorial statements followed suit. The vocal opposition of local governmental bodies to the project diminished dramatically. At medical grand rounds, the university department that had warned about serious health effects was publicly chastised for irresponsibility. Public apprehension and opposition remained minimal despite the fact that the eradication program had to be enlarged to involve six additional counties for a total area of 1,300 square miles; that an average of 12 aerial applications per site were made instead of the six originally projected; and that the eradication was not completed until September 1982.

Discussion

The Medfly crisis presented public health officials with extraordinarily urgent demands: the need to develop an objective evaluation of the potential health hazards; the need to provide a response mechanism for information requests from a highly alarmed public; the need to create a suitable forum for scientific debate; and the requirement to act in the role of emergency convener of local leaders and respected experts to provide understandable, reliable, and publicly acceptable information to a frankly mistrustful population.

The interventions of CDHS—both in the provision of emergency information and the establishment of the inde-

pendent Health Advisory Committee—proved effective in ending the near panic and allaying residual public anxiety and mistrust. In particular, the committee was clearly seen to be independent, authoritative, and committed to the public interest, and its pronouncements were accepted accordingly.

Two studies on reproductive effects have been published. Both yielded negative results.[13,14] Surveys using symptom interviews to assess possible acute health effects were rapidly designed and conducted.[15] They showed that symptom prevalence actually declined after the spraying began, especially for symptoms with possible attribution to anxiety. These experiences may be of value in similar situations involving community mistrust and anxiety over perceived environmental hazards. In the recent Medfly eradication project in Los Angeles, public anxiety and resentment reached levels exceeding those a decade earlier in Santa Clara County before the CDHS was called on to intervene and again create a forum to provide an avenue for scientific debate and objective evaluation of potential health hazards.

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