

Pertussis in adults

Epidemiology: Pertussis (whooping cough) primarily affects children less than 10 years old, but the number and proportion of cases involving adults have increased over the last decade. In the United States 50% of reported cases have involved people 10 years of age and older.¹ In addition, the disease appears to be as contagious among adults as it is among nonvaccinated children.

In August 2002 a 39-year-old man working at an oil refinery in Illinois reported to the company health unit with a cough that had lasted 14 days.¹ On the same day, the employee's supervisor, aged 50, also reported to the health unit with symptoms of paroxysmal cough of 3 days' duration and an episode of cough syncope. Subsequent investigation identified 15 other cases of pertussis at the refinery, all of which were linked by contact with the supervisor, and 7 cases in the community.

In Canada the incidence of pertussis has increased four-fold, from 5 per 100 000 in the late 1980s to about 20 per 100 000 in recent years.² In the United States, incidence rates also quadrupled between 1990 and 2001.¹ Official reports underestimate actual incidence considerably, because most cases go unreported.

The increasing incidence and demographic shift mean that adults and adolescents are major reservoirs of pertussis in the community. This is because immunity following vaccination declines beginning at about 5 years of age.

Pertussis causes considerable morbidity in both adults and older children, although it is rarely fatal. Infants too young to be fully protected by vaccination (those less than 4 months of age) are at greatest risk of a fatal outcome. Thus, early recognition and treatment of pertussis in adults and adolescents may be helpful in limiting transmission to very young children.

Clinical management: Pertussis is difficult to diagnose. It typically begins with a catarrhal stage (rhinorrhoea and mild cough), which can last up to 2 weeks.

This is followed by paroxysms of an irritating cough. The repeated violent coughs consist of short expiratory bursts followed by an inspiratory gasp, or "whoop," that gives the disease its

popular name. Although characteristic of the disease, the whoop is often absent in adults and in infants less than 6 months old. Initially dry, the cough becomes productive of a clear, tena-

Epidemiology, diagnosis, treatment and prevention of pertussis (whooping cough)

Epidemiology

- About 50% of cases are in adolescents (aged 10–19 years) and adults (aged ≥ 20 years).
- Case-fatality rate is 0.8% in infants aged < 6 months.
- Transmitted person to person via aerosolized droplets from cough or sneeze or by direct contact with secretions from the respiratory tract of infectious people.
- Incubation period 6–20 days; usually 7–10 days.
- Highly contagious; 80% secondary attack rates among susceptible people.
- Epidemic every 3–5 years.

Clinical findings

- Catarrhal period (week 0–1): illness onset insidious (coryza, mild fever, non-productive cough); infants can have apnea or respiratory distress or both.
- Paroxysmal period (week 1–6): paroxysmal cough, inspiratory "whoop," post-tussive vomiting; pneumonia common among infants; infrequent manifestations include seizures.
- Convalescent period (week 6–12): cough paroxysms and intensity gradually decrease.

Laboratory testing

- Nasopharyngeal aspirate or Dacron swab for *Bordetella pertussis* on Regan Lowe or Bordet-Gengou culture media plate.
- Detection of *B. pertussis* DNA by polymerase chain reaction (PCR) test.
- Diagnosis confirmed with isolation of *B. pertussis* or positive *B. pertussis* PCR test result.

Outbreak setting testing

- Confirm outbreak with ≥ 1 culture-confirmed case.
- Test people when pertussis is highly suspected, symptoms are compatible with pertussis or person has been exposed to a case and has new cough symptoms.
- Do not test contacts without respiratory symptoms.

Recommended treatment

- Prescribe 14-day course of erythromycin: children 40–50 mg/kg daily divided into 4 doses; adults 2 g/d divided into 4 doses.
- Alternatively use trimethoprim (T)–sulfamethoxazole (S): children 8 mg/kg daily (T) and 40 mg/kg daily (S), divided into 2 doses; adults 320 mg/d (T) and 1600 mg/d (S), divided into 2 doses.
- Exclude from school or work for first 5 days.
- Treat people aged ≥ 1 year within 3 weeks of cough onset.
- Treat infants aged < 1 year within 6 weeks of cough onset.

