

# Pertussis Outbreaks Underline Need for Vaccination

*Vaccines for teens and adults could be beneficial, as immunity from infant immunization wanes.*

BY MIRIAM E. TUCKER  
Senior Writer

Three recent hospital pertussis outbreaks and one infant death from the disease strongly point to the need for improved recognition and protection against transmission, the Centers for Disease Control and Prevention said.

The cases, from four states, also illustrate the potential benefit of vaccination against *Bordetella pertussis* in adolescents and adults, because immunity from infant immunization wanes after a decade. No vaccine is currently licensed for persons aged 7 years and above, but two manufacturers have filed for licensure with the Food and Drug Administration for vaccines that combine acellular pertussis, tetanus toxoid, and tetanus toxoid antigens. One would be indicated for persons aged 10-18 years, the other for ages 11-64 years.

All three hospital outbreaks, which occurred in August and September of 2003, involved hospitalized infants with cough illness. In Pennsylvania, a 3-week-old infant was hospitalized with cough, post-tussive vomiting, and fever. Pertussis was considered unlikely, the infant wasn't tested for it, and hospital staff did not observe droplet precautions.

The infant was transferred to a referral hospital after 1 day, nasopharyngeal secretions were obtained, and *B. pertussis*

was isolated 16 days later (MMWR 2005;54:67-71).

Meanwhile, the pediatrician who had cared for the infant at the first hospital developed a cough 9 days after exposure. Despite remaining symptomatic, he continued to treat patients—and to have contact with coworkers, family, and friends—without wearing a mask. His nasopharyngeal secretions tested positive 22 days after the initial exposure, while a total of 16 other health care workers and two pediatric patients at the initial hospital developed cough illness and/or tested positive for pertussis.

Hospital infection control personnel subsequently screened exposed employees, treated all who were symptomatic with a 5-day course of azithromycin, and excluded them from work for 5 days. Another 307 close contacts of the symptomatic health care workers were given azithromycin prophylactically, the CDC reported.

The other two outbreaks, in Kentucky and Oregon, also involved acutely ill infants with cough illness, exposed health care workers, and potential transmission to a large number of contacts who subsequently received azithromycin as either treatment or prophylaxis.

All three cases illustrated the difficulties in the diagnosis of pertussis, particularly in older individuals in whom the symptoms during the catarrhal stage are usual-

ly nonspecific while the disease is already highly communicable. In infants, diagnosis may be delayed when the presentation is respiratory distress with apnea but without the typical cough.

Also problematic is the lack of adequate diagnostic tests for pertussis. Culture is not sensitive beyond 3 weeks of illness or after antibiotic therapy, polymerase chain reaction for pertussis is not standardized, and no serologic test is available, although the CDC and the FDA are developing one.

A second MMWR report illustrates the fact that incompletely immunized children aged less than 6 months continue to be the most vulnerable to pertussis when the disease is circulating around them (MMWR 2005;54:71-2).

A 29-day-old West Virginia infant was brought to the emergency department with difficulty breathing. The infant's mother had had prolonged paroxysmal cough illness for 3 weeks before the in-

fant's delivery; the father had onset of paroxysmal cough illness 2 weeks before the infant's illness.

The infant had been coughing for 5 days with increasing severity, resulting in posttussive vomiting and choking. At presentation, she was lethargic, tachycardic, and had a mild fever. Laboratory results indicated leukocytosis. Chest x-ray revealed pneumonia, and she developed respiratory failure. She died approximately 30 hours after admission to the pediatric intensive care unit, despite azithromycin treatment for presumed *B. pertussis*, high-frequency ventilation, nitric oxide administration, and a double-volume exchange transfusion.

The diagnosis of pertussis was based on history, clinical findings, and a positive polymerase chain reaction test. Around the time of the infant's death, two cousins, her paternal grandmother, and a great-grandmother all had cough illness as well. ■

## Caring for Infected Health Workers

### Clinical Findings:

- ▶ Incubation period: 7-10 days (range: 4-21 days).
- ▶ Catarrhal stage: 1-2 weeks; coryza, low-grade fever, and mild cough.
- ▶ Paroxysmal stage: 1-6 weeks; paroxysmal cough, posttussive vomiting, and inspiratory "whoop."
- ▶ Convalescent stage: at least 3 weeks; cough lessens and disappears.

### Treatment/Prophylaxis:

- ▶ Macrolides (erythromycin, azithromycin, or clarithromycin) are preferred.
- ▶ Trimethoprim-sulfamethoxazole is an alternative antibiotic for use in persons with allergy or intolerance to macrolides.

