# Pertussis

## Te Mana Ora protocol

This protocol is based on the Ministry of Health's Communicable Disease Control Manual[1] and Immunisation Handbook[2] pertussis chapters and the advice of local clinicians.

Te Mana Ora-specific content is in green.

- Protocol users should **document** their response to **action points,** marked throughout with this arrow.

## Contents



## 1. Associated documents

CDHB Māori health policy

CDHB tikanga policy

CDHB interpreter procedure

CPH privacy/nohotapu policy

### Forms, letters, questionnaires:

Y:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Pertussis\FormsStdLettersQuest

### Ministry of Health online information:

https://www.health.govt.nz/your-health/conditions-and-treatments/diseases-and-illnesses/whooping-cough

## 2. The Illness

Pertussis (whooping cough) is a bacterial respiratory infection caused by Bordetella pertussis, an exotoxin-producing gram-negative bacillus. The bacillus is fastidious (requires special techniques to grow in culture) and will often have decreased in numbers by the time the typical cough develops, making laboratory confirmation by culture difficult. The availability of sensitive and specific PCR and serological assays has improved laboratory confirmation of suspected B. pertussis infection.

Pertussis is **highly transmissible**. It is one of the most infectious vaccine-preventable diseases in humans. The rate of transmission is several-fold greater than most respiratory pathogens, including influenza, such that in a non-immune population, approximately 5–17 secondary pertussis cases are expected from one case. Transmission occurs by **aerosolised droplets**.

There are three stages of **typical pertussis infection**:

Catarrhal stage – **rhinorrhoea** (runny nose) and **irritating mild cough** (typically lasting 7–10 days).

Paroxysmal stage – **paroxysms** (bursts)[1] **of coughing**; in children, these may end in vomiting, cyanosis or apnoea and inspiratory gasp or whoop (1–6 weeks). Usually afebrile.

Convalescent stage – less persistent cough, **gradual recovery** (up to 10 weeks).

However clinical presentation **varies with age, immunisation status and previous infection**. Pertussis must be considered in **infants** presenting with **apnoea**, since apnoea and/or cyanosis may precede paroxysmal cough. In **school-aged childre**n, **inspiratory whoop**, **post-tussive vomiting** and the **absence of wheezing and fever** distinguish pertussis from other causes of coughing illnesses. Almost all pertussis infections in adolescents and adults occur in the context of previous infection and/or immunisation. **Persistent cough for more than 14 days** is the cardinal feature in **adults**. Coughing is often **paroxysmal** and **worsens at night**, with the patient waking with a choking sensation, but post-tussive vomiting and whoop are infrequent.

Studies performed in several countries during both epidemic and non-epidemic periods have shown that between 12 and 37 percent of school-aged children, adolescents and adults with **persistent cough** (lasting 14 days or more) have evidence of recent B. pertussis infection. A primary care-based study in New Zealand performed during the early phase of the 2011–2013 epidemic showed recent B. pertussis infection in 17 percent of children aged 5–16 years and 7 percent of adults aged 17–49 years presenting to primary care with a persistent cough of two or more weeks' duration.

The disease is **most often severe in infants in the first few months of life**. One in six infants with pertussis sufficiently severe to require intensive care admission will either die or be left with brain or lung damage. The most common complications of pertussis are secondary infections, such as otitis media and pneumonia, and the physical sequelae of paroxysmal coughing, (eg, petechiae and other haemorrhages within subconjunctiva, nasopharynx and central nervous system; pneumothorax; hernia; and urinary incontinence). At the peak of the paroxysmal phase, vomiting can lead to weight loss especially in infants and young children.

### Global burden of disease

Pertussis mortality and morbidity rates continue to be highest in the **first year of life**. In the US during the 1940s pertussis resulted in more infant deaths than measles, diphtheria, poliomyelitis and scarlet fever combined. Beyond age 3 years mortality rates have always been relatively low. In immunised populations virtually all deaths occur in the first two months of life, and deaths in toddlers and preschool-aged children have largely disappeared. Among infants, younger age, lack of immunisation, low socioeconomic status, premature gestation, low birthweight and female gender are associated with an increased risk of fatal pertussis.

Pertussis mortality and morbidity is **under-reported**. It is estimated that there are three times more deaths due to pertussis than are reported in high-income countries. **The burden of pertussis in older adults is underestimated**, particularly for those with chronic respiratory conditions, and increases with age. Infants continue to die from pertussis despite advances in intensive care.

[1] A paroxysm is a series of sudden, violent, uncontrollable movements that your body makes because you are coughing, laughing, or in great pain (Collins)

Following the introduction of mass immunisation, countries with consistently high immunisation coverage rates have achieved consistently low pertussis incidence rates. The most pronounced decrease in incidence was seen in those aged under 10 years. Although primarily associated with low immunisation coverage, in some instances higher pertussis incidence rates are due to lower or waning vaccine efficacy or less-than-optimal immunisation schedules. The burden of severe disease, particularly since the introduction of acellular vaccines, is highest in infants and unvaccinated young children. However, less severe pertussis cases are also seen in vaccinated children who are further away from the last DTaP and, in some countries, adolescents. Infants too young to have received more than one dose of pertussis vaccine (age 3 months or less) have the highest rate of notification, hospitalisation and death.

**Epidemic peaks** of pertussis occur **every 2–5 years** without the consistent seasonal pattern that is typical of most respiratory infections, although evidence from Australia suggests increased incidence (by 15 percent compared with annual average) during spring to summer months. Epidemics are frequently sustained over 18 months or more, during which there are dramatic increases in hospital admission rates. Lack of change in the pertussis epidemic cycle with mass immunisation suggests minimal impact on the circulation of B. pertussis in the population, unlike other epidemic vaccine-preventable diseases, such as measles.

