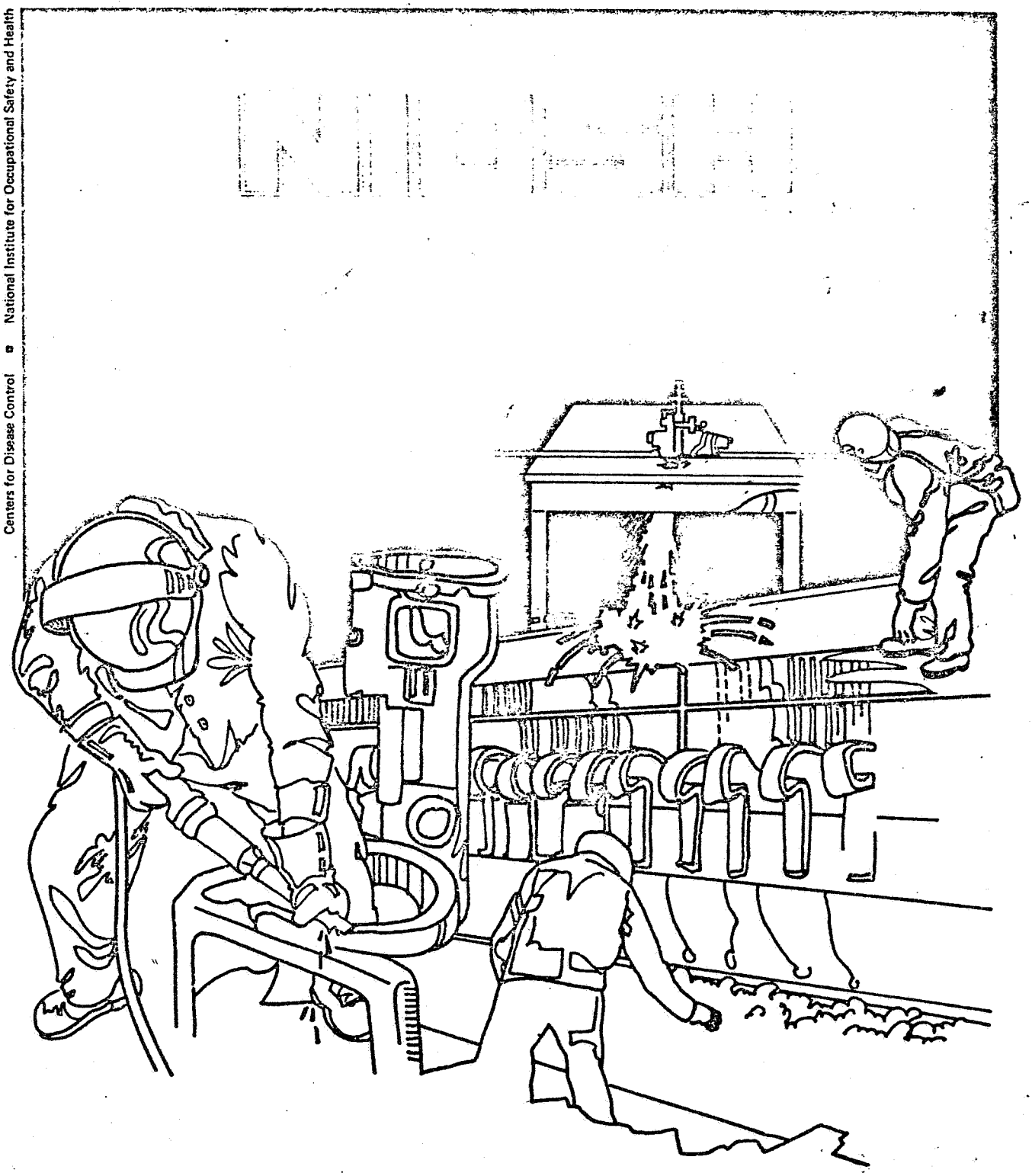
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES ■ Public Health Service
Centers for Disease Control ■ National Institute for Occupational Safety and Health



Health Hazard Evaluation Report

HETA 81-184-946
OUR LADY OF VISITATION ELEMENTARY SCHOOL
CINCINNATI, OHIO

PREFACE

The Hazard Evaluations and Technical Assistance Branch of NIOSH conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6) which authorizes the Secretary of Health and Human Services, following a written request from any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The Hazard Evaluations and Technical Assistance Branch also provides, upon request, medical, nursing, and industrial hygiene technical and consultative assistance (TA) to Federal, state, and local agencies; labor; industry and other groups or individuals to control occupational health hazards and to prevent related trauma and disease.

