

[CDC Home](#)[Search](#)[Health Topics A-Z](#)*Weekly*

May 15, 1998 / 47(18);365-8

Varicella-Related Deaths Among Children -- United States, 1997

During the first quarter of 1998, the Texas Department of Health and the Iowa Department of Public Health notified CDC of three fatal cases of varicella (chickenpox) that occurred in children during 1997. All three children were unvaccinated. Two children contracted chickenpox from unvaccinated siblings, and the mode of exposure was unknown for the third. This report summarizes these cases and indicates that varicella-related deaths continue to occur among children in the United States despite the availability of vaccine and recommendations for its use in all susceptible children (1,2).

Case 1

On February 28, 1997, a previously healthy, unvaccinated 21-month-old boy developed a typical varicella rash. He had no reported exposure to varicella. On March 1, he was taken to a local emergency department (ED) with a high fever and was started on oral acetaminophen and diphenhydramine. On March 3, his primary-care physician prescribed oral acyclovir. On March 4, his mother noted a new petechial-like rash. The next morning, his primary-care physician noted lethargy, a purpuric rash, and poor perfusion. He was transferred to a local ED. Fluid resuscitation and intravenous ceftriaxone were initiated, but the child continued to deteriorate rapidly, requiring intubation, mechanical ventilation, and inotropic support with dopamine. Blood cultures were negative for bacterial pathogens. Laboratory tests indicated disseminated intravascular coagulation and severe dehydration. Approximately 1 1/2 hours after arrival at the ED, he was transported to a tertiary-care center. Within 10 minutes of arrival, he suffered cardiac arrest and died. The death was attributed to varicella with hemorrhagic complications.

Case 2

On December 21, 1997, a 5-year-old unvaccinated boy with a history of asthma was taken to a local ED with a fever of 104.5 F (40.3 C) and a typical varicella rash in multiple stages of healing. The child was treated with antipyretic and antipruritic medications and discharged.

That evening, the boy developed mild dyspnea and was treated at home for a presumed asthma attack with metered-dose inhalers and one dose of oral prednisone. He returned to the ED on December 22 with shortness of breath and a 4-hour history of abdominal and leg pain. On presentation to the ED, one of the patient's siblings had active varicella and another had recently recovered from varicella. Physical examination revealed numerous chickenpox lesions, one of which appeared infected. He was tachypneic, and his extremities were mottled consistent with peripheral septic emboli. Chest and abdominal radiographs revealed a right pleural effusion,

pneumonia, and mild ileus. Thoracostomy produced pleural fluid containing gram-positive cocci, confirmed 8 hours later to be group A Streptococcus (GAS). A peripheral blood sample revealed gram-positive cocci. He was admitted to the hospital and treated with intravenous ceftriaxone, nafcillin, and acyclovir.

After admission, his breathing became labored and his extremities increasingly mottled. He rapidly developed hypotension, obtundation, and bradycardia. Despite efforts at cardiopulmonary resuscitation, the child died 5 hours after arriving at the ED. A post-mortem examination attributed the death to GAS septicemia, pneumonia, and pleural effusion, complicating varicella infection.

Case 3

On December 14, 1996, a previously healthy, unvaccinated 23-month-old boy developed fever and a typical varicella rash. Approximately 1-2 weeks earlier, his unvaccinated 4-year-old sibling had contracted varicella. He was taken to his physician on December 17 because of persistent fever and cellulitis of the left foot, and he was hospitalized on December 19 for failure to improve on an unspecified outpatient antibiotic regimen. Because his condition deteriorated despite intravenous methicillin and ceftriaxone, he was transferred to a regional hospital on December 21. Sepsis, possible viral meningoencephalitis, and mild pleural effusion were diagnosed. A cerebrospinal fluid examination revealed lymphocytic pleocytosis, and blood and urine cultures grew penicillin-resistant Staphylococcus aureus. Antibiotics were changed to nafcillin and gentamycin, and intravenous acyclovir was added on December 23. On December 24, the child developed an aortic insufficiency murmur, and an echocardiogram revealed a 9x9 mm vegetation on the aortic valve, consistent with bacterial endocarditis. Serial echocardiograms displayed growth of the vegetation and development of a pericardial effusion. He was transferred to a cardiac surgery center on December 26. While awaiting surgery, he developed refractive heart failure secondary to staphylococcal endocarditis. He became incoherent, probably secondary to a major embolic neurologic event, and died on January 8, 1997.

Reported by: FA Guerra, MD, R Sanchez, San Antonio Metropolitan Health Dept, San Antonio; L Tabony, MPH, M VanEgdom, J Pelosi, MPH, DM Simpson, MD, State Epidemiologist, Texas Dept of Health. K Gerdes, MD, Blank Children's Hospital, Des Moines; MP Quinlisk, MD, State Epidemiologist, Iowa Dept of Public Health. A Bowen, MPH, Univ of Wisconsin. Child Vaccine Preventable Disease Br, Epidemiology and Surveillance Div, National Immunization Program, CDC.

Editorial Note

Editorial Note: The three cases described in this report indicate that healthy children continue to die from complications of varicella, a disease that is preventable through vaccination. Although commonly viewed as a benign disease of childhood, serious complications and death can occur following varicella. Varicella is the leading cause of vaccine-preventable deaths in children in the United States.