## Epidemiology in New Zealand

The epidemiology of B. pertussis *infection* and pertussis *disease* differ. Infection occurs across the age spectrum, and repeated infection without disease is common. The endemic circulation of B. pertussis in older children and adults provides a reservoir for spread of the infection and the development of severe disease in incompletely vaccinated infants. The high prevalence of subclinical infections in household contacts of pertussis cases indicates a significant role in disease transmission to young infants. As observed in Australia, seasonal peaks in incidence in children aged less than 5 years occurred 1–2 months later than for the general population, supporting the theory that **older household members are sources of infection to younger children**.

New Zealand has continued to experience **cyclic outbreaks** of pertussis, occurring every few years, in recent decades. This is in part due to historically low immunisation rates and because immunity from both natural infection and immunisation wanes over time. Epidemic peaks occurred in 2000, 2004, 2012, and 2018.

For detailed information on pertussis mortality and morbidity in New Zealand see the Immunisation Handbook and the Institute of Environmental Science and Research (ESR) surveillance website.

## Te Mana Ora cases: last 11 years

**Table 1: Te Mana Ora cases since 2012 by district**

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Waitaha/ Canterbury | 1226 | 581 | 107 | 236 | 278 | 243 | 177 | 70 | 9 | 3 | 1 |
| Waitaha ki te Toka/ South Canterbury | 58 | 52 | 4 | 4 | 8 | 18 | 18 | | | | |
| Te Tai o Poutini/ West Coast | 153 | 60 | 4 | 1 | 2 | 10 | 152 | 18 | | | |
| **TOTAL** | **1437** | **693** | **115** | **241** | **288** | **271** | **347** | **88** | **9** | **3** | **1** |

**Table 2: Te Mana Ora cases since 2012 by ethnicity**

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| European | 1227 | 605 | 104 | 198 | 254 | 237 | 298 | 71 | 5 | 2 | 1 |
| Māori | 107 | 43 | 5 | 23 | 14 | 21 | 35 | 8 | 3 | 1 | |
| Pacific | 35 | 12 | | 8 | 9 | 4 | 5 | 7 | | | |
| Asian | 40 | 14 | | 9 | 8 | 7 | 4 | 2 | 1 | | |
| Other | 4 | 1 | 1 | | 2 | | 2 | | | | |
| Unknown | 24 | 18 | 5 | 3 | 1 | 2 | 3 | | | | |
| **TOTAL** | **1437** | **693** | **115** | **241** | **288** | **271** | **347** | **88** | **9** | **3** | **1** |

## Clinical description

Clinical presentation is **variable** – see The Illness above.

## Incubation

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

## Transmission

Droplets of respiratory, oral or nasal secretions. Indirect spread via contaminated objects occurs rarely.

## Communicability

Highly communicable in the catarrhal stage (runny nose, mild sore throat) before the paroxysmal cough stage, and during the first 2 weeks of the paroxysmal stage of the cough. Transmissibility gradually decreases after that.

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 azithromycin, infectivity lasts **until 2 days of azithromycin have been taken**. This lengthens to 5 days if other antibiotics are used (eg, erythromycin).[2]

## Prevention

### Vaccination strategy

The goal of the pertussis immunisation programme is to **protect those most at risk of developing severe disease**; that is, **infants in the first year of life**. Two key strategies for reducing the burden of disease in infants are the administration of **Tdap vaccination during pregnancy** and **on-time infant immunisation**.

[2] Although Public Health England guidelines recommend an exclusion of 2 days for all excluded cases, the clearance of B. pertussis with other antibiotics may not be as rapid.

Whole-cell pertussis vaccine for routine use was introduced in 1960 and was replaced with acellular pertussis vaccine in 2000. The current schedule of **three acellular pertussis-containing vaccines in the first year of life** plus **booster doses at ages 4 and 11 years** has been in effect since 2006.

Vaccination during **pregnancy** is recommended and funded for women from the second trimester, preferably from 16 weeks' gestation. This is the most effective way to protect young infants. More complete and timely delivery of the current infant immunisation schedule would reduce the infant pertussis disease burden in older infants. It is important that all children attending early childhood services are fully vaccinated for their age.

Data on the protective effects of indirect strategies is currently incomplete. '**Cocoon strategy'** is the term used to describe the protection of infants by immunising those who are potential sources of B. pertussis. Three identified target groups who have the most contact with young and vulnerable infants are (1) new parents who have not had recent immunisation, family and close contacts of newborns; (2) health care workers; and (3) early childhood workers. Some protection may be provided to infants by cocoon immunisation of parents and other potential household contacts post-partum, which may be pertinent in some circumstances where maternal vaccination did not occur, such as preterm birth, and infants in neonatal intensive care.

**Health care workers** in particular are at increased risk of pertussis and can transmit pertussis to other health care workers and to patients. Outbreaks in maternity wards, neonatal units and outpatient settings have been described. Fatalities occur as a result of such nosocomial spread.

Mass immunisation **cannot be used to control an established community outbreak**, although action to update age-appropriate vaccination in institutional settings (schools and early childhood services for staff and students) is appropriate. When an outbreak occurs, individual immunisation status should be checked, and any missing doses given. Vaccination in pregnancy is particularly important to protect the most vulnerable, young infants.

### Vaccine effectiveness

The acellular pertussis vaccines approved for use in New Zealand have been shown to provide around 81–85 percent efficacy (95% CI: 51–100) against confirmed pertussis after **three infant doses**, with follow-up studies suggesting sustained efficacy to age 6 years.

Protection against pertussis begins to **wane** within several years of completion of a three-dose primary and two-dose booster immunisation series.

