

## Infectious Agent

*Bordetella pertussis* (a bacterium)

## Clinical Features

### Infants and Young Children

Pertussis (whooping cough) usually begins with mild upper respiratory tract symptoms (runny nose and eyes, malaise, low-grade fever) that progress over 2-7 days to a dry, non-productive cough that becomes paroxysmal, often with a characteristic inspiratory “whoop” and followed by vomiting (in children). Apnoea is more common in infants <6 months of age, and paroxysmal coughing is less common in older children and adults. Without treatment, pertussis symptoms usually last 6-10 weeks. Complications include seizures, pneumonia, encephalopathy, and death.

**Older children and adults** may have atypical or milder symptoms, but cough typically persists for several weeks.

## Epidemiology

Occurrence is worldwide. Epidemics can occur every 3-4 years in immunised populations. The disease is more common in spring/summer, and there is an estimated 80% attack rate in susceptible household contacts. Symptoms are usually milder in older children and adults. The case fatality rate in unvaccinated infants <6 months of age is estimated to be 0.8%. In Australia between 1993 and 2005, 4 epidemics of pertussis occurred and more than 84,000 cases were reported, with an annual incidence of 22.8 to 57.4 cases per 100,000 population. A total of 18 deaths were attributed to pertussis, all but 2 in infants < 12 months of age. WA experienced a large pertussis epidemic in 2004/05, with a high incidence in children aged 10-19 years and younger children who were incompletely or not immunised.

## Mode of Transmission

Respiratory droplets.

## Incubation Period

Six to 21 days (average 7-10 days, rarely >14 days).

## Infectious Period

From onset of symptoms (about 1 week before onset of cough) up to 3 weeks after onset of cough and gradually decreases to negligible after 3 weeks.

## Immunity

Susceptibility is general. Immunity following infection or immunisation decreases after about 5 years.



## Case Management

### Clinical evidence

- A coughing illness lasting two or more weeks, or
- Paroxysms of coughing OR inspiratory whoop OR post-tussive vomiting.

*Early diagnosis and treatment is essential in order to minimise transmission to non-immune contacts.*

### Diagnosis

- **PCR**

For reported cases presenting <21 days from onset of coughing a nasopharyngeal specimen should be taken for PCR/culture, either by aspiration (preferable) or with a blue-topped rayon swab (not a cotton swab) which has a flexible metal shaft. The swab should remain in the posterior nasopharynx for 10 seconds before removal. If nasopharyngeal aspirates and swabs (above) are not available, a dry nose and throat swab should be sent.

For PCR studies the swab should be re-inserted into the holder; if viral culture is also requested the swab tip should be placed in viral transport medium. PCR is most reliably positive for 14 days from the onset of coughing or up to five days of antibiotic treatment but sensitivity declines after this. Culture is less sensitive than PCR testing.

- **Serum IgA (performed at PathWest)**

In addition to PCR testing acute and convalescent IgA serology can be performed. For cases presenting more than 14 days after onset of coughing, the diagnosis may still be confirmed by positive pertussis IgA serology. However, a negative pertussis serum IgA result does not exclude pertussis, and another pertussis IgA serology test is recommended 7-10 days later. IgM or IgG pertussis serology are not available. (Note: Princess Margaret Hospital performs IgA testing on nasopharyngeal specimens, provided at least 1mL of fluid is available).

### Treatment

The recommended antimicrobial therapy and chemoprophylaxis regimens for Pertussis in infants, children and adults is listed below in Table 1.

Antibiotic treatment is not recommended if the duration of paroxysmal cough is >21 days.

### Exclusion of Cases

Exclude cases from child care, school or health-care settings or other settings where there are young children, for 21 days from the onset of cough **OR** until they have completed at least 5 days of appropriate antibiotic treatment.



## Contact Management Prophylaxis

Prophylaxis is only recommended for contacts in those settings where the benefit is greatest. These settings are best defined by the chance of transmission and the high risk of severe complications should transmission occur.

Based on these principles, prophylaxis is recommended for the following high risk contacts of pertussis cases:

- All household members when the household includes any child <24 months of age who have received less than 3 doses of pertussis vaccine (i.e. commenced at six weeks of age with at least a 4 week interval between doses, and the last dose given at least 14 days previously).
- Any women in the last month of pregnancy, regardless of vaccine status.
- Where a case worked in a maternity ward or newborn nursery for more than an hour while infectious, then all babies in that ward should receive antibiotics.
- All other children and adults in the same care group of the case, regardless of immunisation status, attended child care for more than 1 hour while infectious and that care group includes one or more children <24 months of age who have received less than 3 doses of pertussis vaccine.
- Where the case attended child care for more than 1 hour while infectious and their care group does not contain children <12 months of age who have received fewer than 3 effective doses of pertussis vaccine, then other children in the same care group who have received fewer than 3 effective doses of pertussis vaccine, and staff who have not received pertussis vaccine in the previous 10 years, should receive antibiotics.
- Health care staff, regardless of vaccination status, working in a maternity hospital or newborn nursery. Chemotherapy is not recommended routinely for health care staff caring for older infected children or adults.