Mention of company names or products does not constitute endorsement by the National Institute for Occupational Safety and Health.

HETA 81-184-946
August 1981
Our Lady of Visitation Elementary School
Cincinnati, Ohio

NIOSH INVESTIGATORS:
Linda Frederick, R.N., M.S.N.
John Love, B.S.Ch.E.

I. SUMMARY

On February 4, 1981, the principal of Our Lady of Visitation School, Cincinnati, Ohio requested the National Institute for Occupational Safety and Health (NIOSH) to investigate the cause of outbreaks of skin rash, watery eyes, and breathing problems among fifth grade students and teachers. Between February 9-20 NIOSH conducted an inspection of the school environment; interviewed and examined affected students; examined the skin of the 4th, 5th, and 6th grade students to evaluate grade-specific prevalence rates of rashes and other signs of skin irritation; and sampled the air of the four classrooms used by 5th grade students prior to and since the second outbreak (January 22) for fibrous glass, general organics, ozone, metals, asbestos, and polychlorinated biphenyls (PCB's).

Skin symptoms present during this survey were generally described as a burning or itching. They were transient and generally occurred only at school. There was no consistent association between time of day, activity or weather. There was no obvious clustering of symptomatic students within the classrooms. Fifth grade students were found to have a greater frequency of rash or other signs of skin irritation than 4th or 6th grade students, but no clearly defined syndrome was apparent. The most common skin findings were small, usually single areas of redness and/or excoriations (as from scratching or rubbing). They tended to be on one side of the body, primarily on the face or forearm(s) and often on unexposed skin.

Air sampling results showed no detectable levels of asbestos, PCB's, or fibrous glass. Samples analyzed for organics revealed only carbon tetrachloride at a quantifiable level--0.04mg/$m^3$to 0.95 mg/m^3--with an OSHA permissible exposure limit of 65mg/m^3. Settled dust samples from the ventilation system showed no detectable amounts of asbestos. On a percent by weight basis, settled dust samples results were fibrous glass, iron, and calcium--greater than 1%; aluminum, cadmium, copper, sodium, phosphorus, lead, titanium, and zinc--less than 1%. The level of metals found in these samples should be considered common for settled dust. [A PCB capacitor for an electric motor in the heating unit of a storage room -- near the original fifth grade classrooms--overheated one week prior to the first report of a rash. In a separate NIOSH survey, HE 81-237-915, air and surface wipe samples were taken which revealed that PCB contamination from the capacitor was confined to the storage room.]

The cause of the outbreaks of skin rash and eye irritation in December 1980 and January 1981--two months prior to this investigation was not identified. In general, the symptoms and physical findings present at the time of this survey were not typical of any known environmental exposure.

Keywords: SIC 8210 (Elementary school) rash, itching, eye irritation, outbreak, epidemiologic study

II. INTRODUCTION

On February 4, 1981 the principal of Our Lady of Visitation School, Cincinnati, requested NIOSH to investigate reports of skin and eye irritation and breathing problems among fifth grade students and teachers. Outbreaks of skin rash in December, 1980 and again in January, 1981 had previously been investigated by several other health agencies, including the Hamilton County Health Department and the Ohio Department of Health, with no cause identified.

On February 9 and 10, a NIOSH industrial hygienist and an occupational health nurse conducted an initial investigation. On February 17, a team of NIOSH medical investigators conducted a skin examination survey of the 4th, 5th, and 6th grade students and later met with a group of parents at the school. On February 19, one of the NIOSH physicians who had participated in the survey two days earlier re-examined all of the fifth grade students with skin symptoms or findings. On February 20, the industrial hygienist performed environmental sampling. A letter (March 4) and an interim report (March 12) were sent to school authorities. [At the request of the Hamilton County Health Department, a separate environmental survey for possible PCB contamination, HE 81-237-915[1], was done on March 19 and 26. The results of this study were presented to the requestor and school officials on April 1.]

III. BACKGROUND

Our Lady of Visitation is a Catholic elementary school in a western suburb of Cincinnati. The building has been used as a school for approximately thirty years. Additions were made to the building in 1960 and 1970. The basement of the first addition was divided into four rooms (24,25,26, and 27) in the 1960's. This area has been in continuous use except for a three year period (approximately 1976-78) when the ceiling tile had to be replaced because of tornado damage. For the school year 1980-81, Rooms 24 and 26 were used as fifth grade homerooms; Room 25 for special fifth grade classes; Room 27 for storage.