**Maternal vaccination**, given more than seven days before delivery, was estimated to be 91 percent (95% CI: 88–94) effective against laboratory-confirmed pertussis in infants younger than 3 months of age. Protection of infants is achieved both by passive antibody transfer and reduced exposure to maternal disease. Tdap given in pregnancy was shown to be 85 percent more effective than post-partum vaccination in preventing pertussis in infants younger than 8 weeks of age. Timing is important because protection is not as good if the pregnant person is vaccinated less than two weeks prior to birth. Vaccinating from 16 weeks' gestation allows time for passive transfer and accumulation of antibody in the fetus, such that by 40 weeks' gestation, infant antibody levels at birth are higher than those in the birthing person. Giving maternal vaccination during the second trimester rather than later provides more preterm infants with pertussis protection.

## 3. Notification

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

## 4. Laboratory testing

### Polymerase Chain Reaction (PCR)

PCR should be considered the **diagnostic method of choice**, unless the presentation is delayed until 4 weeks after onset of symptoms, or 3 weeks after the onset of paroxysmal cough. After that sensitivity declines as the amount of bacterial DNA in the nasopharynx diminishes. PCR is 2–3 times more likely to be positive than culture when symptoms of classic pertussis are present (eg, 2 weeks of paroxysmal cough). PCR can be affected by

specimen collection but is less affected by prior antibiotic therapy since the organism does not need to be viable to be positive by PCR.

### Culture

Culture is only useful during the catarrhal (runny nose) and very early paroxysmal phase of illness. The sensitivity of nasopharyngeal culture decreases rapidly after the onset of cough.

Culture sensitivity is reduced by antibiotic treatment, immunisation, duration of illness and can also be affected by specimen collection, transportation and isolation techniques. Cultures are rarely positive after 2 weeks from the onset of the catarrhal stage of the illness, or 1 week of paroxysmal cough, or for more than a few days after antibiotic treatment. Cultures may also take up to 2 weeks to be finalised, so the results may not be clinically useful.

### Serology

The sensitivity and specificity of serology is low. Serology cannot be used as a confirmatory test. Therefore the use of serology is **not recommended**, except for public health purpose after consultation between the Medical Officer of Health and the local microbiologist. Serology can then sometimes be used late in the course of illness, generally when the patient is no longer infectious. Serologic tests measure antibodies that could result from either infection or vaccination. Anti-pertussis toxin IgG is the best serological marker of infection. IgA assays lack adequate sensitivity and specificity and should not be used for diagnosis.

### Testing advice for Te Mana Ora districts

Local testing advice is available on Community HealthPathways. Current advice is:

*If the patient has consistent clinical history, test in general practice for public health purposes only.*
*Testing for public health purposes:*
*Testing rarely alters individual patient management due to false negatives and the delay between symptom onset and test results. Consider testing only if:*

- *there are few cases in the region and the diagnosis is unsure.*
- *the patient is an index case in a family or cluster where there is a child younger than 1 year or other vulnerable people.*
- *a retrospective diagnosis is necessary.*

*Do not test if:*

- *the patient has a clinically compatible illness and is a contact of a case.*
- *the result will not influence the management of the case or contacts.*

*Bordetella pertussis PCR – preferred. Polymerase chain reaction (PCR) testing:*

- *has higher sensitivity in the first 2 weeks, then sensitivity drops rapidly. A negative test at any stage does not exclude pertussis infection, so advise patients to complete antibiotic courses.*
- *is expensive, but may provide an opportunity to detect and treat pertussis early. Results take 3 days.*
- *Depending on the situation, consider testing the first suspected case in a family, and treating other contacts without testing.*

*Bordetella pertussis serology – for retrospective diagnosis at the request of Public Health only*
*See Canterbury Health Laboratories Bordetella pertussis PCR test information.*

## 5. Case classification

### Clinical criteria

A clinically compatible case characterised by **cough** and one or more of:

- **paroxysms** of cough
- cough ending in **vomiting, cyanosis or apnoea**
- inspiratory **whoop**.

**Infants** are less likely to have the inspiratory whoop and are more likely to present with gagging, gasping, cyanosis, apnoea, or non-specific signs such as poor feeding or seizures.

Adults and children **partially protected by vaccination** can present with illness ranging from a mild cough illness to classic pertussis.

### Laboratory criteria

Laboratory definitive evidence for a **confirmed case** requires: isolation of Bordetella pertussis or detection of B. pertussis nucleic acid, preferably from a nasopharyngeal swab.

Laboratory suggestive evidence for a **probable case** requires: B. pertussis toxin IgG test of > 100 IU/ml or a significant increase[3] in antibody levels between paired sera at the same laboratory. Serology should only be requested for public health purposes after consultation between the Medical Officer of Health and the local microbiologist.

Note that **a negative test does not necessarily rule out pertussis**: consider exposure, clinical compatibility, the test used and the timing of the 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** where the **cough is lasting longer than 2 weeks**. However in situations where serology has been requested after consultation between the Medical Officer of Health and the local microbiologist, a **clinically compatible illness** with **laboratory suggestive evidence** (*ie serology*) will also be considered as probable.

**Confirmed**: A **clinically compatible illness** accompanied by **laboratory definitive evidence**, or is **epidemiologically linked**[4] to a confirmed case.

**Not a case**: A case that has been investigated and subsequently found not to meet the case definition

## 6. Cultural and social context

Cultural, social, work and home environments affect any person's risk of contracting a communicable disease, the likely impact of that disease on them, and their likelihood of passing the infection on others. Keep these factors in mind at every point of your investigation and follow-up.

