Tetanus—Puerto Rico, 2002

During February-May 2002, the Puerto Rico Department of Health (PRDOH) received reports of three tetanus cases, two of which were fatal. The last reported case of tetanus in Puerto Rico had occurred in 1999. This report summarizes the investigations of these three cases, which underscore that health-care providers should ensure that all patients have been vaccinated fully against tetanus.1,2

Case Reports
Case 1. On December 19, 2001, a man aged 86 years with a history of hypertension and coronary artery disease (CAD) sustained a splinter in his right hand while gardening. On December 22, the patient saw a physician for wound care. At that time, he was not treated with either a tetanus toxoid vaccine or prophylactic tetanus immune globulin (TIG). His tetanus vaccination history was not documented in the medical record; he had no history of military service.

On December 26, the patient received treatment for pharyngitis from a local physician. On December 29, he presented to an emergency department (ED) with difficulty talking, swallowing, and breathing and with chest pain and disorientation of 2 days’ duration. He was admitted to a general medicine ward with a preliminary diagnosis of stroke.

On January 2, 2002, the patient had neck rigidity and respiratory failure requiring tracheotomy and mechanical ventilation and was transferred to the intensive care unit (ICU) with tetanus diagnosed. He was administered a dose of tetanus and diptheria toxoids (Td); TIG was ordered but was unavailable. On January 11, the patient received nonspecific intravenous immune globulin (pooled plasma, 7.5 grams). His hospital course was complicated by two myocardial infarctions, congestive heart failure, a lacunar stroke, and pneumonia. He died on February 2.

Case 2. On April 18, 2002, a man aged 68 years with a history of diabetes mellitus, CAD, and mitral valve replacement sustained a puncture wound in his right foot from stepping on a rusted nail. His spouse cleaned the wound with a surface antiseptic (benzalkonium chloride). The following day, the patient sought care from a primary-care physician who administered intravenous cefazolin and prescribed oral ciprofloxacin and oxycodone. The patient requested vaccination against tetanus but was told that the vaccine was unavailable. The patient did not know if he had been vaccinated previously against tetanus; he had not served in the military.

On April 22, the patient presented to an ED complaining of difficulty swallowing, mild shortness of breath, abdominal pain, throat pain, and mandibular rigidity. On physical examination, he had trismus, risus sardonicus, muscular rigidity, and difficulty speaking. He was admitted to the ICU with diagnoses of suspected tetanus and right foot cellulitis. He was treated with metronidazole, ciprofloxacin, and midazolam by continuous intravenous infusion. On April 23, the patient had seizures and respiratory failure requiring mechanical ventilation. He also was given intramuscular TIG (500 units) and Td (0.5 cc) at that time. Despite midazolam therapy and supplemental diazepam for seizures, the patient’s muscle spasms persisted. He died on April 27.

Case 3. On April 10, 2002, a man aged 76 years with a history of hypertension sustained a splinter in his right hand. On April 18, the patient experienced weakness and dysphagia, and on the following day, trismus. At that time, he was treated for otitis media but refused Td vaccination. His previous tetanus vaccination status was unknown; he had not served in the military.

On April 20, the patient presented to an ED with difficulty walking, talking, and swallowing. He did not report any wound history to the attending physician. He was treated with an intramuscular corticosteroid injection and an antihistamine. On April 21, the patient sought care at another ED. He was admitted to the ICU with diagnosed tetanus and intubated preemptively. On April 22, he received 3,000 units of TIG and was started on metronidazole. His course was complicated by methicillin-sensitive Staphylococcus aureus pneumonia and pseudomembranous colitis. He was released from the hospital on June 17.

Case Summary
During January 1990–April 2002, PRDOH received reports of 20 cases of tetanus (average annual incidence rate: 0.04 per 100,000 population). Of these, 18 (90%) were in men; the median age was 70 years (range: 55–86 years). Among the 11 (55%) for whom supplemental information was available, none had a definite history of previous vaccination with tetanus toxoid. Five (25%) patients had a history of diabetes mellitus. The overall case-fatality rate was 68%.

