The complete guide to pertussis management

Reviewed November 2018

Situation update

- Auckland has recently had a short pertussis epidemic and the potential remains for a second peak of infections, ARPHS recommends vigilance for an increase in cases of pertussis.
- **Tdap Immunisation for pregnant women is recommended and funded** for every pregnancy from 28 weeks gestation.
- **Azithromycin is the first line treatment and prophylaxis for all ages** and is fully funded, this is a convenient dosage regime and treatment duration.
- Pertussis is especially serious in infants under 12 months old. For every 100 infants <12 months old with whooping cough, around 70 will be hospitalised. The current public health strategy aims to protect this vulnerable cohort.

Guide to Pertussis Management

Immunisation

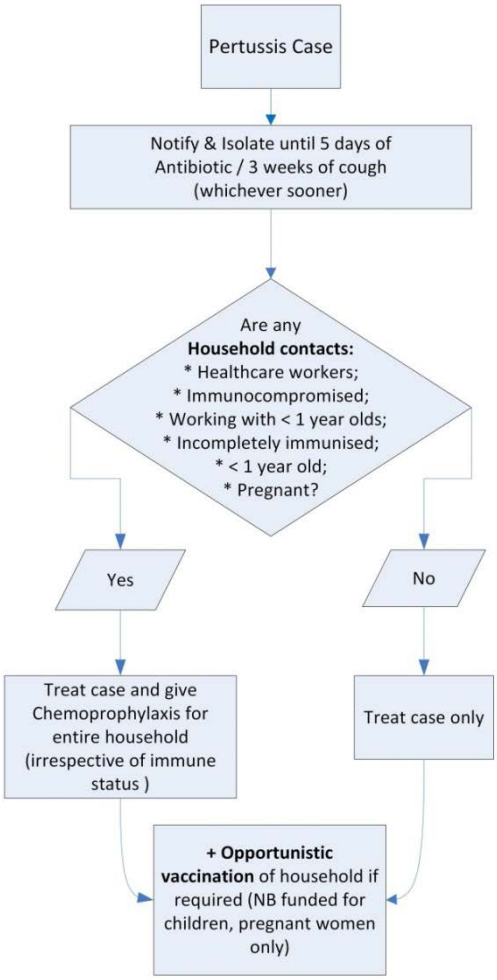
The Pertussis vaccine saves infants lives.

Pregnancy: Immunisation is funded for every pregnancy from 20 weeks gestation – with the ideal time to give the vaccine between 28-38 weeks. **Vaccination protects both mother and baby in the most vulnerable first 6 weeks of life.**

Vaccination needs to be on time to protect infants best: Delay in receipt of any of the first three pertussis immunisations increases the odds of hospitalisation with pertussis in the first year of life by 4-5 times.

- DTaP-IPV_HepB at:
  - 6 weeks
  - 3 months
  - 5 months
- DTAP-IPV at 4 years
- TdaP at 11 years

Immunity wanes (whether from vaccine or infection) over 4-6 years, so boosters are required.



Treatment and Prophylaxis

Treatment reduces infectivity, early treatment may modify disease severity.

1st line:
Azithromycin 5 days is fully funded for all age groups for the treatment or prophylaxis of pertussis Dose:

- Infants and children: Day 1: 10mg/kg/day in a single daily dose (max 500mg day 1); Days 2-5: 5mg/kg/day in a single daily dose (max 250mg per day)
- Adults: Day 1: 500mg as a single dose; Days 2-5: 250mg once daily

2nd line:
Erythromycin ethyl succinate (EES/E-Mycin) is also fully funded for treatment in children aged 12 months and older and in adults but must be given as a **14 day course**:

- Adults: 400 mg four times a day for 14 days
- Children 12 months or older: 10 mg/kg/dose four times a day for 14 days (max 400mg qid)

Roxithromycin (RULIDE) is NOT recommended for treatment/chemoprophylaxis of pertussis due to poor serum and tissue concentrations achieved.

Current information

(links provided to updated sections)

- Current process for health professionals
- Investigation recommendations updated
- After-Hours laboratory requests
- Azithromycin for all ages now fully funded
- Management in Primary Care & Hospitals
- Immunisation recommendations
- Resources available from ARPHS

Current process for health professionals

Pertussis is endemic to New Zealand and the public health strategy for pertussis aims to protect those most vulnerable (under 12 month olds, pregnant, immune compromised).