- Request an **interpreter** if needed
- **Consider** the potential impact of cultural, social, work or home factors on a person or family's ability or willingness to provide information and/or follow public health advice
- **Tailor your advice** to the situation
- **Seek advice yourself** if unsure. Talk to:
  - Te Mana Ora's Māori Relationships or Pacific Relationships or Communicable Diseases Manager for advice on community and primary care support people or agencies
  - Ngā Ratonga Hauora Māori for Māori patients at Christchurch Hospital or Christchurch Women's hospital
- If appropriate, and with the case and/or contact's permission, seek the **assistance** of family or other community members, community leaders, and/or support agencies if required.

[3] 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.
[4] A **epidemiological link** is established when there is: contact between two people at a time when one of them is likely to be infectious (from the catarrhal stage, approximately 1 week before, to 3 weeks after onset of cough) AND the other has an illness which starts within 5 to 21 days after this contact AND at least one case in the chain of epidemiologically linked cases (which may involve many cases) is a confirmed case with either laboratory definitive or laboratory suggestive evidence.

# 7. Management of case

## Notification and clinician management

Because Te Mana Ora's capacity to individually investigate all notified cases can be quickly exceeded during pertussis epidemics, and much public health management is in any case undertaken by general practitioners, our approach is:

1. General practitioner:
   - **Identifies** a confirmed, suspect, or probable case
   - Calculates **infectious period**
   - Asks case:
     - Any **vulnerable individuals in household**?
     - If not, is there anyone **in the household who works or spends much of their time** with vulnerable individuals?
     - Does the **case work or spend much of their time in institutional settings** with vulnerable people (especially ECE, health care)?

2. General practitioner:
   - Prescribes **treatment** for case
   - Provides case with **information**, including exclusion
   - Provides **antibiotics** for either:
     - all susceptible household contacts if there are vulnerable people present in the household, or
     - any household members who work or spend much of their time with vulnerable people
   - **Notifies** medical officer of health via ERMS, including information about contacts identified and actions taken

3. Public health:
   - Receives notification
   - Follows up:
     - Any **household contacts** identified by GP who **require further follow-up**
     - Any **institutional settings** with vulnerable people where the case has worked or spent much of their time
   - For **hospital notifications** (less common), Te Mana Ora would conduct case interview and follow up household and other contacts.

### Notes:

1. This approach is based on local agreement between primary care and public health, with shared guidelines, and specific information provided at the time of notification.
2. It falls somewhere between the CD Manual and Immunisation Handbook advice.
3. It prioritises household and institutional settings with vulnerable people (especially infants).
4. It also includes household contacts who work or spend lots of time with vulnerable people.
5. Not included for public health follow-up are : non-household (or household-like) close contacts who are vulnerable or who live or work with vulnerable people. These contacts are advised to discuss boosters and antibiotics with their own GP.
6. Recent vaccination is assumed to provide sufficient protection that further public health controls (antibiotics, exclusion) are not justified.
7. New Zealand advice on contact management is silent on an upper time limit for providing prophylaxis. CDNA guidelines[3] state:

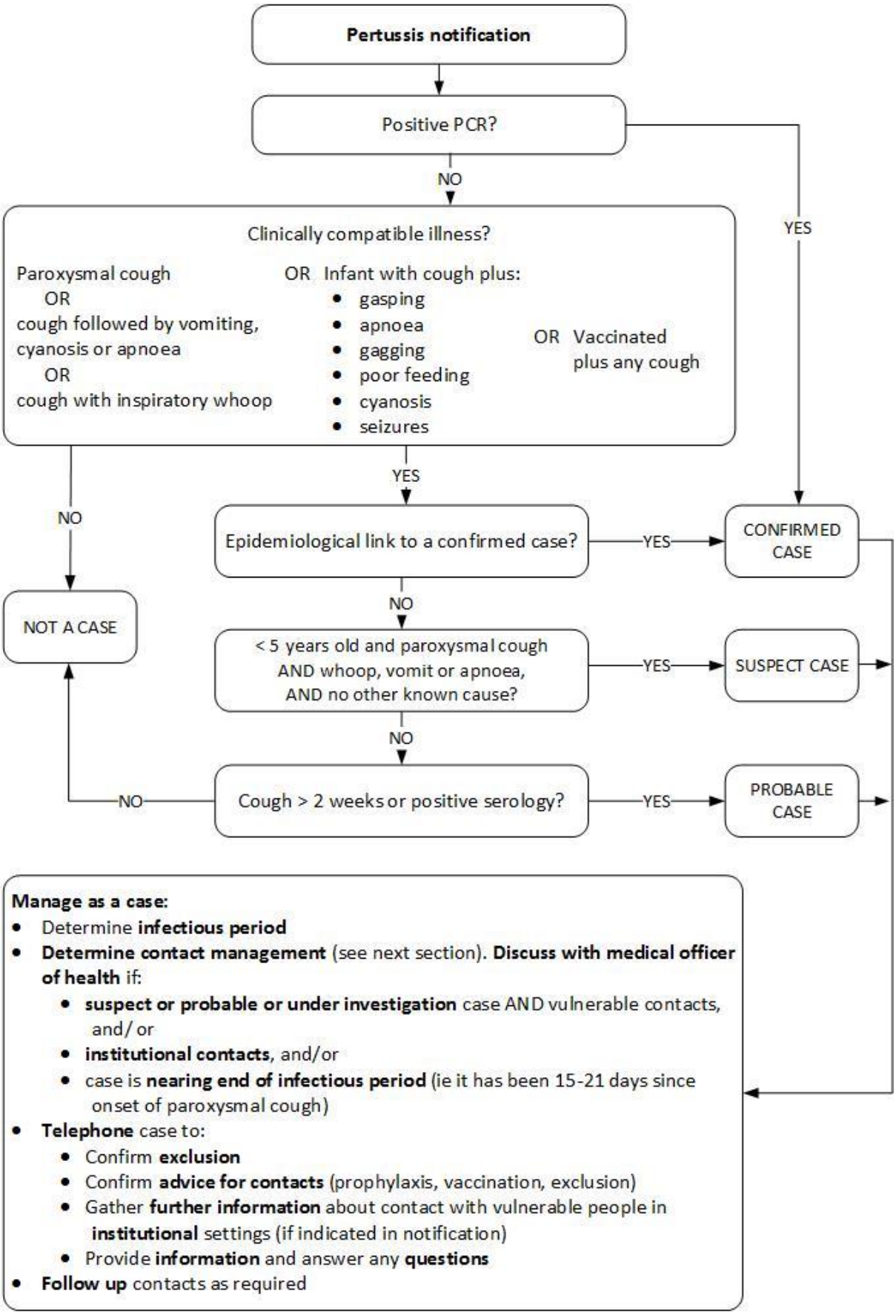
   *Antibiotic prophylaxis is only useful if given as soon as possible after first contact with an infectious index case. Based on the preceding statements (re limitations of prophylaxis) and considering the decline in infectiousness during the infectious period, the timeline for providing antibiotic prophylaxis to high-risk contacts should be within 14 days of first contact with an infectious case.*
   If it has been **more than 14 days since the contact's first exposure** to the infectious case, discuss antibiotic prophylaxis with a medical officer of health.