As a result of the Td shortage affecting the United States during 2000-2002, PRDOH instituted a protocol in March 2001 consistent with the modified guidelines for Td use during the shortage.3,4 Priority was given to persons requiring prophylaxis for wound management and to persons who had previously received fewer than 3 doses of tetanus-containing vaccine, and routine Td boosters in adolescents and adults were deferred. The shortage reduced Td use in Puerto Rico by 67% during 2000-2001 (Puerto Rico Immunization Program, unpublished data, 2002).
In response to the recent tetanus cases, PRDOH has (1) continued reminding health-care providers of the increased risk for tetanus among persons aged ≥60 years and those with no history of primary vaccination against tetanus; (2) promoted an increase in the availability of TIG for prophylactic and therapeutic use; and (3) notified physicians that the Td shortage has ended and that Td is available for routine indications.3

CDC Editorial Note: Tetanus is a rare disease in the United States; following the introduction of vaccination with tetanus toxoid in the 1940s, the overall incidence of tetanus declined from 0.4 per 100,000 population in 1947 to 0.02 during the latter half of the 1990s. The overall case-fatality ratio declined from 91% to 11% during the same period. The majority of tetanus cases reported during 1989-1997 occurred in persons who had not completed a 3-dose primary tetanus toxoid vaccination series or for whom vaccination histories were uncertain; no tetanus deaths occurred in persons who received primary tetanus vaccination (CDC, unpublished data, 2002).5,7

Adults aged ≥60 years are at greatest risk for tetanus and tetanus-related mortality.5,7 During 1998-2000, the average annual incidence of tetanus in persons aged ≥60 years was 0.03 with a case-fatality ratio of 31%, both more than twice that of adults aged <60 years. The increased risk for tetanus with increasing age is thought to be related to the lower prevalence of protective immunity in older age groups. Protective levels of antibodies against tetanus toxoid decline with age; by age 70 years, only 30% of the population is protected.5 Older persons might never have received a primary vaccination series or might not have received subsequent Td boosters. Women are significantly less likely to be protected against tetanus than men likely, in part, because women are less likely to have received a Td booster in conjunction with military service.

The Td shortage during 2000-2002 necessitated deferral of routine Td boosters in adolescents and adults. However, booster doses given as part of wound management and administration of primary series in unvaccinated persons remained priorities.3 Previous reports on tetanus cases occurring in the United States during the 1980s and 1990s indicated that even during periods in which Td was in ample supply, <60% of persons for whom Td was indicated received a dose during wound management.5,7

Recommendations for the use of Td and TIG for wound care depend on the nature of the wound and the patient’s vaccination history. Persons who have received a primary tetanus toxoid vaccination series but who have not had a Td booster during the 10 years preceding any injury should receive a booster dose. Persons who present with wounds contaminated with dirt, feces, or saliva, deep wounds, or wounds with necrotic tissue and who have not had a booster during the preceding 5 years also should receive a dose of Td. Persons who have never received tetanus vaccination or those with unknown or uncertain vaccination histories should receive the first dose of a primary series at the time of presentation. These patients also should receive TIG (250 units injected intramuscularly at a site distant from that used for Td administration) unless the wound is superficial and clean, because a single dose of Td in the absence of previous tetanus vaccination will not induce the production of protective levels of antibody. Therapeutic TIG (3,000-6,000 units as 1 dose) should be administered as soon as possible to any patient presenting with tetanus.9

The majority of cases of tetanus and virtually all tetanus-associated deaths are preventable through adequate vaccination. Because all wounds, even minor and relatively clean wounds, confer a risk for tetanus, health-care providers should review the vaccination status of all patients and administer indicated tetanus toxoid vaccine to keep their patients fully protected.1,2

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Norwalk-Like Virus–Associated Gastroenteritis in a Large, High-Density Encampment—Virginia, July 2001

MMWR. 2002;51:661-663

1 figure omitted

Norwalk-like viruses (NLVs) are an important cause of gastroenteritis in the United States, with approximately 23 million cases of NLV-associated gastroenteritis occurring each year.1 NLVs accounted for 96% of nonbacte-
rial gastroenteritis outbreaks reported to CDC during January 1996–June 1997. These outbreaks are common especially in settings of crowding and poor sanitation. Transmission of NLVs in these settings is facilitated by high attack rates (82%), a low infectious dose (<100 virions), the absence of long-lasting immunity, the durability of the organism, and the potential for multiple modes of transmission. In 2001, outbreaks were reported from youth camps in Wisconsin and Florida, resulting in closure of the camps (CDC, unpublished data, 2001). This report describes an outbreak of NLV-associated gastroenteritis at a large youth encampment in Virginia and the successful use of control measures to limit spread of illness to other campers. Rapid, effective containment is a central goal of public health response when outbreaks of infectious diseases occur.