There are two fifth grade homeroom teachers and a third teacher who conducts only special classes. Before the original outbreak on December 11, fifth grade students moved freely between Rooms 24 and 26 for various classes. On December 11, a number of students from Room 24 suddenly developed itching and/or burning of the skin. The group had just made posters using Crayola poster paints and had placed the finished posters in the hall outside the classroom to dry. Within an hour about half of the fifth grade students (including those in Room 26) was affected and school officials moved everyone from the area. Shortly thereafter their symptoms were relieved. None of the teachers and no other classes were similarly affected. According to school officials, symptomatic students tended to be fair-skinned.

That afternoon the Hamilton County Health Department was called to investigate the outbreak. A representative examined the affected students, inspected the classrooms, and expressed the possibility that the symptoms might be caused by a "toxic irritant". He recommended

removal and analysis of the paints as a possible source and made arrangements for samples to be picked up the next day. Students returned to their original classrooms the next day where, within an hour, a similar episode occurred. They were again relocated within the building. That weekend, upon the advice of a representative of the Hamilton County Health Department, Rooms 24 and 26 were given a general housecleaning.

The following Monday, December 15, students returned to their usual classrooms. There were a few symptomatic students that day but none the rest of the week. School was closed for the next two weeks for Christmas holiday and reopened on January 5.

After the holidays the fifth grade students returned to their original classrooms where they remained without incident for 2 1/2 weeks. During this period (on January 7) a representative from the Consumer Product Safety Commission (CPSC) picked up the poster paint samples from the Hamilton County Health Department for analysis and visited the school. (CPSC later reported that the paints contained no toxic materials.)

On January 21, during lunch break, two fifth grade students reported to the school principal that they had a skin rash. By the end of school that day (3:30 pm) a total of 15 fifth grade students had also reported a rash and, for the first time, their homeroom teachers were also affected, i.e., both noticed a "chapped" feeling of the skin on the face. One also experienced chest tightness. The next day, about an hour after school started, approximately a third of the class reported a rash and, for the first time, eye irritation as well. That day the students were (permanently) relocated within the building (Rooms 8 and 10) and the area where the classrooms were located was no longer used.

A few students reported symptoms during the week of January 26-30, but no systematic records were kept. On January 26, the same fifth grade homeroom teacher who had experienced chest tightness earlier--now located in Room 10--noted a burning sensation in her throat and upper chest, chest tightness, and difficulty breathing. These symptoms caused her to be absent from school for three days. She has a history of seasonal allergy. About this time a few students also reported a transient feeling of chest tightness and/or difficulty breathing.

On February 2, representatives from the Ohio Department of Health investigated but were unable to determine the cause of the reported rash. Starting on this date all fifth grade students were instructed to report any unusual symptoms to either the school nurse or the principal's office, where they were recorded on a daily log. On February 4 the school principal requested NIOSH conduct an investigation.

IV. EVALUATION DESIGN AND METHODS

A. Environmental[2]

A sampling strategy was based on reported symptoms and knowledge of the building materials and cleaning agents possibly used in these classrooms. General area air samples were taken for organic compounds, fibrous glass, and polychlorinated biphenyl's (PCB) in the four fifth grade classromms: Rooms 24 and 26, which were occupied at the time of the

incident, and Rooms 8 and 10, where students were moved after the outbreaks. Organic compounds were collected on activated charcoal connected to a battery- operated vacuum pump operating at 1.0 liters per minute (lpm). The charcoal tube samples were desorbed in one milliliter of carbon disulfide and analyzed by gas chromatography using a 25-meter SP-2100 fused silica capillary column. The limit of quantification for these samples was 0.01 milligrams per sample (mg/sample). The fibrous glass samples were collected on mixed cellulose ester filters using a battery powered sampling pump operating at 2.0 lpm. Analysis of the filter samples was performed according to NIOSH method P & CAM 239. The limit of detection (LOD) was 0.03 fibers per field, which is lower than the reported LOD in the quoted NIOSH method. The sample for PCB's was analyzed on a gas chromatograph using an electron capture detector. The limit of detection was 0.01 mg/sample for Aroclors 1016, 1242, 1248, 1254, and 1260.