## Investigation

- Action **on day of notification** during office hours. Only action after hours if confirmed case and outstanding high risk contacts, case <1 year-old, or case being transferred to Starship.
- Review notification to check information is adequate, and to identify any high-priority contacts who have not had prophylaxis
- **If necessary, interview** case or parent/guardian to obtain any missing case and contact details that could alter public health management
- Determine **case status** (see Figure 1)
- Determine **infectious period**
- **Determine contact management** (see next section). **Discuss with medical officer of health** if:
  - **suspect or probable or under investigation** case AND vulnerable contacts, and/ or
  - **institutional contacts**, and/or
  - case is **nearing end of infectious period** (ie it has been 15-21 days since onset of paroxysmal cough)
- **Telephone**[5] case to:
  - Confirm **exclusion**
  - Confirm **advice for contacts** (prophylaxis, vaccination, exclusion)
  - Gather **further information** about contact with vulnerable people in **institutional** settings (if indicated in notification)
  - Provide **information** and answer any **questions**

[5] If case volume exceeds Te Mana Ora's capacity to telephone all cases, leadership team will consider triaging of cases, use of text messaging, etc.

**Figure 1: Pertussis case assessment**



### Restriction

- **Exclude** the case from **school, early childhood services, other institutions or work** until they have received **at least two days of azithromycin** (this lengthens **to five days if other antibiotics are used**), or if antibiotics are not used, exclude them for **3 weeks from the date of onset of typical paroxysms** of cough.[6]

### Treatment

Antibiotic treatment for pertussis cases and prophylaxis for contacts **are prescribed by clinicians**, not by public health staff. Guidance for clinicians on antibiotic choice and dose is available on HealthPathways (and differs slightly from the information in the Immunisation Handbook). The preferred option is **azithromycin** for 5 days, with **co-trimoxazole** for 14 days available as an alternative.

The following paragraphs are from the Immunisation Handbook:

A range of antibiotics are available for the treatment and prophylaxis of pertussis. Prompt treatment with macrolide antibiotics **may reduce the severity and duration of clinical disease if started during the catarrhal (runny nose) phase**. Antibiotics **commenced after coughing paroxysms have begun have no effect on the clinical disease but do reduce the risk of spread of disease** to others. Antibiotics are of limited value if started after 21 days of illness, but should be considered where there are high-risk contacts (eg, young infants and pregnant people).

To minimise transmission to newborn infants, it is recommended that pregnant women diagnosed with pertussis in the third trimester be treated with appropriate antibiotics if within six weeks of cough onset.

Macrolide use during pregnancy, lactation and in the neonatal period has been associated with 2–3 times increased risk of **infantile pyloric stenosis** (which affects 1–3 in 1,000 infants). The risk is lower when given during pregnancy and breastfeeding than when given to the infant during the neonatal period. With erythromycin, the risk is highest when given within the first two weeks of life (relative risk 10.7; 95% CI: 5.2–21.9), and increased duration of treatment. The risk is presumed to be lower with azithromycin, although there are case reports of infantile pyloric stenosis occurring when azithromycin has been used during pregnancy.

Parents should be informed of the risks of this complication and of the symptoms and signs of infantile hypertrophic pyloric stenosis. The infant should be monitored for this complication for four weeks after completion of treatment.

Children who have laboratory-confirmed pertussis should **complete their immunisation series with all the scheduled doses** recommended for their age.

### Counselling

Provide written information to the case by email.

## 8. Management of contacts

### Definition

For the purposes of public health management:

| | |
|---|---|
| **Infectious period:** | is from start of the catarrhal stage until 3 weeks after the onset of paroxysmal cough |
| **Close contact**: | A contact can be defined as someone who has been in close proximity (within two metres) of the index case for one 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 (CD Manual definition) |
| **Susceptible:** | For the purposes of public health follow-up, susceptible people are those who are not fully immunised for their age, or if they are over 16 years of age and have not received a booster of pertussis-containing vaccine in the last 5 years (CD Manual definition) |

[6] Clarification requested from Ministry of Health, as the "infectious period" guidance does not state that cases are no longer infectious once they stop coughing but case management guidance says exclusion can finish when cough ceases.