In July 2001, a large encampment held every 4 years by a national youth organization began in rural Virginia. Approximately 40,000 campers arrived on July 23 from locations throughout the United States and from several other countries. The camp was divided into 20 subcamps comprising approximately 600 groups of 40-90 campers, who were housed in tents. Groups of campers shared water that was dispensed at multiple central locations, outdoor showers, and flush toilets that drained to septic systems. Meals were prepared in small groups of five to 10 campers. On arrival, each group of campers had a requisite health-screening examination before proceeding to a campsite. Medical and public health personnel screened each group by using a standard interview form that asked about the presence of rashes, vomiting, diarrhea, fever, headache, and cough. Groups of campers in which at least one person had a rash or at least two persons shared other symptoms associated with communicable disease were then referred for in-depth screening by the epidemiology support team. Ill campers were asked about the nature and timing of symptoms, travel history, and the source of food and beverages consumed recently. In addition, campers from each of the 20 subcamps within the 7-square-mile encampment who had vomiting, diarrhea, or other symptoms were assessed daily during the encampment to monitor for outbreaks of illness.

On initial screening, two groups of campers had multiple members with vomiting and diarrhea. Initially, these symptoms were found in six (8%) of 80 campers in group A from Illinois and 15 (18%) of 84 in group B from California; both groups arrived on July 23. On the morning of July 24, five (6%) of 80 members of group C from Oklahoma, camped several miles from the other two groups, were found to have similar symptoms. All illnesses were characterized by an acute onset of malaise, nausea, vomiting, and diarrhea. Symptoms typically lasted 24-48 hours. Review of cases by date of onset suggested an infectious illness that had an incubation period of approximately 24 hours but was inconsistent with a single-point source for all of the outbreaks. Attack rates were eight (10%) of 80 for group A, 26 (31%) of 84 for group B, and 22 (28%) of 80 for group C. Interviews of patients did not reveal any shared exposures or travel history among the three groups. Stool samples were collected from two (25%) of eight ill campers in group A, two (8%) of 26 ill campers in group B, and four (18%) of 22 ill campers in group C. NLVs were detected by the Virginia Division of Consolidated Laboratory Services by using reverse transcriptase-polymerase chain reaction (RT-PCR) in six of the eight stool samples, two from each group. All strains were tested at CDC and were genetically identical within the portion of the genome sequenced.

Control measures, including limiting contact between ill and well persons, were instituted for groups A and B on July 23 and for group C on July 24. All members of groups in which cases of gastroenteritis had been identified were excluded from camp activities in which transmission might occur, including all water sports and any activity in which a shared implement might be contaminated (e.g., archery, shooting, and rappelling). Affected groups were provided with dedicated latrines and washing facilities and were supplied with drinking water, ensuring that they would not draw it themselves from sources used by other campers. Shower space was reserved for affected group members at specified times; facilities were cleaned after each use with a 10% bleach solution. All symptomatic campers were excluded from food handling or preparation for at least 48 hours after resolution of symptoms. Scrupulous hand washing was stressed for all members of the affected groups. Arrangements were made so that well members of affected groups could participate in limited camp activities consistent with enteric precautions (e.g., supervised walks around the encampment and attendance at evening concerts). An affected group was released from isolation when no new cases in that group were detected for at least 36 hours; however, campers remained in isolation until they were asymptomatic for 48 hours.

Outbreaks in the affected groups lasted 4-9 days, compared with durations of 3-4 weeks in two recent camp-associated outbreaks (CDC, unpublished data, 2001). Group A was released from isolation on July 25, group B on July 26, and group C on July 29. No new cases were reported from any of the three groups between the time of release from isolation and the end of the encampment. Of 244 campers in the three groups, 56 (23%) became ill. For the subcamps housing the three affected groups, the average rate of campers who had vomiting or diarrhea was 6.0 per 1,000 campers, compared with 3.7 among nonaffected subcamps.

On July 31, the final evening of the encampment, 36 campers staying at the same subcamp as group A became ill with vomiting or diarrhea, for a rate that day of 23.3. Because all campers left the next morning, no information was available on the group or groups in-
volved. The sudden increase in gastro-intestinal symptoms was indicative of a point-source outbreak; rates for such symptoms at the subcamp during the days between this outbreak and the release of group B for general activity had averaged 4.1 with no significant upward trend.