- ARPHS receives notifications, provides advice and manages institutional outbreaks (see 'Managing Suspected Pertussis Cases' section).
- General Practice and hospital-based health professionals provide the case and high priority contacts with appropriate information, advice, and treatment or prophylaxis (see link below)
- Written information for cases, contacts, early childhood education centres, schools, and healthcare institutions is available from ARPHS: https://arphs.health.nz/public-health-topics/disease-and-illness/whooping-cough-pertussis/

Managing suspected pertussis cases

Notify – Investigate – Treat – Isolate – Advise – Immunise

Notify on suspicion

- If your patient has a clinically compatible illness and the diagnosis is most likely pertussis, notify ARPHS. Do not wait for investigations to be completed.
- **Inform the patient or caregiver that ARPHS has been notified** and may be in contact
- To notify ARPHS, call **09 623 4600** (24-hour phone line) or fax **09 630 7431** with the information listed below: Fax template provided in Appendix 1

Information to supply to ARPHS when notifying

- **Your details:** Name, treating doctor, contact number
- **Case details:** Name, address, age, ethnicity, NHI, occupation, contact number, pregnancy
- **Clinical History:** Especially onset date of illness, paroxysmal cough onset date.
- **Laboratory tests:** Any tests arranged
- **Immunisation Status:** Dates of pertussis immunisations if available
- **Links to confirmed or probable cases:** Including names

Investigate only where necessary

- Investigation is NOT required for all suspected cases.
- ARPHS does NOT recommend testing for the following people:
  - Patients that meet the case definition of a cough for more than two weeks and one or more of the following: whoop, post-tussive vomiting, or apnoea
  - Cases that have been coughing for under 2 weeks, with an illness compatible with early whooping cough, and known contact with a case that met the case definition or with a confirmed case of pertussis (i.e. PCR or culture positive)
  - Symptomatic household contacts of a confirmed case of whooping cough or a case that meets the case definition
- Diagnostic testing should be considered **ONLY** if the result **will alter the management of cases** with high priority contacts (infants under 12 months, pregnant women, immune compromised, chronic disease), or if employment issues arise, or if requested by ARPHS
- Any tests believed urgent should be discussed with the appropriate pathologist

Timing of Infectivity, Investigation, and Treatment

First symptoms

Paroxysmal / Severe Cough Start Date

~5-10 days after first unwell – infectious for a further 3 weeks

Week	0	1	2	3	4	5	6	7	8	9	10	11	12
Disease Phase	Catarrhal												
		Paroxysmal											
Infectious													
PCR													
Culture													
Serology													
Treat Cases													

Adapted from CDC: www.cdc.gov/pertussis/clinical/diagnostic-testing/diagnosis-confirmation.html
Shading indicates relative sensitivity

After-Hours Laboratory Requests from Virology and Immunology

- PCR and serology specimens collected at community laboratories are all tested at LabPlus
- Specimens will be processed on the next working day

Other important considerations (see diagram above)

- There are several laboratory tests available for the diagnosis of pertussis (see Resources)
  - PCR nasopharyngeal swab should be performed in preference to culture
  - Pertussis serology is not recommended generally as it is useful only late in the disease course or as paired sera.
- The timing of a test impacts on its sensitivity
- A negative laboratory result does not necessarily rule out pertussis – consider exposure, clinical compatibility, the diagnostic test performed and its timing. There is no point in requesting PCR testing if the patient has been symptomatic for more than 3 weeks.

Treat suspected cases

- Early treatment may modify disease severity. Treatment reduces infectivity if started during the catarrhal phase or within three weeks of the onset of paroxysmal cough. Beyond this time it should only be considered for high risk cases (pg 390, Immunisation Handbook 2017).
- **Azithromycin** is the recommended first-line treatment and a five day course is fully funded for all age groups if endorsed for the treatment or prophylaxis of pertussis. The recommended dose varies by age and is:
    - **Infants and children:** Day 1: 10mg/kg/day in a single daily dose (max 500mg day 1); Days 2-5: 5mg/kg/day in a single daily dose (max 250mg per day)
    - **Adults:** Day 1: 500mg as a single dose; Days 2-5: 250mg once daily
- **Erythromycin ethyl succinate** (EES/E-Mycin) is also fully funded for treatment in children aged 12 months and older and in adults but must be given as a 14 day course:
    - **Adults:** 400 mg four times a day for 14 days
    - **Children 12 months or older:** 10 mg/kg/dose four times a day for 14 days (max 400mg qid)
- **Roxithromycin (RULIDE) is NOT recommended** for treatment/chemoprophylaxis of pertussis due to poor serum and tissue concentrations achieved.
- Alternative antibiotic regimens can be found in the Immunisation Handbook

Isolate cases

- Cases should be advised by their GP or hospital doctor to stay away from babies, young children, pregnant women and immuno-compromised people. They should not attend early childhood education centres, school, work, and social gatherings until either:
    - 2 days (48 hours) since treatment started if Azithromycin used as an antibiotic; or
    - 5 days since treatment started if other antibiotic used; or
    - 3 weeks from the start of cough if no antibiotic treatment is given to prevent them spreading the infection to others.
- Children diagnosed with pertussis may be required by the Medical Officers of Health to be excluded from Early Childhood Centres/Schools as described above in accordance with the Health Act 1956 and/or the Education (Early Childhood Centres) Regulations 1998.