**Vulnerable:** - children aged under 12 months; particularly those whose mothers did not receive Tdap in pregnancy or who have received fewer than two pertussis-containing vaccine doses by 14 days prior to exposure
- unvaccinated pregnant people, especially in the last month before expected delivery date (due to risk of transmission to the newborn infant)
- individuals at risk of severe illness or complications (eg, with chronic respiratory conditions, congenital heart disease or immune deficiency)
(adapted Immunisation Handbook definition)

## Contact management

The primary goal of public health follow-up for pertussis contacts is to **protect "vulnerable" individuals**, particularly infants and pregnant people, and also other people at high risk of severe or complicated illness. Contact management does not significantly reduce the spread of pertussis in the community – for this, see Other control measures.
New Zealand guidelines are silent on an upper time limit for providing prophylaxis to contacts. CDNA guidelines[3] state that:

> *Antibiotic prophylaxis is only useful if given as soon as possible after first contact with an infectious index case. Based on the preceding statements (ie the limitations of prophylaxis) and considering the decline in infectiousness during the infectious period, the timeline for providing antibiotic prophylaxis to high-risk contacts should be within 14 days of first contact with an infectious case.*

- Give prophylaxis **as soon as possible** from the contact's first exposure to the infectious case because effectiveness decreases with time. By 14 days after first exposure the efficacy is minimal.

**General practitioners** play a key role in public health follow-up of pertussis, by:

a. arranging prophylactic antibiotics for any eligible susceptible household contacts of their patient, and
b. ascertaining whether there are any other institutional settings which should be followed up by public health staff.

General practitioners are requested to:

1. Calculate their patient's infectious period (ie from early catarrhal stage to 21 days after onset of coughing spasms),
2. Enquire whether the patient's household includes "vulnerable" individuals, ie:
   - an infant under 12 months old (other than the patient)
   - pregnant within one month of expected delivery date
   - individuals at high risk of severe illness or complications because of a pre-existing health condition that may be exacerbated by a pertussis infection (for example those with chronic respiratory conditions, congenital heart disease or immunodeficiency)
3. Where someone in the household meets the above criteria, arrange a 5-day course of azithromycin (or alternative) for all susceptible household members.
4. If not treating the whole household, enquire whether any other susceptible person in the case's household works or spends much of their time with vulnerable person(s). If yes, arrange a 5-day course of azithromycin (or alternative) for that household member.
5. Advise any individuals who have been offered antibiotics as above but decline them that they should avoid vulnerable people for 14 days from their last contact with the case while infectious.
6. Ask whether the case worked with or spent extended time with vulnerable people in institutional settings while infectious
7. Indicate on the notification form whether there are any outstanding household contacts or institutional settings requiring further follow-up by public health (see Appendix Two: information requested from notifying clinicians).
8. For anyone associated with a case of pertussis:
   - Give information about pertussis

- Reinforce importance of on-time immunisation
- Advise to seek care if symptoms develop (ie should have nasopharyngeal swab and start azithromycin if they develop catarrhal symptoms)

Also see: Appendix One: summary of primary care management of pertussis

For Te Mana Ora staff:

- Advice for household and institutional contacts about antibiotics, booster vaccinations, and exclusion are the same as in steps 1-8 above.
- If a case has spent extended time in an institutional setting while infectious and there are vulnerable individuals present, discuss antibiotics, booster vaccinations and exclusion with a medical officer of health
- Any contacts requiring antibiotic prophylaxis or booster vaccinations should be referred to their own general practitioner.

➢ Contact any **household contacts** identified by GP who require prophylaxis and advice but have not yet received it, and provide information and advice about the illness, prophylaxis, vaccination, and exclusion (see Summary of case and contact actions)

➢ Conduct a **risk assessment** for any **institutional settings with vulnerable people** where the case has worked or spent much of their time, and provide information and advice about the illness, prophylaxis, vaccination, and exclusion for the setting to distribute.

➢ For **hospital notifications** (less common), Te Mana Ora **conduct case interview and follow up household and other contacts.**

### Preferred antibiotic

Recommended antibiotics and dosages are the same as for case treatment above.

### Counselling

Provide information to the contact by email.

## 9. Summary of case and contact actions

Give **prophylaxis as soon as possible** from the contact's first exposure to the infectious case because effectiveness decreases with time. By 14 days after first exposure the efficacy is minimal.

| *Criterion* | *Action* |
|---|---|
| Confirmed or suspected pertussis case? | GP treats case and advises re exclusion |
| Is anyone in case's household "vulnerable" and "susceptible"? | If yes, GP provides antibiotics for **all** "susceptible" people in household |
| If whole household isn't being treated, then does anyone else in the case's household work or spend much of their time with vulnerable person(s)? | If yes, GP provides antibiotics for **that** household member if they're "susceptible" |
| Has the case worked with or spent extended time with vulnerable people in institutional settings while infectious? | If yes, Te Mana Ora performs **risk assessment** for setting and provides information +/- recommends antibiotics for vulnerable + susceptible contacts |
| Did any of the contacts recommended antibiotics as above decline them? | If antibiotics recommended but declined, advise the contact to avoid vulnerable people for 14 days from their last contact with the case while infectious |
| For all close contacts: | GP +/- case letter +/- Te Mana Ora recommend:<br>• Symptom vigilance and early medical attention if symptomatic<br>• Booster vaccination and discuss antibiotics with own GP if vulnerable and susceptible |

## 10. Other control measures

### Identification of source
Not applicable.

### Disinfection
Clean and disinfect surfaces and materials contaminated by respiratory secretions.

### Health education
The following are advised by the Ministry of Health:

- Encourage immunisation of pregnant people between 28–38 weeks gestation at every pregnancy.
- Encourage on-time immunisation, particularly for infants at 6 weeks, 3 months and 5 months.
- Encourage timely immunisation of older children against pertussis at aged 4 and 11 years as per the Immunisation Handbook 2017 (Ministry of Health).[7]
- Encourage (re-)vaccination of immunosuppressed patients with pertussis-containing vaccine according to the existing guidance[8](funded).
- Encourage close family contacts of young infants, such as grandparents and partners to have a booster dose of pertussis vaccine to reduce spread of the disease. Older siblings should be up-to-date with their immunisations.
- Encourage a booster dose against pertussis every 10 years to all lead maternity carers and other health care personnel who work in neonatal units and other clinical settings (such as GPs, practice nurses and Well Child providers), where they are exposed to infants.
- Encourage a booster dose against pertussis every 10 years to all those living or working with people with a pre-existing health condition that may be exacerbated by a pertussis infection, especially health care workers.
- Encourage a booster dose against pertussis every 10 years to all early childhood workers.
- Promote behaviours that protect infants, such as encouraging people with a cough to keep their distance from babies.
- Promote behaviours that prevent the transmission of communicable respiratory diseases.