Source: Centers for Disease Control and Prevention

# Diagnosing and Treating UTIs in Newborn Called Difficult

BY DAMIAN McNAMARA  
Miami Bureau

MIAMI BEACH — Diagnosis of a newborn urinary tract infection is challenging, but identification is crucial to prevent potentially serious complications, according to a review of recent literature.

Although urinary tract infections (UTIs) are common in newborns—with an estimated 4 million cases in the United States—clinical questions remain. What is the true incidence of complications if left untreated, which are the more serious or long-term consequences, and what is the best approach to treatment?

"UTIs remain a classic type of bad problem. We need to keep abreast of them. If you see a febrile infant, you should always think UTI," Thomas E. Wiswell, M.D., said at a pediatric update sponsored by Miami Children's Hospital.

He estimated that up to 10% of the 4 million newborns, or 300,000-400,000, have a febrile UTI at some time during the first 2 years of life.

"Unfortunately, as we deal with this in infants, the signs can be misleading or general and we may not think of this diagnosis. Know they may be more prone for kidney injury, and follow them for that," Dr. Wiswell advised.

Almost all infants with a UTI in the first

year of life have pyelonephritis. These patients are at greatest risk for renal scarring and permanent injury. An estimated 35%-64% of newborns with a UTI experience renal scarring. There is a significant correlation between the severity of scarring and higher nighttime systolic and diastolic blood pressures in children (J. Pediatr. 2003;142:117-22).

This hypertension occurs in about 1% of children with a UTI and may persist into adulthood. "We may think we've treated the UTI completely, but as adults the internist is treating something that stems from a UTI when [the patient was] young," said Dr. Wiswell, attending neonatologist at Florida Hospital Center for Neonatal Care, Orlando.

Effects of minor renal scarring are less well known, but advances in technetium-99m dimercaptosuccinic acid (DMSA) imaging may help, Dr. Wiswell said. "We pick up a lot more [minor] scarring with our modern day DMSA scanning versus traditional intravenous pyelogram imaging studies. But we've only done DMSAs for about a decade, and we need long-term follow-up to see if these smaller scars worsen over time."

A less common, but more severe, complication is end-stage renal disease, which occurs in 0.2% of newborns with a UTI. These newborns are also at higher risk for

systemic bacteremia and vesicoureteral reflux. For example, in a study of 71 newborn infants treated for UTI, 15% had vesicoureteral reflux (Pediatr. Int. 2004;46:21-5).

Several recent studies address the importance of taking a urine culture at the appropriate time. For example, in a study of 538 premature infants born with sepsis, none of the 349 urine cultures taken in the first 24 hours after birth were positive (Pediatr. Infect. Dis. J. 2003;22:805-8). The babies were an average of 28.5 weeks' gestation and had an average birth weight of 1,072 g. However, cultures in 189 symptomatic infants 6 days or older showed 25% had a UTI, and of these, 38% had concomitant bacteremia.

"So there is little benefit of doing a urine culture on the first day of life with a baby with sepsis," Dr. Wiswell said. "It is of extreme importance, however, a few days later."

The mean time for fever resolution was 4-8 hours after start of treatment in an investigation of 128 infants 60 days old or younger with febrile UTI (Pediatr. Emerg. Care 2004;20:85-8). All had repeat cultures at 48 hours, and none were positive. Other researchers assessed the clinical course of 364 children admitted to the hospital for a UTI (Arch. Pediatr. Adolesc. Med. 2003;157:1237-40). Almost one-third, 32%, had a fever that persisted more than 48

hours, and 90% were afebrile by 80 hours. None of the 291 follow-up cultures were positive.

"From these two studies, it seems follow-up cultures are of no utility," Dr. Wiswell commented.

Breast-feeding may have a transient but significant protective effect against UTIs, according to another study (Acta Paediatr. 2004;93:164-8). The prospective case control study compared 200 children with their first febrile UTI to 336 controls. Dr. Wiswell said, "They concluded breast-feeding significantly lowered risk of UTI, with strongest effect in the first months after birth. The protection was no longer present after 7 months of age."

There is still uncertainty about whether long-term, low-dose antibiotics prevent recurrent UTIs in susceptible children (Cochrane Database Syst. Rev. 2001;4:CD001534). There is no consensus in the literature about traditional long-course antibiotics versus short-course therapy in upper UTIs. For eradication of lower UTIs, however, a Cochrane Collaboration Systematic Review indicates a 2- to 4-day course of oral antibiotics is as effective as 7- to 14-day therapy (Cochrane Database Syst. Rev. 2003;1:CD003966).

Until larger and more rigorous trials are completed, questions will remain about UTIs in newborns, Dr. Wiswell said. ■