**Table 1: Recommended antibiotics and dosages for treatment and for prophylaxis of high risk contacts**

Age group	Azithromycin	Clarithromycin	Erythromycin	TMP-SMX*
<1month	10mg/kg single dose for 5 days**	Not recommended	Only use erythromycin if azithromycin is unavailable**. For ≤7 days old: 10mg/Kg/dose 12-hourly for 7 days; For 8-28 days old: 10mg/Kg/ dose 8-hourly for 7 days	Not recommended in infants <2 months of age unless macrolides cannot be used
1-5 months	10mg/Kg single dose for 5 days	7.5mg/kg/dose twice daily for 7 days	10mg/Kg/dose 6-hourly for 7 days	≥2 months of age; TMP:4mg/Kg twice daily, SMX: 20mg/Kg twice daily for 7 days
Infants (≥6 months) and Children	10mg/Kg single dose on day 1, then 5mg/Kg single dose for 4 days (maximum 250 mg/day)	7.5mg/kg/dose (up to a maximum dose of 500 mg) twice daily for 7 days (maximum 1g/day)	10mg/Kg/dose (up to a maximum dose of 250 mg) 6-hourly for 7 days (maximum 1g/day)	TMP:4mg/Kg, SMX: 20mg/Kg twice daily for 7 days (max) 160 mg TMP and 800 mg SMX 12-hourly)
Adults	500mg single dose on day 1, then 250 mg dose for days 2-5	500mg twice daily for 7 days	Erythromycin: 250 mg 6-hourly for 7 days; or Erythromycin ethyl succinate (EES): 400mg 6-hourly for 7 days	TMP: 160mg twice daily, SMX: 800mg twice daily for 7 days

\* Trimethoprim (TMP)-sulfmetoxazole (SMX)

\*\*Azithromycin is preferred for this age because of an association between erythromycin prophylaxis for pertussis and infantile hypertrophic pyloric stenosis.

### Antibiotic prophylaxis is not recommended:

- In other settings such as primary schools, high schools, tertiary institutions and workplaces (unless maternity hospital or newborn nursery).
- If more than 21 days from date of last contact with an infectious case has elapsed.
- Routinely for health care workers caring for infected adult patients. Additional infection control precautions should be utilised for hospitalised cases.

### Exclusion of Contacts

Child contacts in the same room as the case who have not received 3 effective doses of vaccine should be excluded from preschool and child-care until the expiry of 14 days from their last exposure to the infectious case, unless they have already completed 5 days of a course of an effective antibiotic.

### Immunisation

The immunisation status (age-appropriate) of high risk contacts should be checked and if not completed, DTPa immunisation should be offered as per recommended WA schedule. Missed doses are available free, including dTpa (**Boostrix™**) for Years 7-12 school students (see also “catch up” section of Australian Immunisation Handbook 9<sup>th</sup> Edition, 2008).



## Public Health Unit Follow-up

Public Health Nurses working within the local Public Health Units will follow up notified cases of pertussis, with priority given to cases under five years of age, those confirmed by PCR or culture, and those reported to have high risk contacts. Follow-up involves contacting GPs to determine if contact tracing has been undertaken, and checking ACIR to verify immunisation status of the case.

### Information for Contacts

Provide advice to close contacts (parents of) on the signs and symptoms of pertussis and to consult a doctor if symptoms of pertussis develops within 14 days of last contact with a confirmed or clinical suspect case.

### Pertussis in Pregnancy

Treatment of pregnant women with pertussis within 1 month of delivery is important to prevent neonatal pertussis. Erythromycin is safe to use in pregnancy (category A). There are limited data on the use of azithromycin in pregnancy (category B1). In addition, if the onset is within three weeks of delivery, the newborn should receive antibiotic therapy, as per Table 1.

### More Information

See the Australian Immunisation Handbook 9th Edition. 2008, also available at [www.immunise.health.gov.au/](http://www.immunise.health.gov.au/), or telephone your local Population Health Unit.

Public Health Unit	Telephone/Fax No.	Public Health Unit	Telephone/Fax No.
<b>North Metropolitan</b> (Perth)	Tel: 9380 7700 Fax: 9380 7719	<b>Kimberley</b> (Broome)	Tel: 9194 1630 Fax: 9194 1633
<b>South Metropolitan</b> (Perth)	Tel: 9431 0200 Fax: 9431 0223	<b>Midwest</b> (Geraldton)	Tel: 9956 1985 Fax: 9956 1991
<b>Great Southern</b> (Albany)	Tel: 9842 7500 Fax: 9842 2643	<b>Goldfields</b> (Kalgoorlie)	Tel: 9080 8200 Fax: 9080 8201
<b>Southwest</b> (Bunbury)	Tel: 9781 2350 Fax: 9781 2382	<b>Wheatbelt</b> (Northam)	Tel: 9622 4320 Fax: 9622 4342
<b>Midwest</b> (Carnarvon)	Tel: 9941 0515 Fax: 9941 0520	<b>Pilbara</b> (Port Hedland)	Tel: 9172 8333 Fax: 9172 8370

