DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
ATLANTA, GEORGIA 30333

CDC--MOUNT ST. HELENS VOLCANO HEALTH REPORT #9 June 24, 1980

CDC Hospital Surveillance--Hospital Emergency Room Visits, Yakima, Washington

The diagnosis of emergency room (ER) visits to one hospital in Yakima, Washington, for the month of May 1980 were reviewed. Similar data from the one other Yakima hospital in the hospital surveillance system are awaited. Yakima received over an inch of volcanic ash from the May 18, 1980, eruption.

There were 2- to 3-fold increases in the number of ER visits for eye problems such as foreign bodies, corneal abrasion, eye irritation, conjunctivitis, and "red eye" for the 2 weeks after the eruption (May 18-31), compared with the 2 weeks before (Table 1).

In the same 2 periods, there was a 5-fold increase in ER visits by asthmatic patients; the increase was especially marked for the week after the ashfall. Other increases were for visits diagnosed as "hyperventilation syndrome" and airway irritation from volcanic ash, sore throat, cough, shortness of breath, and chronic obstructive pulmonary disease (COPD) or emphysema. No increase in visits can be seen for patients diagnosed as having acute or chronic bronchitis.

Except for an increase in the number of complaints of chest pain, the number of ER visits for cardiac problems (myocardial infarction, congestive heart failure, and arrhythmias) showed little or no increase after the ashfall.

The greater number of respiratory and eye problems during the first week after the eruption coincided with high levels of total suspended particulates (TSP) for several days after the ashfall (Table 2). Increasingly higher wind speeds (up to 25-29 mph on May 24-25, 1980) caused the fallen ash to be resuspended in the air. A rainfall of 0.4 inches on May 27 helped reduce the level of airborne dust, and this may partly explain the lower morbidity in the second week after the ashfall.

NIOSH Study of Loggers

This week, NIOSH, CDC, is beginning a study of respiratory health of timberworkers in the area of the Mount St. Helens ashfall, using a mobile pulmonary laboratory. This health hazard evaluation is being undertaken at the request of the Weyerhaeuser Company. About 400 exposed workers in 5 logging camps or sawmills will be studied, together with a control group of workers in camps free of ash. The aims are to obtain baseline data for longitudal studies of lung function, immunology, and morbidity and to evaluate the acute effects of ash exposure. Loggers are generally considered to be one the groups at highest risk in terms of occupational exposure to ash. Industrial hygiene measurements for total and respirable dust using personal and static samplers will be performed on several different occasions in the first 6 months and will be continued thereafter. Samples will be analyzed to assess air concentrations and of particle size of ash, and concentrations of free silica as well as trace metals.

Clinical and Epidemiologic Studies of Community Exposure to Ash

In addition to the hospital surveillance system and the Moses Lake symptom questionnaire study, the results of which have been appearing in issues of this health report, CDC is involved in coordinating other health studies being planned or undertaken in collaboration with the Washington State Health Department. These include the evaluation of mortality data in areas of ashfall (already in progress with Washington State Health Department) and a case-control study of patients with respiratory disease associated with ash exposure. A telephone survey of asthmatic children is in progress under the auspices of the

Table 1: Diagnoses (eye, respiratory and cardiac only) of emergency room visits at one hospital, Yakima, Washington, May 4-31, 1980.*

	Week of May 1980			
	4-10	11-17	18-24	25-31
EYE				
Foreign body	6+6R	2	11+2R	13+2R
Irritation/abrasion	4	1	6	6+2R
Conjunctivitis/"red eye"	1	1	4	2
Blepharitis	2	0	0	0
Other eye conditions	5	1	3	1+2R
RESPIRATORY				
Epistaxis	3	3	0	2
Fever only	0	4	3	1
Hay fever/allergy	0	0	1	0
URI/cold/viral syndrome	23	11	25	16
Tonsillitis	5	4	1	6 (1)
Oral thrush	2	1	0	0
Pharyngitis/laryngitis	7	6	12	5
Sore throat	6	12	11	19
Airway irritation	0	0	8	2
Cough	2	5	10	8
Wheezing	0	1	1	1
Hyperventilation	0	0	6	3
Shortness of breath	1	7	16 (1)	7
Bronchitis, with URI or otitis	4	2	4	4 (1)
Bronchitis, acute	5 (1)	6	9 (1)	3 (1)
Bronchitis, chronic	1	0	0	1
Asthma	3 (1)	2	20 (3)	6 (1)
COPD/emphysema	3 (1)	2 (1)	8 (4)	5 (3)
Pneumonia	4 (3)	3 (1)	4 (2)	0
Pneumonitis	1	2 (2)	1	0
Pneumothorax	0	0	1 (1)	1 (1)
Hemoptysis	2 (1)	0	0	0
Other upper respiratory	0	0	0	1
Other pulmonary	1 (1)	0	2 (2)	0
CARDIAC				
Chest pain	7 (1)	16 (3)	23 (3)	16 (4)
Angina	6 (6)	3 (2)	6 (5)	7 (5)
Myocardial infarct	2 (2)	0	0	0
Congestive failure	3 (1)	2 (1)	3 (2)	4 (2)
Arrhythmia	1	2 (1)	3 (1)	2 (1)
Other cardiac	0	1 (1)	0	1

*First volcanic eruption with ashfall--May 18, 1980.
R=Return visit for follow-up.
Numbers in parenthesis are the patients admitted into the hospital.

