Pertussis

Epidemiology in New Zealand

New Zealand has continued to experience outbreaks of pertussis in recent decades. This is in part due to historically low immunisation rates and in part because immunity from both natural infection and immunisation wanes over time.

More detailed epidemiological information is available on the Institute of Environmental Science and Research (ESR) surveillance website at www.surv.esr.cri.nz.

Case definition

Clinical description
A disease characterised by a cough lasting longer than 2 weeks and including one or more of:
- paroxysms of cough
- cough ending in vomiting or apnoea
- inspiratory whoop.

Laboratory test for diagnosis
Laboratory confirmation requires isolation of Bordetella pertussis or detection of B. pertussis nucleic acid, preferably from a nasopharyngeal swab.

Discuss appropriate specimens with the testing laboratory or ESR.

While serology is sometimes used it is not a confirmatory test.

Case classification

- Under investigation: A case that has been notified, but information is not yet available to classify it as suspect, probable or confirmed.
- Suspect (in children under 5 years of age): Any paroxysmal cough with whoop, vomit or apnoea for which there is no other known cause.
- Probable: A clinically compatible illness with a high B. pertussis IgA test or a significant increase in antibody levels between paired sera at the same laboratory\(^1\)

\(^1\) A ‘significant increase’ is generally taken as a fourfold rise in titre, however interpretation of serology results should be discussed with the testing laboratory or ESR.
OR a cough lasting longer than 2 weeks and with one or more of the following, for which there is no other known cause:
- paroxysmal cough
- cough ending in vomiting or apnoea
- inspiratory whoop.

- **Confirmed**: A clinically compatible illness that is laboratory confirmed, or is epidemiologically linked to a confirmed case.
- **Not a case**: A case that has been investigated and subsequently found not to meet the case definition.

### Spread of infection

#### Incubation period

Usually 7–10 days, ranging from 5–21 days.

#### Mode of transmission

Droplets of respiratory, oral or nasal secretions.

#### Period of communicability

Highly communicable in the catarrhal stage before the paroxysmal cough stage.

For control purposes, the communicable stage lasts from the catarrhal stage to 3 weeks after the onset of paroxysmal cough in a case not treated with antimicrobials. When treated with an effective antibiotic (for example, erythromycin), infectivity lasts until 5 days of antibiotics have been taken.

### Notification procedure

Attending medical practitioners or laboratories must immediately notify the local medical officer of health of suspected cases. Notification should not await confirmation.

### Management of case

#### Investigation

In consultation with the attending medical practitioner, ascertain pertussis immunisation status and determine whether there are close contacts for whom chemoprophylaxis is appropriate.

Ideally, a nasopharyngeal swab should be collected from all suspected cases of pertussis. However, testing may not be necessary or appropriate for cases with an epidemiological link to a confirmed case, or in outbreak situations.
Restriction
Exclude the case from school, early childhood service, other institutions or work until they have received at least 5 days of a course of antibiotic treatment, or exclude them for 3 weeks from the date of onset of typical paroxysms of cough or until the end of the cough, whichever comes first.

Treatment
Antimicrobial treatment does not alter the clinical course of the illness unless administered during the catarrhal stage or the early paroxysmal stage (usually the first 2 weeks) but may reduce infectivity.

Recommended antibiotics include erythromycin, azithromycin, clarithromycin and co-trimoxazole. Oral erythromycin should be used with caution in infants less than 2 weeks of age due to the risk of pyloric stenosis. Azithromycin is the preferred drug for infants less than 1 month old. There is no clinical evidence to support the effectiveness of roxithromycin for pertussis.

The standard length of treatment with erythromycin is 14 days. Most other antibiotics for pertussis are a 7 day course.

Infants must be kept under close observation while on treatment with any of these drugs.

See the Immunisation Handbook (Ministry of Health 2011) and medicine data sheets for more details, including use of antibiotics during pregnancy, or consult an infectious diseases physician or obstetrician.

Counselling
Advise the case and their caregivers of the nature of the infection and its mode of transmission.

Management of contacts
Identify contacts for restriction, immunisation and chemoprophylaxis as appropriate.

Definition
A contact can be defined as someone who has been in close proximity (within 1 metre) of the index case for 1 hour or more, during the case’s infectious period. Contacts include household members, those who have stayed overnight in the same room, and those who have had face-to-face contact with the case.