## 11. Legislation and enforcement

Case exclusion from ECEC is mandated in the Education (Early Childhood Centres) Regulations 2008. Although exclusion is mandated by the facility in these regulations, Te Mana Ora does not have legal enforcement powers. If non-compliance with exclusion is an issue, writing to the manager or principal of the institution is warranted, reminding them of the requirements of the legislation.

In other situations, use of the Part 3A powers in the Health Act 1956 could be considered.

## 12. Reporting

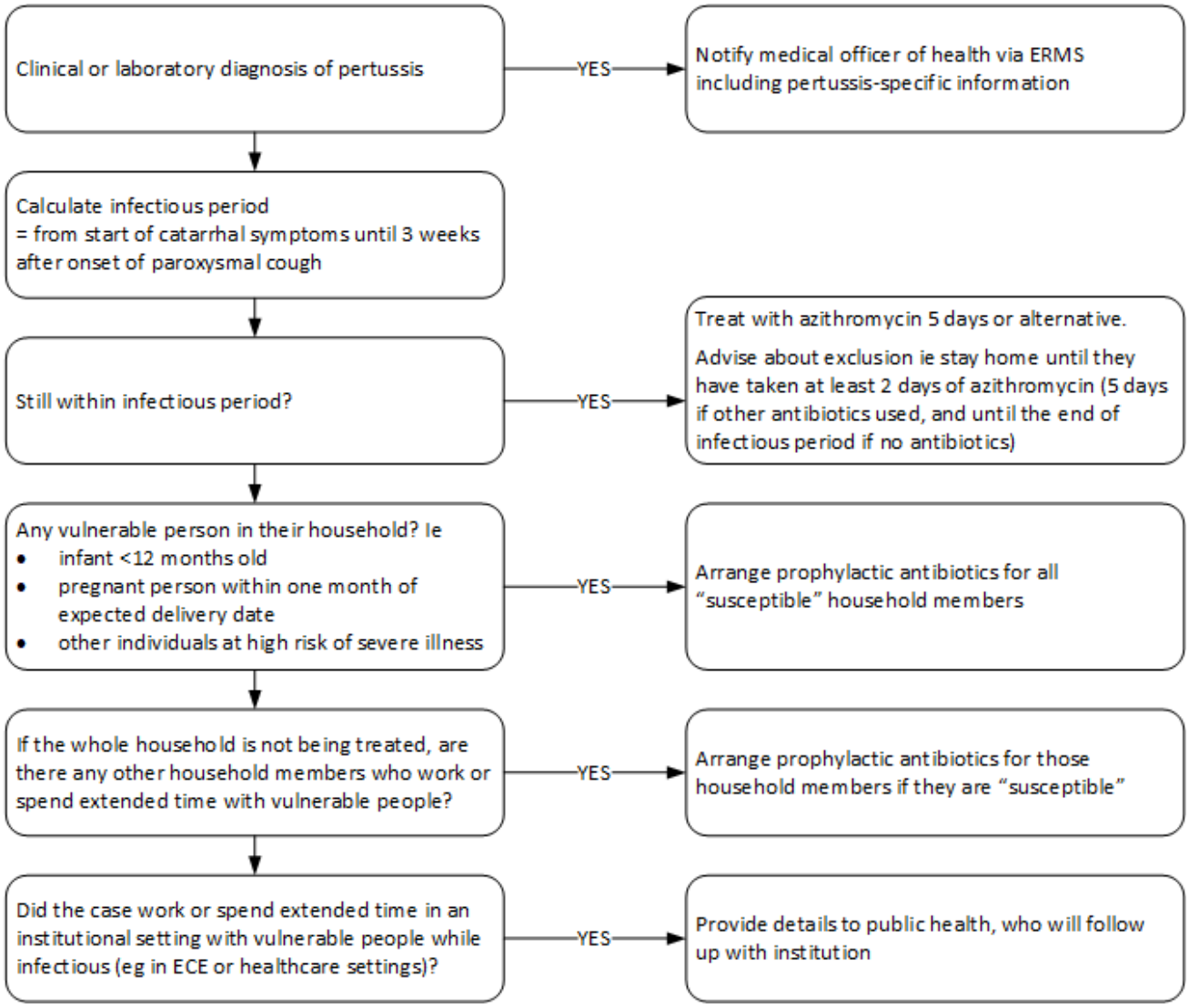
- Enter case details on **EpiSurv.**
- If a **cluster** of cases occurs, **inform** the Ministry of Health Communicable Diseases Team and outbreak liaison staff at ESR, and complete the **Outbreak Report Form.**
- If an **outbreak,** write **report** for Pertussis Outbreak Report File Y:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Pertussis\Outbreaks.
- **Document** your response to each **action point** (marked with this arrow) in this protocol

[7] Refer to the 'Funded vaccines for special groups' chapter of the Immunisation Handbook.
[8] Refer to the 'Funded vaccines for special groups' chapter of the Immunisation Handbook.