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National vaccination coverage with ≥1 dose of VAR increased from 67.8% (95% confidence interval [CI] = ±0.9%) in 2000 to 76.3% (95% CI = ±0.8%) in 2001. Coverage with ≥1 dose of measles, mumps, and rubella (MMR) vaccine increased from 90.5% (95% CI = ±0.6%) in 2000 to 91.4% (95% CI = ±0.6%) in 2001, and coverage with ≥3 doses of hepatitis B vaccine (HepB) decreased from 90.3% (95% CI = ±0.6%) in 2000 to 88.9% (95% CI = ±0.7%) in 2001.

In 2001, estimated vaccination coverage differed substantially among states. The estimated coverage with the 4:3:1:3:3 series† ranged from 81.7% in Rhode Island to 63.2% in New Mexico, a difference of 18.5 percentage points. Variability among states was lowest for 3 doses of diphtheria and tetanus toxoids and pertussis vaccine, diphtheria and tetanus toxoids, and diphtheria and tetanus toxoids and acellular pertussis vaccine (DTP/DT/DTaP) (9.1 percentage points; range: 89.2%–98.3%) and highest for 1 dose of VAR (34.1 percentage points; range: 55.8%–89.9%). Variability among the 28 urban areas was slightly greater than among states. Among the 28 urban areas, the highest estimate for coverage with the 4:3:1:3:3 series was 79.5% in Jefferson County, Alabama, and the lowest was 57.7% in Detroit, Michigan, a difference of 21.8 percentage points.

For the 4:3:1:3:3 series, the magnitude of the disparity between the highest and lowest estimates for states has been consistent during the preceding 4 years (20.3 percentage points in 1998, 21.4 in 1999, 19.3 in 2000, and 18.5 in 2001) having decreased from 28.1 percentage points in 1997. The decreased disparity in 1998 compared with 1997 was attributed mostly to more complete implementation of hepatitis B vaccination in a few states. No state consistently had either the highest or lowest coverage estimates from year to year.

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CDC Editorial Note: The findings in this report indicate that among U.S. children aged 19-35 months, coverage with recommended vaccines remains near all-time highs, and declines observed recently probably are too limited to pose a major public health risk. Although coverage with recommended vaccines for each new birth cohort remains high, vigilance is needed to maintain these high levels. Eliminating the disparity between states and urban areas with the highest and lowest coverage remains a priority. Should vaccine-preventable disease be introduced in an area with low coverage, groups of susceptible persons might serve as a reservoir to transmit disease.

The findings in this report are subject to at least three limitations. First, NIS is a telephone survey; although statistical weights adjust for nonrespondents and households without telephones, some bias might remain. Second, NIS relies on provider-verified vaccination histories; incomplete records and reporting could result in underestimates of coverage. The estimation procedure assumes that coverage among children whose providers do not respond is similar to that among children whose providers respond. Finally, although national level estimates are precise, estimates for states and urban areas should be interpreted with caution.

In October 2000, the Advisory Committee on Immunization Practices recommended that all children aged 2-24 months without contraindications receive 4 doses of pneumococcal vaccine. The first NIS coverage estimates will be presented next year because the recommendation applies to all children covered by the 2002 NIS.

Shortages of routinely recommended childhood vaccines, including DTaP, pneumococcal conjugate vaccine (PCV7), MMR, varicella vaccine, and tetanus toxoid began in early 2001. The shortages did not affect coverage in 2001 because almost all children included in the 2001 NIS were eligible to receive recommended vaccines before 2001. As children potentially affected by the shortages are surveyed by NIS, CDC will monitor the impact on coverage. The supplies of all vaccines, except PCV7, have improved. Additional information about the status of the vaccine shortages is available at http://www.cdc.gov/nip/news/shortages/default.htm.

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‡Comprises ≥4 doses of diphtheria and tetanus toxoids and pertussis vaccine, diphtheria and tetanus toxoids, and diphtheria and tetanus toxoids and acellular pertussis vaccine; ≥3 doses of poliovirus vaccine; ≥1 dose of measles-containing vaccine; ≥3 doses of Haemophilus influenzae type b vaccine; and ≥3 doses of HepB vaccine.