During 1990-1994, varicella was the underlying cause of death in an average of 43 children aged less than 15 years each year (CDC, unpublished data, 1998). During 1988-1995, up to 10,000 children were hospitalized each year for varicella or its complications (CDC, unpublished data, 1998). Ninety percent of the children who died did not have high-risk

conditions for severe varicella. The most common severe complications from varicella among fatal cases in children are secondary bacterial infections and pneumonia. Other complications include encephalitis, hemorrhagic complications, hepatitis, arthritis, and Reye syndrome. Reports of severe invasive infections from GAS-complicating varicella have heightened awareness that varicella is a well-defined risk factor for GAS disease (3,4).

Varicella vaccine was licensed in the United States in March 1995, is widely available, and is recommended for routine vaccination of children aged 12-18 months and for vaccination of susceptible older children, adolescents, and adults (1,2). The Vaccines For Children (VFC) program provides varicella vaccine for VFC-eligible children aged greater than 12 months who were born on or after January 1, 1983, and for VFC-eligible children aged less than 19 years who are family members of an immunocompromised person.

National coverage levels among children aged 19-35 months for varicella vaccine have increased from 14% during July-September 1996 to 25% during March-June 1997 (5). Barriers to vaccine use include the perception that varicella is a benign disease, concerns that immunity will not persist, the potential that varicella disease burden will shift to older age groups among whom the disease is more severe, and concerns about vaccine efficacy and safety (4). A recent study documented 100% vaccine efficacy for prevention of moderate or severe varicella and 86% for prevention of all varicella (6). In addition, vaccinated children who developed varicella caused by wild virus or "breakthrough disease" had very mild disease of short duration with less than 50 lesions (7). Persistence of immunity for more than 20 years post vaccination has been demonstrated (8). As disease incidence and exposure to wild virus declines, continuing surveillance will determine the need for and timing of additional doses of vaccine.

To monitor the impact of varicella vaccination programs throughout the United States, varicella surveillance is needed, and surveillance for varicella deaths in all states is a key first step in this process. States also are encouraged to develop additional sustainable surveillance systems, including monitoring hospitalizations and establishing statewide aggregate reporting for cases by schools, day care centers, and/or health-care provider offices, and to consider instituting vaccine requirements for day care and school entry (1).

Efforts to increase routine and catch-up varicella vaccination among children should include educating health-care providers that deaths and severe morbidity from varicella are preventable (1,2). Policies that delay vaccination of susceptible children until adolescence accept the considerable disease burden that occurs among children aged 2-11 years. The most effective vaccination strategy focuses on vaccinating children routinely at age 12-18 months and vaccinating all susceptible older children and adolescents. Children have the highest disease incidence and are the group that serve as the primary source of transmission of varicella to groups at higher risk for severe disease, including adults (9) and persons who are not eligible for vaccination. Most deaths and severe morbidity from varicella in children and in adults can be prevented by implementing recommended policies for childhood vaccination.

References

1. CDC. Prevention of varicella: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR* 1996;45(no. RR-11).
2. American Academy of Pediatrics, Committee on Infectious Diseases. Recommendations for the use of live attenuated varicella vaccine. *Pediatrics* 1995;95:791-6.

3. CDC. Outbreak of invasive group A Streptococcus associated with varicella in a childcare center -- Boston, Massachusetts, 1997. *MMWR* 1997;46:944-8.
4. Davies D, McGeer A, Schwartz B, et al. Invasive group A streptococcus infections in Ontario, Canada. *N Engl J Med* 1996;335:547-54.
5. CDC. National, state, and urban area vaccination coverage levels among children aged 19-35 months -- United states, July 1996-June 1997. *MMWR* 1998;47:108-16.
6. Chew D, Hofmann J, O'Donnell C, Finelli L. Physician attitudes and practices regarding varicella vaccine in New Jersey {Abstract}. In: Program and abstracts of the 36th Interscience Conference on Antimicrobial Agents and Chemotherapy. Washington, DC: American Society for Microbiology, 1996:278.
7. Izurieta HS, Strebel PM, Blake PA. Postlicensure effectiveness of varicella vaccine during an outbreak in a child care center. *JAMA* 1997;278:1495-9.
8. Asano Y, Suga S, Yoshikawa T, et al. Experience and reason: twenty-year follow-up of protective immunity of the Oka strain live varicella vaccine. *Pediatrics* 1994;94:524-6.
9. CDC. Varicella-related deaths among adults -- United States, 1997. *MMWR* 1997;46:409-12.

Disclaimer All *MMWR* HTML versions of articles are electronic conversions from ASCII text into HTML. This conversion may have resulted in character translation or format errors in the HTML version. Users should not rely on this HTML document, but are referred to the electronic PDF version and/or the original *MMWR* paper copy for the official text, figures, and tables. An original paper copy of this issue can be obtained from the Superintendent of Documents, U.S. Government Printing Office (GPO), Washington, DC 20402-9371; telephone: (202) 512-1800. Contact GPO for current prices.

**Questions or messages regarding errors in formatting should be addressed to mmwrq@cdc.gov.

Page converted: 10/05/98

[HOME](#) | [ABOUT *MMWR*](#) | [MMWR SEARCH](#) | [DOWNLOADS](#) | [RSS](#) | [CONTACT](#)
[POLICY](#) | [DISCLAIMER](#) | [ACCESSIBILITY](#)

SAFER • HEALTHIER • PEOPLE™
Morbidity and Mortality Weekly Report
Centers for Disease Control and Prevention
1600 Clifton Rd, MailStop K-95, Atlanta, GA
30333, U.S.A



Department of Health
and Human Services

This page last reviewed 5/2/01