## 13. References and further information

1. Ministry of Health. Communicable Diseases Control Manual 2012. Pertussis. https://www.health.govt.nz/our-work/diseases-and-conditions/communicable-disease-control-manual/pertussis
2. Ministry of Health. Immunisation Handbook 2020. Chapter15 Pertussis. https://www.health.govt.nz/our-work/immunisation-handbook-2020/15-pertussis-whooping-cough
3. Communicable Diseases Network Australia. Pertussis National Guidelines for Public Health Units. 2018. https://www.health.gov.au/resources/publications/pertussis-whooping-cough-cdna-national-guidelines-for-public-health-units?language=en

## 14. Appendix One: summary of primary care management of pertussis




Notes:

1. **Infants aged <12 months** are at greatest risk of severe illness and their protection is the main focus of contact prophylaxis.
2. Give prophylaxis **as soon as possible** from the contact's first exposure to the infectious case because effectiveness decreases with time. By 14 days after first exposure the efficacy is minimal.
3. Contacts are considered "**susceptible**" if they are not fully immunised for their age or if they are over 16 and have not received a pertussis booster in the last 5 years.
4. Any vulnerable and susceptible close contacts outside the abovementioned household and institutional settings should discuss prophylaxis with their own general practice.
5. All contacts should be advised to be **vigilant for symptoms**, with a low threshold for starting azithromycin if catarrhal symptoms develop.
6. **Booster vaccination** is recommended for any susceptible close contacts, but is not funded outside the Immunisation Schedule.
7. **Advise public health** of any institutional settings requiring follow-up, and of any household members requiring prophylaxis who have not yet received it.

# 15. Appendix Two: information requested from notifying clinicians

Canterbury HealthPathways asks notifying clinicians to include the following information in their ERMS referral:

***Pertussis disease-specific information***

*Include all of the following:*

- *Infectious period – Date of catarrhal onset to 21 days after onset of paroxysmal coughing or as shortened by antibiotic course*
- *Whether cough is present or absent, and presence or absence of:*
    - *paroxysmal cough*
    - *cough ending in vomiting or apnoea*
    - *inspiratory whooping*
- *Contact with a laboratory confirmed case of pertussis*
- *Azithromycin or alternative antibiotic prescribed*
- *Specific laboratory tests done (PCR, culture, serology) and result if available*
- *Whether the patient has been advised of isolation requirements, if still infectious*
- *Whether there is a high-risk person in the household (infant younger than 1 year, pregnant within one month of expected delivery date,, or any other person at risk of severe disease, e.g. chronic respiratory disease, congenital heart disease, immunocompromise) and, if so, whether information and antibiotics have been provided to all susceptible household contacts*
- *Whether any household member spends significant time with infants younger than 1 year or other high-risk people outside the household and, if so, whether that household member has been given information and antibiotics*
- *Whether, during the case's infectious period, they worked or had extended contact with infants younger than 1 year or high-risk people in institutional settings – Advise details for Te Mana Ora (Public Health) to follow up*

## Document Control

| Protocol review task | Responsibility | Date completed + version no. |
|---|---|---|
| Advise team, quality, doc control & web coordinators of review (and planned timeframes). | Public Health Specialist (PHS) | V3, 17/02/2023 |
| Open the protocol in EDMS Owner's view, ensure it is based on the current template, remove any blue font formatting (indicating new content for the previous version), and turn on "track changes". | PHS | V3, 17/02/2023 |
| Review Ministry of Health (MoH) advice, literature, other protocols, and write draft update, marking new content in blue font. | PHS | V3, 17/02/2023 |
| Update Fact Sheet as necessary (or source the URL link from MoH website). | PHS | V3, 17/02/2023 |
| Start an EDMS review workflow of draft version to pre-set document members – MOsH, CD, Team Leader, and HPO for feedback. (Check members are correct before starting workflow.) | PHS | V3, 17/02/2023 |
| Incorporate feedback and update draft(s) further as required. | PHS | V3, 16/02/2023 |
| Start an EDMS approval/ publishing workflow of final version to Clinical Director (Authoriser). | Com Dis Medical Officer of Health (MOoH) | V3, 17/02/2023 |
| Clinical Director approval recorded in EDMS. | Clinical Director (CD) | V3, 17/02/2023 |
| Document Controller receives EDMS notification of CD approval –<br>Complete **electronic** document control tasks, incl.: header; footer; EMDS document properties/metadata.<br>Check Te Mana Ora policies and procedures site page links are valid, and add new links as required.<br>Create .pdfs (for external links), and save to CFS folders:<br>• Protocols – Y:\CFS\Quality\Archive\Protection\IntranetPROTOCOLS<br>• Fact Sheets –Y:\CFS\Quality\Archive\Protection\FactSheets<br>• Once a new or reviewed document has been approved, upload pdf version to:<br>• Protocols – Surveillance (PHU server) website and Microsoft Teams on-call documentation group.<br>• Fact Sheets – CPH website or links are checked to MoH website | Quality Coordinator (QC) | V3, 17/02/2023 |
| Update **paper** copies as required (on-call folder/ vehicle). | Health Protection Officer (HPO) | V3, 17/02/2023 |
| Advise operational/ regional staff of update, summarising any substantial changes (text highlighted in **green font** in document). | QC or HPO<br>or Team Leader | V3, 17/02/2023 |
| Once process finalised, **move** any original draft documents saved in CFS locations to: Y:\CFS\Quality\Archive\Protection\ComDisProtocolsArchive | QC | V3, 17/02/2023 |
| Major update notes: V3: full update includes approach and rationale for working closely with primary care to manage cases and contacts. | PHS | V3, 17/02/2023 |
| Minor update notes: | | |
| Minor update notes: | | |