Advise

- Provide information sheets for patients and contacts with suspected or confirmed pertussis (see Resources)

Immunise

- Review the immunisation status of all household members and update as necessary
- Pregnant women should be offered TDap “Boostrix” vaccine in every pregnancy. The vaccine is funded when given in the third trimester. See Resources for more information
- Offer immunisation to adolescent (>16 years) and adult household members who have not received an immunisation booster in the last 10 years – this is not funded.
- Children who have had pertussis infection should still have all of their childhood pertussis immunisations as per the National Schedule

Managing contacts of pertussis in primary care and hospitals

- ARPHS coordinates the management of institutional outbreaks but does not undertaking contact tracing for individual pertussis cases.
- Primary care continues to manage chemoprophylaxis for household contacts of a pertussis case and provide information to cases to distribute to their other important contacts
- Hospitals continue to manage hospital inpatient contacts of a case and provide information to other contacts (from ARPHS website) so they can discuss with their GP whether prophylaxis is indicated. GPs may have additional information regarding other high priority contacts in the family.
- The aim of contact management is two-fold:
  1. *To identify symptomatic contacts for treatment*
     A contact can be defined as someone who has been in close proximity (within 2 metres) of the index case for 1 hour or more, during the cases infectious period or who has had direct contact with respiratory secretions.
  2. *To provide chemoprophylaxis with an aim of reducing the odds of infection in high priority groups* (infants under 12 months, pregnant women in their 3rd trimester, immune compromised, those with chronic disease, and their contacts)

Arrange Chemoprophylaxis

- Advise or arrange chemoprophylaxis for the following household contacts of a case of pertussis:
  - all members of a household that includes:
    - an infant under 12 months old **or**
    - a pregnant woman in the third trimester **or**
    - household contacts under five years of age who are unimmunised or have had less than three pertussis immunisations, **or**
    - individuals at risk of severe illness or complications (e.g. chronic respiratory conditions, congenital heart disease or immunodeficiency)
  - contacts who themselves have daily contact with infants under 12 months, pregnant women or individuals at risk of severe illness or complications (e.g. chronic respiratory conditions, congenital heart disease or immunodeficiency) e.g. through childcare or work.
- Prophylactic **antibiotic regimens are the same as for treatment** of pertussis
- Prophylaxis is not 100% effective. Advise contacts to:
  - be vigilant for symptoms and to see a GP if they develop catarrhal symptoms or cough.
  - Stay away from babies, children under 12 months, pregnant women, and immunocompromised people, until:
    - 2 days (48 hours) since treatment started if Azithromycin used as an antibiotic; or
    - 5 days since treatment started if Erythromycin used; or
    - 3 weeks from the start of cough if no antibiotic treatment is given to prevent them spreading the infection to others.

Provide Information for the Case to Pass on to Their Contacts

- Advise cases/parents to let their contacts know that they have pertussis including informing:
  - Early childhood centres, daycares, schools, workplaces (ARPHS will follow-up any institutional contacts)

  - Contacts who are aged under 12 months, partially or unimmunised children under five years, pregnant, or immune compromised
  - Contacts who are in daily contact with pregnant women, infants under 12 months
- Provide cases with Information Sheets to give to their contacts (see Resources)

Immunisation

Immunisation remains the mainstay for protecting the vulnerable from pertussis.

Every opportunity to immunise should be taken, including active precall, recall, review of immunisation status at all paediatric consultations, and opportunistic immunisation.

