FOREWORD

Health Effects of Volcanoes: An Approach to Evaluating the Health Effects of an Environmental Hazard

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This monograph provides a case study of the concerns and responses of North American communities, public health agencies, and basic research scientists to the disastrous explosive eruptions of Mount St. Helens in 1980. The major eruption of Mount St. Helens on May 18, 1980 caught almost everyone off their guard. Despite the predictions by US Geological Survey scientists just a few years earlier[1] of an imminent major eruption, and despite several months of premonitory volcanic activity, the public steadfastly refused to believe that a major eruption might occur and public health officials had no contingency plans ready to deal with the ashfall-related hazards.

It is probably fair to say that few if any medical or public health professionals in the United States had given any thought to what the medical effects of volcanic activity might be. Those who had would have found it very hard to unearth any solid scientific data about the effects of volcanic ash on various organ systems and, more broadly, about the effects of volcanic activity on physical and mental health. This may seem curious since volcanoes have always posed a threat to health and have been responsible for around 55,000 deaths in the 20th century alone.[2] The vast majority of these deaths, however, have resulted from massive flooding and tidal waves that have occurred in the aftermath of the volcanic eruption. Typically, the immediate public health concerns following a volcanic eruption relate more to the practical problems of dealing with refugees and preventing further mortality and morbidity than to spending limited financial resources on trying to measure relatively subtle and probably minor clinical effects.

One of the reasons that the eruptions of Mount St. Helens prodded the medical and scientific communities in North America to take a closer look at the effects of volcanic activity on health was the realization that Mount St. Helens is not the only explosive volcano in North America capable of such destructive force; six volcanoes in California, Oregon, and Washington are active and potentially hazardous (Figure 1). Although the west coast of the US does not have anything like the population density of Indonesia, where explosive volcanic eruptions occur every few years, there was clearly the potential of a sizable population mass being affected by volcanic activity (Figure 2). This provided the impetus for scientific investigation that went beyond the immediate public health response. In this monograph, we describe both the immediate public health-related concerns and response in the aftermath of the eruptions of Mount St. Helens from May through October 1980, and how we addressed the question of potential long-term health effects.

It is interesting to look back over the five years since the major eruption of Mount St. Helens in 1980 and remember how anxious the population in the impacted area was about the potential effects of the volcanic activity on human health.

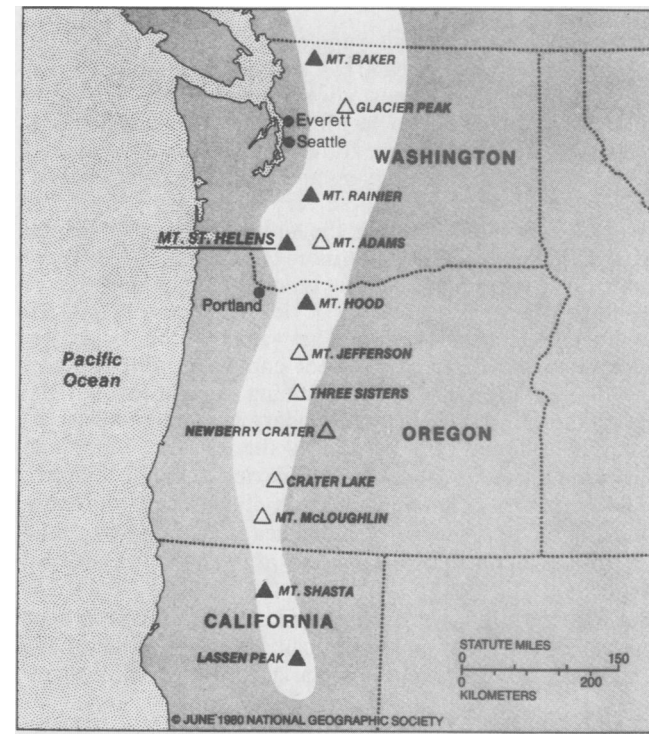

FIGURE 1—Triangles mark the major volcanoes of the Cascade Range (the area shown in white); black triangles designate the volcanoes that have erupted in the past 200 years and still show signs of thermal activity.
SOURCE: *Mt. St. Helens Erupts*, published by the *Everett Herald and Western Sun*, reprinted with their permission.

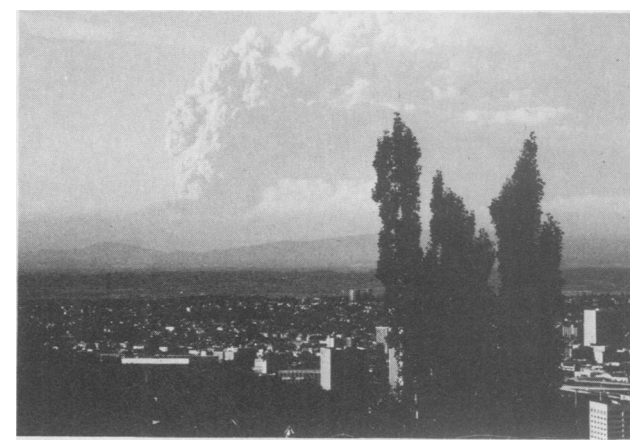

FIGURE 2—A modest eruption of Mount St. Helens in June 1980. The city of Portland, Oregon is in the foreground.

The intensity of this anxiety undoubtedly related in large part to the fact that so little information existed.

Previous publications have provided useful descriptions of the effects of volcanic activity on human safety and

NOTE: Author affiliations and addresses are listed on p vi.
Editor's Note: See also related editorial p 233, Am J Public Health March 1986 issue.

health.[3–6] Their usefulness has been somewhat limited, however, because they have been mostly anecdotal rather than based on results obtained from carefully designed and rigorously executed experimental and observational studies. We hope that the value of this Supplement to health professionals lies as much in its description of the laboratory and epidemiological approaches taken to assessing the nature and characteristics of acute and long-term health effects of Mount St. Helen's eruptions as in the answers that have been obtained.

We recognize that this Supplement does not address the practical issues of search and rescue and the public health and safety concerns which must always take priority. We chose not to dwell on the public health aspects of feeding, housing, and providing medical care to refugees because we did not have to deal with this problem and because recent publications have dealt with this topic very effectively.[7–11]

It seems likely that, in the future, the art of natural hazard prediction will become more of a science. An increase in the lead time, and in the precision and reliability of predicting natural hazards will obviously be very helpful for public health professionals. The value of this is greatly diminished, however, if it is not combined with effective pre-disaster planning. Such planning should involve the design of both primary and secondary preventive measures and should identify the barriers to the implementation and operational effectiveness of such barriers. One of the most important barriers in all countries continues to be the availability of funds which can be mobilized rapidly to provide the scientific backup both during and after the acute medical response.

Finally, it is worth emphasizing that the approach described in this Supplement can be generalized to the evaluation of other environmental hazards. We have therefore stressed the reasoning behind the laboratory and applied research approaches that were taken and have placed less emphasis on a detailed description of the results of the studies that were carried out. These have been or will be published in the appropriate peer reviewed literature.

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