Direct reading measurement using colorimetric detection tubes samples were taken for ammonia, formaldehyde, styrene, acetaldehyde, acetic acid, formic acid, triethylamine, phenol and ozone. These direct reading samples were taken in the four classrooms, next to books used by the fifth grade students, over opened containers of cleaning agents, and in rest rooms.

Bulk samples of accumulated dust from the ventilation systems in Rooms 26, 24, and 8 were obtained for analysis of metals, asbestos, and fibrous glass content. (No dust was present in Room 10's ventilation system.) The samples taken for asbestos and fibrous glass were analyzed utilizing polarized light microscopy and dispersion staining techniques. Metals in the bulk samples of dust were analyzed using inductively coupled plasma-atomic emission spectroscopy. Due to the nature of the samples and lack of sufficient material, no quality control techniques were available to determine precision or accuracy of the analysis, therefore, only qualitative results were reported. [Air and wipe samples for PCB's were subsequently collected throughout the school, and extensively in Room 27 where a PCB capacitor for an electric motor in a heating unit had overheated one week before the first outbreak of rash in December. (Each room has an individual heating unit and there is no circulation between rooms.)]

B. Medical/Epidemiological

The medical/epidemiological evaluation consisted of (1) inspection of the environment and reconstruction of the temporal sequence of events through review of school records and questioning of school officials including the principal, school nurse, maintenance man and fifth grade students and teachers; (2) an interview and detailed skin examination of all symptomatic fifth grade students, and (3) a skin examination survey of the 4th, 5th and 6th grade students to determine any difference in grade-specific prevalence rates for skin rashes and other signs of skin irritation. Fourth and sixth grade students were chosen for comparison because of their similar age. Two NIOSH physicians, who did not know which grade or which individual students were affected, examined the face, hands, and arms of the students. Students from all three grades were randomly mixed so that their grades would not be known to the examiners.

V. RESULTS AND DISCUSSION

A. Environmental[3,4,5,6]

Direct reading measurements for ammonia, formaldehyde, styrene, acetaldehyde, acetic acid, formic acid, triethylamine, phenol and ozone were below the limit of detection for each compound. Carbon tetrachloride (CCl_4) was the only substance identified in the area air samples (Rooms 24, 26, 8 and 10) with a concentration that could be quantified (Table I). The CCl_4 levels ranged from 0.04mg/m^3 to 0.95 mg/m^3, which is below the NIOSH recommended occupational standard of 12.6 mg/m^3. Other major peaks identified were toluene, perchloroethylene, xylene, dichlorobenzene, alkanes, and molecular weight 120 aromatics; however, concentrations of these substances on all samples were less than the limit of quantitation (0.1 mg/sample). The air samples detected no fibrous glass or PCB's [limits of detection--0.03 fibers per field and 0.01 ug/sample, respectively (Table II)].

Three accumulated dust samples from the ventilation system had no detectable amounts of asbestos, and in one of three samples fibrous glass was non-detectable. The remaining two dust samples contained less than 1% fibrous glass. The analysis of the bulk dust samples for metals indicated that only two metals, iron and calcium, could be detected at levels above 1.0% by weight. Other metals--aluminum, cadmium, copper, magnesium, manganese, sodium, phosphorus, lead, titanium, and zinc--were present in the samples at levels of less than 1% of the material. (There are no health standards for constituents of settled dust.)

B. Medical/Epidemiological

During the course of the NIOSH investigation, skin symptoms were described as an itching, prickling and/or burning sensation which caused minor discomfort (generally students continued with their usual daily activities). There was no consistent relationship between the occurrence of skin symptoms and the time of day, activity or weather. They were transient and generally occurred only at school. A few students reported that their symptoms sometimes occurred at home as well and were associated with such things as heat (e.g., from an oven) and with the use of books from school. Several students volunteered that the "rash" could be elicited at will. One family member of a fifth grade student reportedly developed a rash after handling a fifth-grade book. One student reported that he developed a rash while playing an electronic game at the home of a friend. One student developed a rash on the same arm from which his cast had recently been removed.

The most common skin findings were small, usually single areas of redness, often with signs of scratching. Another frequent finding was an area of excoriation (as from scratching or rubbing). Most were unilateral, located primarily on the face or forearms--frequently on unexposed skin. With rare exception the hands were unaffected. A few students had a rash--a single area of redness with bumps. No clearly defined syndrome was apparent and no specific case definition could be established.

