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TDH Investigates Three Clusters of Unexplained Rash Illnesses

In recent months the national media have reported on the Centers for Disease Control and Prevention (CDC) investigation of unexplained rash illnesses among school children first reported last fall. By the end of February 2002, 14 states (including Texas) had reported investigations; by the beginning of April the number of states involved had increased to 23. This DPN report summarizes the CDC investigation and describes the findings to date of three Texas Department of Health (TDH) investigations: two in schools and one in a retail establishment.

The March 1, 2002, MMWR (Vol 51, No. 8), published by CDC, features a report, "Rashes Among Schoolchildren-14 States, October 4, 2001-February 27, 2002," available at www.cdc.gov/mmwr/preview/mmwrhtml/mm5108a1.htm. The rashes have been the focus of clinical and environmental investigations in several states; to date no single etiology has been identified, and descriptions of the rashes have varied. Tests for various viral infections have, for the most part, been inconclusive (a few children had Parvovirus B19/fifth disease), and environmental testing has not identified an obvious problem. In many cases, the rash has cleared when the child left school, and there were no reports of secondary transmission. Many rashes have been highly pruritic, but fever and other systemic expressions of illness have been lacking in most cases. There have been several reports in the national news media, and in at least one case, children reportedly used sandpaper to create "rashes" in an attempt to get their school closed.

Rash Cluster in an Elementary School

On February 12, 2002, a suburban school district in Harris County notified its local health department and the Harris County Public Health and Environmental Services (PHES) of a cluster of rash-like illnesses among students and staff at one of its elementary schools. At that time, 3 students and 3 adults had been identified by the school nurse as having itchy hives on face, neck, and hands with some of the individuals experiencing swelling of lips, eyes, tongue, and hands. Onsets occurred February 1 through 11. The diagnosis for both students who saw their respective physicians was allergic reaction. One of these students and the other child had a prior history of allergies. From February 18 through April 2, 8 additional rash illnesses occurred: 6 in students and 2 in adults. These onsets were February 18 through March 24. Rashes were variously described as follows: red, flat, itchy rash only on exposed parts of body; hives over face, neck, and hands; and reticulated, pruritic rash over trunk and extremities. Of the 6 students, 3 were taking prescribed antibiotics at the time of rash development, and 2 had concurrent fever (1 measured at 101°F). No secondary cases were identified.

The school district retained an outside industrial hygienist to conduct mold sampling; results were not remarkable. In addition, school officials found no evidence of new product usage, nor of recent pesticide or fertilizer application. (The school is located near a golf course.) On a March 27, 2002, visit to the school, a TDH investigation team reviewed the information previously collected by the local county health department and gathered information on the recent cases. An industrial hygienist with the TDH team performed a preliminary visual survey of occupied areas and the ventilation systems of the school. Several health hazards related to poor housekeeping practices and inadequate fresh air ventilation rates were observed. Evidence of exposure or specific conditions of the ventilation systems for the period of the rash illnesses was not available. However, if the ventilation conditions were similar from February through early March, these hazards could have contributed to indoor air pollution and perhaps to rash illnesses in sensitive individuals.

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Rash Cluster in Hunt County

On April 2, a disease investigation was initiated of an undiagnosed rash outbreak among 7 Hunt County residents; 6 were patients of the same physician. They included 5 students attending the same high school and 2 adults. One of the adults was a medical technician who worked in the physician's office; the other had had no known contact with the other patients. Rash onset for all 7 patients occurred during January 31 through February 27, with 5 cases appearing during February 25 to 27.

Each rash illness lasted 3 to 4 weeks. Lesions were defined as small red punctuations with a pink halo appearing in clusters concentrated on the chest, shoulders, and upper arms. Additionally, 4 members of the group reported rash on the back, 2 reported rash on the inner thighs, and 1 had rash on the face. One lesion biopsy was performed with inconclusive results; none of the students were tested for Parvovirus. There were no other symptoms of disease, and there was no common dietary history or history of exposure to livestock or hazardous chemicals among those affected.

Rashes were treated in a variety of ways, including antibiotic therapy for 3 students, without effect on duration of the rash. At this time no new rash cases have been identified and the rashes in this cluster remain undiagnosed.

Rash Outbreak in a Retail Establishment

The CDC investigation has focused only on unexplained rash illnesses in school children. In general, nonfebrile rash complaints in business settings are addressed by the employer as potential occupational illness. However, health departments in Texas routinely respond to reports of disease clusters, regardless of location or patient age. Moreoever, mass coverage of the CDC investigation into unexplained rash illnesses in school children probably resulted in heightened concern/awareness of rash illnesses in other populations.

In early March the Galveston County Health District received a complaint regarding rash illnesses among employees of a newly built retail establishment. About a month earlier 100 employees had begun work on preparations to open the store for business. Approximately 100 additional employees were added weekly until the store opened in early March with a total of around 500 employees.

Up to 100 employees were reported as having complained of rash illness. Additional symptoms reported by some employees included itchy and watery eyes. The typical rash was described as red and pruritic. Some of the employees described the rash as "bumpy," but others said it was like sunburn. The rashes occurred on many exposed and unexposed parts of the body, including legs, arms, back, buttocks, neck, and face.