Key immunisation messages for patients

- ***On time* immunisation is essential at 6 weeks, 3 months, 5 months**
  Delay in receipt of any of the first three pertussis immunisations increases the odds of hospitalisation with pertussis in the first year of life by 4-5 times. Note: Due to waning immunity in adulthood, maternal antibodies are generally inadequate to provide protection to newborns.
- ***Boosters* are essential at 4 years and 11 years**
  Immunity following immunisation or pertussis infection wanes after 4-6 years. Boosters help maintain personal immunity through the school years, and also provide indirect protection of infants in the community who are too young to be immunised.
- ***Pregnancy*** (Immunisation Handbook 2017 page 384 and ARPHS website www.arphs.health.nz)
  Immunisation is funded for pregnant women from 20 weeks gestation – with the ideal time to give the vaccine around 28 weeks.
  This booster is given to reduce the risk of the mother infecting her baby, and to provide passive protection in the first weeks of life. An information sheet on Pertussis Immunisation in Pregnancy is available for patients on the ARPHS website (see Resources).
- ***Adult immunisation*** (Immunisation Handbook 2017 Page 387)
  Around 80% of infants with pertussis catch it from a parent, caregiver, or sibling. Immunisation of other family members helps provide indirect protection of those who are most vulnerable. Adult immunisation booster is not funded[1], but is recommended by the Ministry of Health for:
  - Lead maternity carers and all health care personnel working with/around infants, chronic disease (e.g. heart or respiratory) or immuno-compromised individuals
  - Household/family contacts of newborns (including older children over 7 years and adults)
  - Early childhood service personnel

[1] Some employers may provide this to staff free.

Pertussis infection

- Pertussis is a highly infectious bacterial infection spread by coughing and sneezing
- There are two phases of the illness:
    - **Catarrhal Phase:** Most infectious period lasting seven to 10 days. Symptoms include runny nose, fever, malaise and coughing
    - **Paroxysmal Phase:** Severe prolonged coughing episodes (paroxysms) that typically end in a whoop (inspiratory gasp), apnoea, or vomiting
- Pertussis occurs at any age as immunity wanes four to six years after immunisation or infection
- Clinical presentation varies with age and immunisation status:
    - Immunised children and adults typically experience a milder illness and may not whoop
    - Infants < six months frequently have an atypical presentation with a short catarrhal phase, gagging, gasping, or apnoea as prominent features, absence of whoop, and a prolonged paroxysmal phase
- **Complications:** Include pneumonia, neurologic complications including seizures and encephalopathy due to hypoxia, pressure complication resulting from sever coughing include rib fractures, petechial haemorrhage, pneumothorax, hernia, rectal prolapse
- **Serious complications are most common in infants under 12 months:** 65-75% hospitalised, 10% pneumonia, 20-25% apnoea, seizures ~1%, death 1-2%
- **Incubation period:** Ranges from five to 21 days
- **Infectious period:** From symptom onset (catarrhal phase, most infectious period) until three weeks after the onset of paroxysmal or severe coughing.

Resources

For Health Professionals:

- Pertussis clinical pathway
- Pertussis fax notification template
- Quick answers to frequent Tdap questions

For patients and their contacts:

- Pertussis web page
- Pertussis fact sheet
- Information for cases
- Information for contacts
- Pertussis immunisation in pregnancy

For additional information on immunisation, please call the Immunisation Advisory Centre on 0800 IMMUNE (0800 466 863) or visit their website www.immune.org.nz

Appendix 1: Pertussis notification template

Please complete and fax to (09) 630 7431 or Tel: 6234600. Thank you.

Reporting GP: GP Practice:
Tel No:
Name of Case: NHI:
Case Tel No:
Current Address of Case:
Date of Birth: Male or Female (Circle one):

Coryzal/catarrhal prodrome (URTI symptoms and nonspecific cough	Y / N Date of Onset:
Paroxysmal cough (coughing fits)	Y / N If yes, Date of Onset:
Inspiratory whoop	Y / N
Post-tussive vomiting or apnoea	Y / N
In GP's view is this a clinically compatible illness?	Y / N
Laboratory Investigations:	PCR Y / N Date: Culture Y / N Date: Serology Y / N Date:
Hospitalised	Y / N
Infection Control notified	Y / N
Vaccination History (6wks, 3mths, 5mths, 4yrs, 11yrs and Boostrix):	Age appropriately immunised (Circle one): Partially immunised Too young Unimmunised Information incomplete Unknown/uncertain Boostrix given in last 5yrs
Antibiotics Prescribed: Azithromycin for 5 days Or Erythromycin for 14 days **Other**	Y / N Date prescribed: Y / N Date prescribed: Y / N Name of antibiotic:
Pregnant	Y / N Number of weeks:
Attendance at school, pre-school or childcare	Y / N Name:
Staff of healthcare/early childhood facilities	Y / N Occupation:
Exclusion Advice given	Y / N
ARPHS information for case and contacts given	Y / N
Household Contacts: Anyone symptomatic **Anyone less than 1 yr old Anyone Pregnant 3rd trimester Anyone immuno-compromised Unimmunised or Partially Immunised**	Y / N Y / N Y / N Y / N Y / N

Please visit our website at www.arphs.health.nz for further pertussis information and resources.