A examination survey of 55 fourth-, 66 fifth-, and 74 sixth-grade students for the prevalence of skin findings revealed a rate of 3% for rash and 5% for rash and/or redness among fourth and sixth grade students, compared to 13% for rash and 24% for rash and/or redness for the fifth grade. A previously unreported rash was observed on the exposed skin (arms and/or face) of one fourth and three sixth grade students. Despite the survey's intention that students and examiners would not talk during the examination, several fifth grade students volunteered such information to the examiners as--"I've got it (the 'rash')". Thus, the examiner's observations may have been biased.

Twenty one fifth-grade students known to be recently symptomatic or who had had a rash or other skin finding observed during the skin examination survey were interviewed and examined two days later. The findings were localized area of redness (two had redness of the cheek(s) and symptoms of eye irritation on the same side), 6; excoriated area (as from scratching or rubbing), 5; and one each of the following: rash (localized area of redness with rough, raised skin), right cheek; dry skin; scratch on face; breathlessness (no skin findings of observable signs of respiratory problems); "burning in the chest" (no skin findings or observable signs of respiratory problems); and burning of the skin (no skin findings). Three students had no symptoms or findings that day. There was one additional child who had red, swollen eyes, red cheeks and complaints of tiredness and sneezing. He had a history of allergy to molds for which he had been treated until one year ago. The appearance and severity of the findings were unlike those of other children examined and were suggestive, rather, of some acute process such as a viral infection or allergic reaction.

Several children reported eye irritation--usually unilateral-- described as dryness, itching, or burning. A few had watery, reddened eye(s) (usually unilateral) and when questioned admitted to rubbing their eyes. The cause for these symptoms is unclear, but much of the redness may have been caused by rubbing. Eye symptoms developed some time after the skin symptoms (after January 21) and were not as prevalent (see Figure 1). During the week of March 2, there was only one such case. A few students (and one teacher) reported having breathing problems, described usually as chest tightness and difficulty getting a breath. Typically these breathing problems were transient episodes which lasted several minutes and were quickly relieved upon leaving the room or going to a window. They began in early February, peaked in mid-February, and subsided during the week of March 2. They were not associated with any objective signs of respiratory distress, such as labored breathing or wheezing and were not suggestive of any medical problem.

VI. GENERAL DISCUSSION

Inspection of the original classrooms and questioning of school authorities, teachers, and students revealed no consistent association between the symptoms and findings present at the time of the investigation and a putative environmental agent. There were no recent problems associated ceiling tiles, ventilation, lights, or sewers and no construction in or around the school. There was no obvious clustering of symptomatic students in the classrooms.

At the time of the first outbreak it was suggested that the poster paints being used by the fifth grade students at the time of the original outbreak (December 11) might be causing the rashes, but there were several factors which argued against this theory: (1) the poster paints were being used only by the students in Room 24, yet students from Room 26 also developed symptoms; (2) these paints had been used previously by this and other grades without incident; and (3) symptoms recurred even when the paints were no longer being used.

When symptoms continued even after the students were relocated, many thought that their symptoms were caused by their books--which they had brought with them from the original classrooms. There was no consistent association, however, between books and the symptoms present at the time of this investigation. Anecdotal information supports this conclusion. Four periodically symptomatic students were moved to the library (with their books). They remained in this area--asymptomatic--most of the day until several other (symptomatic) fifth grade students joined them. Shortly thereafter one of the original four students developed an area of redness on one arm. One student who felt that her textbooks were causing her symptoms held one of her books against her face to see if it caused a reaction. After several minutes she developed an area of redness on her face where the book had been held. When she later placed an "uninvolved" book against the other side of her face, however, she developed a similar reaction. We asked several other symptomatic students to demonstrate how they held their books when they were reading. In each case the student held his/her book so that it was resting on the affected area of the arm, suggesting that friction or pressure was a possible cause of the "rash". The areas in most intimate contact with the books--the hands--were unaffected.

Other students suggested that their rashes were associated with their desks. Their symptoms, however, continued even after they were no longer using these desks, i.e, while they were sitting at tables in Rooms 8 and 10. Also, the distribution of skin findings on the body was not necessarily that area which came in the most direct contact with the desks. The day after the desks were brought up to Rooms 8 and 10 (February 10), the prevalence of skin symptoms increased appreciably (see Figure 1). They remained at a higher level for the next two weeks gradually subsiding toward the end of February. These desks (from Rooms 24 and 26) which had been cleaned and rinsed twice prior to being brought upstairs were removed from Rooms 8 and 10 on March 3. Skin symptoms continued, although at a lower rate, through the end of the recording period--March 11.