Table 2: Yakima--EPA High Volume Air Samples

Date	Time of Sampling	Total Suspended Particulates ($\mu g/m^3$)
May 18	12:00-16:00	35,621
18-19	16:00-09:00	15,142
19	09:00-13:00	15,134
19	13:00-17:00	13,860
20	09:00-13:40	6,345
20	13:40-17:00	5,743
20-21	17:00-09:00	5,523
21	09:00-13:30	7,879
21	13:30-17:00	14,386
21-22	17:00-09:00	3,644
22	09:00-13:00	27,774
22	13:00-17:00	33,974
23	08:00-18:00	11,606
23/24	18:00-09:00	10,163
24/25	09:00-09:00	2,011
25/26	10:00-10:00	3,979
26/27	10:30-10:00	270
27/28	10:00-09:30	242
28/29	09:30-09:30	355
29/30	09:30-09:30	740
30/31	09:30-03:30	274
Jun 2/3	10:30-09:30	245
3/4	09:10-09:10	188
5/6	10:00-09:10	190
6/7	10:00-09:10	195
7/8	09:10-09:30	237
8/9	10:00-09:20	269
9/10	09:30-09:30	178
10/11	09:30-09:30	188
11/12	09:30-09:30	283
12/13	09:30-09:30	206
13/14	09:30-09:30	68
14/15	00:00-24:00	184
15/16	09:30-09:30	91
16/17	09:30-09:30	175
17/18	09:30-09:30	126
18/19	09:30-09:30	274
19/20	09:30-09:30	180
19/20	00:00-24:00	237
21/22	09:30-09:30	215
22/23	09:30-09:30	98

(NOTE: US EPA Air Pollution Standard: maximum 24-hour concentration=260 $\mu g/m^3$)

Washington Thoracic Society and University of Washington; a study with the same groups of patients with chronic bronchitis and adult asthmatics is also under urgent consideration. Protocols for community and occupational longitudinal studies and a long-term autopsy survey have been received from several university and other groups. The early undertaking of such surveys is regarded as important by CDC, and the considerable commitment required in terms of funding and manpower necessitates careful planning and coordination at this stage. Discussions are currently under way on these matters. Due consideration is also being given to the possibility of further ashfalls from Mount St. Helens and the need in the future for the rapid application of knowledge gained from the previous eruptions.

Laboratory Studies

In vitro studies of volcanic ash, e.g., mutagenesis and effect on macrophages, are being undertaken by NIOSH as well as other laboratories. Animal inhalation studies are also being planned.

Disposal of Ash

Disposal methods and control technology are being assessed by NIOSH, Cincinnati. FEMA's Mount St. Helens Technical Information Network Bulletin #19--"Controlling Blowing Dust from Volcanic Ash"--has information on a variety of materials which can suppress dust formation by forming a firm crust on top of the ash.

Toxic Gases

Sulfurdioxide (SO_2) emissions vented from the volcano are being monitored. The U.S. Geological Survey (USGS) has informed CDC that SO_2 output is likely to increase during the present formation of the plug at the mouth of the volcano. On June 3, it was estimated by USGS that 100 to 200 tons of SO_2 were being released daily, but by June 6, this amount had increased to 1,000 tons.

Monitoring for SO_2 is not currently being undertaken close to Mount St. Helens, but EPA is routinely monitoring ambient concentrations of SO_2 as well as suspended particulates in Port Angeles, Longview, Tacoma, and Spokane (Table 3). No discernible increase above background levels which can be related to the volcano has so far been observed, either for hourly maximum levels or 24-hour averages, but these data are currently under review. Ranges of SO_2 (ppm) for both these values are shown below.

Table 3: SO_2 Concentrations in Ambient Air at Selected Sites, May 18-June 22*, 1980 (EPA Monitoring Stations)

	1-Hour Maximum (Range ppm)	24-Hour Average (Range, ppm)
Port Angeles**	0.04 - 0.31	0.007 - 0.077
Longview	0 - 0.05	0 - 0.007
Tacoma	0 - 0.08	0 - 0.017
Spokane	0 - 0.04	0.002 - 0.012

EPA 3-Hour Maximum Limit--0.5
EPA 24-Hour Maxmimum limit--0.14
(Neither to be exceeded more than once a year)
*Excluding June 6-10
**Excluding June 14-22

EPA is also actively studying the possible wide ranging (beyond Washington State) effects, including acid rain, of SO_2 emissions from Mount St. Helens.

Ambient Air Levels of Total Suspended Particulates

Data are being evaluated by EPA from their monitoring stations in the areas of ashfall; we hope to present an updated summary in the next issue.

Radioactivity of the Ash

Several laboratories have been studying the ash for radioactivity. So far, CDC has not been notified of any adverse health implications from these studies, but CDC is keeping the subject under close review. We hope to provide a summary of the latest findings in the forthcoming issue of the health report.

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