Prevention

- Vaccinate children aged 6 weeks to 6 years with diphtheria, tetanus toxoids and acellular pertussis vaccine (DTaP).
- Prescribe 14-day course of antibiotics for close contacts, especially in high-risk settings; same doses as in treatment schedule: people aged ≥ 1 year, within 3 weeks of exposure; infants aged < 1 year, within 6 weeks of exposure.
- Report all cases to local public health departments.

Source: *Morbidity and Mortality Weekly Report*.¹

cious mucus. Prolonged paroxysms are sometimes associated with episodes of syncope and vomiting. The paroxysmal stage is followed by up to 2 months of coughing episodes, probably secondary to damage to the epithelial cells of the upper respiratory tract and from toxins produced by the bacillus.

Pertussis can be diagnosed in adults and adolescents during the catarrhal stage if there is an epidemiological link to a known case. However, in most adults the diagnosis can only be suspected on the basis of the typical cough. The organism, *Bordetella pertussis*, is fastidious but can sometimes be cultured from a nasopharyngeal aspirate or swab. Serologic testing is available, as is polymerase chain reaction testing for *B. pertussis* DNA.

Although transmission is most likely to occur during the catarrhal stage (probably by droplets, but also by direct contact with respiratory tract discharges), infected people remain contagious during the paroxysmal stage.

A 14-day course of erythromycin therapy is recommended for treatment and is most effective in preventing contagion if given within 3 weeks after the

onset of illness. The antibiotic does not reduce the severity of symptoms unless it is given in the catarrhal stage or early in the paroxysmal phase. Trimethoprim-sulfamethoxazole, azithromycin or clarithromycin are effective alternatives in patients unable to tolerate erythromycin.¹

Prevention: Acellular pertussis vaccines should be given to infants at 2, 4 and 6 months of age followed by a booster at 18 months and a final booster at 4 to 6 years of age.³

Close contacts of a patient with pertussis during the contagious period should receive prophylaxis with erythromycin for 14 days. Alternatively, trimethoprim-sulfamethoxazole can be used. Prophylaxis with azithromycin

and clarithromycin have not been well documented.¹

In the case of the refinery outbreak, 150 close contacts of the 17 patients with documented pertussis received prophylaxis with azithromycin at a dose schedule of 500 mg the first day followed by 250 mg for the next 4 days.

John Hoey
CMAJ

References

1. Pertussis outbreak among adults at an oil refinery — Illinois, August–October 2002. *MMWR Morb Mortal Wkly Rep* 2003;52(1):1-4. Available: www.cdc.gov/mmwr/preview/mmwrhtml/mm5201a1.htm (accessed 2003 Jan 22).
2. Notifiable Diseases Online. Ottawa: Population and Public Health Branch, Health Canada. Available: http://cythera.ic.gc.ca/dsol/ndis/c_dis_e.html (accessed 2003 Jan 22).
3. Weir E. Resurgence of *Bordetella pertussis* infection. *CMAJ* 2002;167(10):1146-7.

Public Health: Authors Wanted

We're interested in receiving well-written submissions from public health experts for *CMAJ's* Public Health page. Submissions should adhere to the format presented above and should provide information applicable to the primary care setting. We encourage potential authors to contact us at pubs@cma.ca to discuss possible topics. — The editors

available for your handheld (PDA)

Enjoy quick access to *eCMAJ* on the run with downloadable content for your personal digital assistant. Content is available in three popular formats — AvantGo, iSilo and handheld-friendly HTML — for any type of handheld — Palm OS, Pocket PC (Windows CE) or Psion.

When each issue appears, you receive:

- table of contents
- abstracts
- news
- Public Health
- Clinical Update
- Preventive Health Care

And you can sign up for our bioethics series, or the clinical practice guidelines on breast cancer (available in both languages). More content is coming soon!

Visit www.cmaj.ca
and click on “*eCMAJ* on your PDA (handheld)”



What they're saying . . .

“I was pleased to be pointed to the *eCMAJ* site recently . . . and I have added the [AvantGo] channel.” — *Dr. Robert Pless, National Immunization Program, US Centers for Disease Control and Prevention, Atlanta*

“Bravo!” — *Dr. Andrew Morris, infectious diseases and general internal medicine, Hamilton Health Sciences, Hamilton*

“I find this format much more user-friendly than the paper version. It is much more portable. I have used the journal regularly since this feature was introduced.” — *Dr. John Haggie, general and vascular surgery, Gander, Nfld.*