Among the several suggestions received by NIOSH was that the rashes might be caused by PCB's from malfunctioning or burned out ballasts of fluorescent lamps in the classrooms. None of the fluorescent lamps fixtures in the fifth grade classrooms, however, were recently malfunctioning. In early March, after the onsite evaluation portion of this study was complete (February 20), NIOSH learned that on December 3, one week prior to the first report of a rash, the capacitor on the motor for the unit heater in Room 27, a storage room across the hall from the original classrooms, had overheated. One of the fifth grade parents suggested that the skin symptoms were caused by PCB's and that the

capacitor attached to the motor was a source. In addition, however, to the epidemiologic evidence the symptoms present at the time of this investigation were not typical of an environmental cause, there were several factors which argued against PCB's from this source in particular. First, students who were in Room 27 the day the motor overheated practicing a play reported no symptoms at the time. Second, there was no known removal of books or other stored items for use by the fifth grade students (textbooks had been issued at the beginning of the schoolyear). Third, there was no obvious means of spread of PCB's from the capacitor to other areas of the building. There is no central distribution of air, rather, individual ventilation units circulate air within each room. PCB's are heavy, relatively non-volatile substances which do not readily spread by passive diffusion.[7] Lighter, odorous substances may have spread by convection since students and teachers in Room 22, directly above Room 27, reported an offensive smell the day the capacitor overheated. No PCB contamination, however, was found in subsequent wipe samples of this room. [NIOSH conducted an environmental survey throughout the school (March 19 and 26) to determine if there was any spread of PCB's from the overheated PCB capacitor in the heating unit of Room 27. The survey revealed that PCB contamination was confined to Room 27, specifically to that area in the immediate vicinity of the motor and heating unit (see HE 81-237-915.)]

NIOSH, as well as several other health agencies, was unable to determine the cause of the outbreaks of rash in December and January. There was no apparent source of continuing environmental contamination, and in general the symptoms and findings were not typical of those caused by an environmental contaminant. First, the type and pattern of symptoms and findings were quite varied and no characteristic rash or other syndrome was apparent. Second, the distribution of skin findings and symptoms did not correspond to the expected distribution of a rash caused either by airborne chemicals or fibers or by direct contact with contaminated objects in the classrooms. Third, the spatial distribution of affected students and the temporal pattern of events were inconsistent with either a continuing point source or a recurring exposure to any plausible moving source such as books or desks. Fourth, the transient occurrence of the rash, typically only at school, was not consistent with systemic toxicity resulting from past exposure. Finally, several students volunteered that the "rash" could be elicited at will.

As the symptoms persisted, a number of parents became increasingly concerned and expressed fear that not enough was being done to determine the cause of the symptoms and that they were not being fully informed of the severity of the problem. This was a frequent topic of discussion throughout the school and community and there was a great deal of attention by the news media. Under ordinary circumstances many of the skin findings and symptoms would likely have been ignored but the atmosphere at the time was such that even minor symptoms were noted and reported.

In March and April there were several meetings of school, county, and NIOSH officials to discuss the problem. During one of these meetings school officials accepted a proposal by the Hamilton County Health Department to have the University of Cincinnati examine 5th grade students for possible PCB exposure.

Questioning of school officials and several students indicated that the symptoms had disappeared by April. At the time of this report (September) school has just opened after a 3-month summer vacation.

VII. REFERENCES

1. Kominsky, JR and Flesch, JP, Health Hazard Evaluation--Our Lady of Visitation. Report No. 81-237-915, Cincinnati, Ohio, NIOSH, 1981

2. NIOSH Manual of Analytical Methods, 2nd Ed., Vols. 1-6. DHEW (NIOSH) Pub. No. 77-15A (April, 1977)

3. Criteria for a Recommended Standard - Occupational Exposure to Fibrous Glass. DHEW (NIOSH) Pub. No. 77-152, 1977

4. Criteria for a Recommended Standard - Occupational Exposure to Carbon Tetrachloride. DHEW (NIOSH) Pub. No. 76-133, 1976

5. Criteria for a Recommended Standard - Occupational Exposure to Polychlorinated Biphenyls. DHEW (NIOSH) Pub. No. 77-225, 1977