There is evidence that for the Erythromycin estolate formulation (which has superior tissue and serum concentrations compared with the other salts), 7 days of treatment is as effective as 14 days. However Erythromycin estolate is not currently available in New Zealand.
However, intensive public health follow-up of all contacts is not usually necessary or effective in preventing community transmission, although raising general awareness and promoting on-time immunisation is important.

The primary goal of public health follow-up for pertussis contacts is to protect infants, pregnant women, and people at high risk of severe or complicated illness.

High priority contacts for public health follow-up are therefore:

- children under 12 months old
- children and adults who live with, or spend much of their time around a child under 12 months old, including healthcare and education settings
- pregnant women (particularly in the last month of pregnancy)
- individuals that are at high risk of severe illness or complications (for example chronic respiratory conditions, congenital heart disease or immunodeficiency).

Factors to consider when determining public health follow-up and intervention include:

- degree of exposure. Most contacts at early childhood services, schools or work or who have only shared vehicle space or only had casual contact are not usually considered contacts for the purposes of public health follow-up, other than providing information and observation
- immunisation status. For example whether there is clearly documented full immunisation or recent boosters
- the health status of the contact
- side effects of prophylactic antibiotics.

**Investigation**

Children and staff at early childhood services, especially partially immunised children, should be observed for respiratory tract symptoms for 3 weeks after contact has been terminated.

**Restriction**

Any contacts (high priority or otherwise) should be advised to avoid attending early childhood services, school, work or community gatherings if they become symptomatic.

Additional restrictions may be advised by the local Medical Officer of Health, in particular where there is a significant risk of transmission to high priority individuals.

3 The Immunisation Handbook 2011 currently recommends boosters (not funded) at 10-yearly intervals for certain groups (p142). Recommended timing will be kept under review, given that immunity wanes after 5–10 years from the last pertussis vaccine dose (MMWR Vol. 54 No. RR-14 December 9, 2005). CDC advice also notes that “shorter intervals between Tdap and last Td may increase the risk of mild local reactogenicity but may be appropriate if your patient is at high risk for contracting pertussis, such as during an outbreak, or has close contact with infants” (CDC pertussis webpages).
For example healthcare workers who work with children under 12 months old (such as paediatric and maternity wards).

The Medical Officer of Health should also consider whether it is necessary to use exclusion provisions in the Health (Infectious and Notifiable Disease) Regulations 1966, and from early childhood centres using the Education (Early Childhood Centres) Regulations 1998.

**Prophylaxis**

**Antimicrobials**

Evidence for the effectiveness of chemoprophylaxis of contacts is limited. Therefore, antibiotics are only recommended for high priority contacts (see above), and if administered within 3 weeks of exposure to an infectious case. Recommended antibiotics and dosages are the same as for case treatment.

See the *Immunisation Handbook* (Ministry of Health 2011) and medicine data sheets for more details, including use of antibiotics during pregnancy, or consult an infectious diseases physician or obstetrician.

**Immunisation**

Unless current immunity is likely, high priority contacts should be offered a dose of a pertussis containing vaccine (note that only doses on the national schedule are funded, including the 11 year old booster).

Advise any unimmunised or partially immunised individuals to be fully immunised.

**Other control measures**

**Identification of source**

Not applicable.

**Disinfection**

Clean and disinfect surfaces and materials contaminated by respiratory secretions.

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4 As noted in the Immunisation Handbook 2011 (p24), pertussis vaccination as Tdap (recommended but not funded), can be offered in pregnancy or post-partum to reduce the risk of a mother infecting her baby. This is particularly recommended when there are high rates of circulating pertussis in the community. In pregnancy, this is best given after 20 weeks gestation. It is likely to result in increased immunity in the newborn infant, as well as in the mother. (also see Updated Recommendations from the Advisory Committee on Immunization Practices (ACIP). MMWR Morbidity and Mortality Weekly Report. Vol. 60, No. 41, October 21, 2011).
Health education

Encourage on-time immunisation, particularly for infants at 6 weeks, 3 months and 5 months.

Promote behaviours that protect infants, such as people with a cough keeping their distance from babies.

Reporting

Ensure complete case information is entered into EpiSurv.

If a cluster of cases occurs, inform the Ministry of Health Communicable Diseases Team and outbreak liaison staff at ESR, and complete the Outbreak Report Form.

References and further information