Onsets ranged from mid-February through early March. Reported duration of rash was from 1 to 35 days, but most lasted a week or less. Some employees reported improvement after they showered, rested at home, and/or were away from the work site. When they returned to work, the rashes recurred. Ages of those affected ranged from 18 to 61 years (median=38). No rash cases were reported for family or household members. Physician diagnoses included contact dermatitis, atopic dermatitis, and allergic reaction.

That 74% of reported cases were among women was not surprising since most affected employees worked in areas of the store in which the majority of workers were women. The temporal clustering of onset and resolution and the apparent lack of household cases indicate an infectious etiology was unlikely. As the food service was not yet opened, there was no common food exposure.

Skin diseases caused by substances or conditions in the workplace are the most frequently encountered occupational

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illness.[1] Volatiles, chemicals, dusts, fibers, and cleaning products are common construction byproducts that are recognized as significant potential contributors to indoor air pollution during and following new construction or renovation. No personal air monitoring, fresh air ventilation measurements, or biological markers of exposure were performed by the employer during the reported rash episodes. However, it is highly plausible that the workers' exposure to construction byproducts in addition to other occupational risk factors such as longer work hours and inadequate ventilation may have caused or contributed to these undiagnosed rash illnesses.

Summary

Although the TDH investigations included both school as well as retail settings, the outcomes had several important findings in common with the nationwide CDC investigation limited to school children: 1) descriptions of the reported rashes varied greatly, 2) no common infectious etiology was identified, 3) no secondary transmission was identified, 4) no definitive environmental causes were found, and 5) heightened concern over rash illnesses resulted in reports of rashes that might have otherwise been ignored.

The investigations by TDH and local health authorities did identify plausible health hazards and processes in one of the schools and the retail establishment that are often associated with occupational or indoor environmental exposures. These exposure concerns were specifically conveyed to school administrators and facility managers.

Reporting Requirements

Nonspecific, self-limiting rashes in children are common and are difficult to diagnose. CDC notes that rashes from a wide range of causes are to be expected among the over 50 million young people who attend schools daily in the United States.

TDH Guidelines for Investigations of Rash-only Illness

Conduct an investigation when there are reports of 5 or more cases of rash-only illness (no other symptoms such as fever, headache, cough, sore throat, vomiting, or diarrhea) occurring in the same place within a 2-week period. Include the following:

- Rule out Parvovirus B19 (based on clinical picture and IgM + lab result).
- Notify the local health authority or TDH of the outbreak, giving the primary contact for the outbreak investigation and describing the location, and initial case reports.
- Have one physician, preferably a dermatologist, examine a variety of affected individuals to characterize the rash.
- Obtain/take photographs of the rash.
- Interview case-patients and possible contacts (parents, teachers, staff, coworkers). Distribute a questionnaire to each affected person (or parent of affected child). Include at least the name, age, sex, race/ethnicity, residence, worksite/school, and rash description.
- Enlist the aid of a qualified industrial hygienist or environmental health investigator to perform an occupational or indoor air quality urvey of the affected facility.
- Conduct active surveillance to look for additional cases in the community.

Ideally, a final outbreak report should include

- Age/sex of cases
- Race/ethnicity of cases
- Location of outbreak (city, county, address)
- Date of first case
- Distribution of cases by date of onset, ie, epicurve
- Type of facility (school, business, etc.)
- Total population (number students in school/classrooms)
- Detailed rash description (generalized or focal, where lesions were first noted, distribution of rash, intensity of pruritis, similarities/differences across cases)
- Description of rash onset (timing, activities prior to onset, grouping among cases)
- Mention of whether secondary transmission occurred
- Average duration of rash
- Treatment provided
- Number of cases seen by a physician
- Number of cases who went to the hospital ED
- Number of cases hospitalized
- Number of recurring cases
- Description by case of symptoms other than rash
- Photographs of rash
- Biological test results
- Summary of environmental assessment

1. Plog BA, Benjamin GS, Kerwin MA, Eds. Fundamentals of Industrial Hygiene, 3rd Edition. National Safety Council, 1988: 145.

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Nevertheless, rash illness with fever should always be reported and investigated. To help health officials continue the regular surveillance of notifiable conditions and also to respond to heightened concern over unusual rash illnesses, TDH requests that health professionals report rash illness as follows.
Contact the TDH or the local health authority by calling 800/705-8868 or 800/252-9152

- *immediately* to report single cases of suspected **measles**
- *within 1 working day,* to report single cases of suspected **rubella** (including congenital)
- *within 1 week,* to report single cases of suspected **chickenpox**
- *within 2 weeks* to report ≥5 cases identified as a **cluster of rash-only illness** occurring in the same place.

Information Resources

Febrile Rash, Including Case Definitions:
www.aafp.org/afp/20000815/804.html
www.tdh.state.tx.us/immunize/docs/guide2000.pdf

Indoor Air Quality in Schools:
www.tdh.state.tx.us/beh/iaq/default.htm
www.epa.gov/iaq/schools/tools4s2.html

Indoor Air Quality Information for Owners and Managers of Large Buildings:
www.epa.gov/iaq/largebldgs/
www.epa.gov/iaq/largebldgs/baqtoc.html

Additional Air Quality Websites:
www.tdh.state.tx.us/epitox/rash.htm

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