6. Revised Criteria for a Recommended Standard - Occupational Exposure to Asbestos. DHEW (NIOSH) Pub. No. 77-169, 1977

7. Hutzinger, O., S. Safe, and V. Zitko. The Chemistry of PCB'S. CRC Press, Inc., Florida, 1974

VIII. ACKNOWLEDGEMENTS

Report Prepared by:

Linda Frederick, R.N., M.S.N.
Occupational Health Nurse
Medical Section

John Love, B.S.Ch.E.
Industrial Hygienist
Industrial Hygiene Section

Field Assistants:

Brigitte Froneberg, M.D.
Medical Officer
Medical Section

Eric Jannerfeldt, M.D.
Medical Officer
Medical Section

Report Typed by:

Terry R. O'Neal
Clerk/Typist

IX. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this report are currently available upon request from NIOSH, Division of Technical Services, Publications Dissemination, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days, the report will be available through the National Technical Information Service (NTIS), Springfield, Virginia 22161.

Copies of this report have been sent to:

1. Principal, Our Lady of Visitation School, Cincinnati, Ohio
2. OSHA, Region V.
3. NIOSH, Region V.
4. Hamilton County Health Department, Cincinnati, Ohio
   Director, Environmental Health
5. Ohio Department of Health, Columbus, Ohio
6. Ohio Department of Health, Southwest District Office, Dayton, Ohio

NUMBER OF FIFTH GRADE STUDENTS WITH SKIN, EYE OR RESPIRATORY SYMPTOMS, BY DAY DECEMBER 1980 THROUGH MARCH 1981

OUR LADY OF VISITATION SCHOOL
CINCINNATI, OHIO

HE 81-184

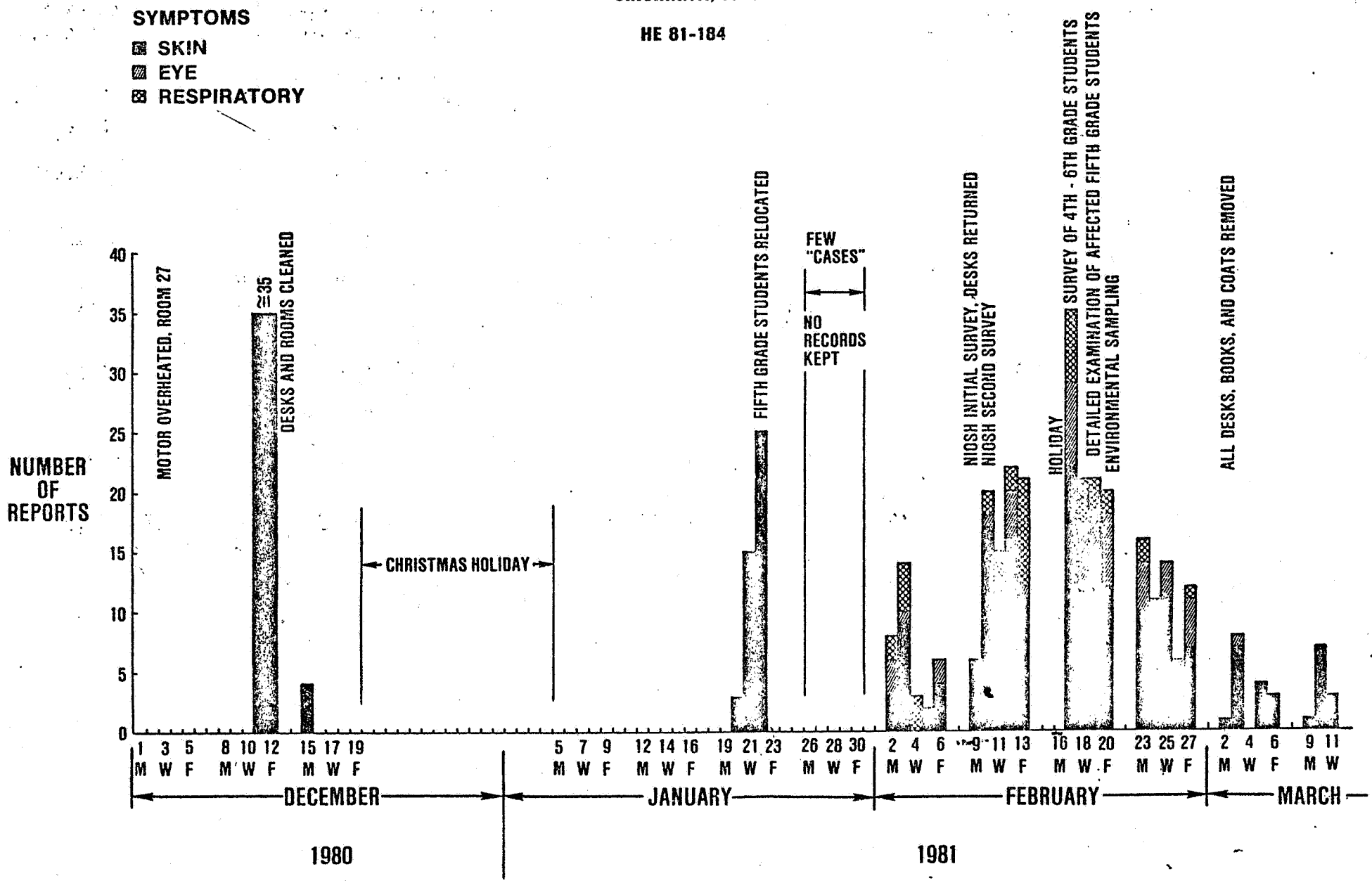


TABLE I

National Institute for Occupational Safety and Health
Hazard Evaluation and Technical Assistance Branch

Analysis for Organics in Air Samples

HETA 81-184
Our Lady of Vistation School
Cincinnati, Ohio

February 20, 1981

Sample Number	Sample Location	Sample Period	Sample Volume (liters)	Substance Detected*	Concentration (mg/M^3)
CT-10	Room 24: center of room; air sampler located approx. 5' from heating unit	9:20am-1:37pm	257	Carbon Tetrachloride	0.73
CT-11	Room 26: air sampler on teacher's desk	9:24am-1:44pm	260	Carbon Tetrachloride	0.95
CT-12	Room 10: air sampler on table in back of room	9:33am-1:50pm	350	Carbon Tetrachloride	0.04
CT-13	Room 8: air sampler on table in back of room	9:35am-1:54pm	364	Carbon Tetrachloride	0.15
NIOSH recommended permissible exposure limit (Ceiling)					12.6
P-10	Room 24: center of room; air sampler located approx. 5' from heating unit	9:19am-1:37pm	439	Polychlorinated Biphenyl	N.D.[1]

*Substances detected: other minor peaks identified were toluene, perchloroethylene, xylene, dichlorobenzene, alkanes and MW 120 aromatics; concentrations of these substances on all samples were less than the limit of quantitation (0.01 mg/sample).

[1]N.D. - non-detectable, below the limit of detection

TABLE II

National Institute for Occupational Safety and Health
Hazard Evaluation and Technical Assistance Branch

HETA 81-184
Our Lady of Visitation School
Cincinnati, Ohio

February 20, 1981

Sample	Sample Type and Location	Substance	Sample Period	Sample Volume (liters)	Concentration
A-1	Room 24: dust from inside ventilation duct	asbestos	-	Bulk	N.D.*
A-2	Room 26: dust from inside ventilation duct	asbestos	-	Bulk	N.D.
A-3	Room 8: dust from inside ventilation duct	asbestos	-	Bulk	N.D.
F-1	Room 24: dust from inside ventilation duct	fibrous glass	-	Bulk	1%
F-2	Room 26: dust from inside ventilation duct	fibrous glass	-	Bulk	1%
F-3	Room 8: dust from inside ventilation duct	fibrous glass	-	Bulk	N.D.
F-10	Room 24: center of room on floor; air sampler approx. 5' from heating unit	fibrous glass	9:21am-1:37pm	256	N.D.
F-11	Room 26: air sampler on top of teachers' desk	fibrous glass	9:24am-1:44pm	260	N.D.
F-12	Room 10: air sampler on table in back of room	fibrous glass	9:33am-1:50pm	437	N.D.
F-13	Room 8: air sampler on table in back of room	fibrous glass	9:35am-1:54pm	440	N.D.

*N.D. or None Detected means that the substance was not detected at the lowest level capable of being measured by the analytical method

DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
CENTERS FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
ROBERT A. TAFT LABORATORIES
4676 COLUMBIA PARKWAY, CINCINNATI, OHIO 45226

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE. $300

Third Class Mail

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF HHS
HHS 396