Pertussis

Te Mana Ora protocol

This protocol is based on the Ministry of Health's Communicable Disease Control Manual[1] (update, 19 December 2024).

Updated content in this version is in blue.

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

Contents

1. Associated documents

Health NZ Waitaha Māori health policy
Health NZ Waitaha tikanga policy
Health NZ Waitaha interpreter procedure
Te Mana Ora privacy/nohotapu policy
NPHS case and contact material
Health Information and Services online information

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 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.

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

[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)

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: 2012-24

Table 1: Te Mana Ora cases since 2012 by district

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024*
Waitaha/ Canterbury	1226	581	107	236	278	243	177	70	9	3	1		206
Waitaha ki te Toka/ South Canterbury	58	52	4	4	8	18	18						17
Te Tai o Poutini/ West Coast	153	60	4	1	2	10	152	18					30
TOTAL	**1437**	**693**	**115**	**241**	**288**	**271**	**347**	**88**	**9**	**3**	**1**		**253**

Table 2: Te Mana Ora cases since 2012 by ethnicity

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024*
European	1227	605	104	198	254	237	298	71	5	2	1		184
Māori	107	43	5	23	14	21	35	8	3	1			39
Pacific	35	12		8	9	4	5	7					6
Asian	40	14		9	8	7	4	2	1				10
Other	4	1	1		2		2						3
Unknown	24	18	5	3	1	2	3						11
TOTAL	**1437**	**693**	**115**	**241**	**288**	**271**	**347**	**88**	**9**	**3**	**1**		**253**

*Data as at 18/12/2024

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**.

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.

[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.

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. Any person awaiting a pertussis test result should be advised to **stay at home and away from work, school, early childhood services, or other institutions** while they await their test results.

Appendix 5 of the Communicable Disease Control Manual provides steps for escalating communicable disease issues to national teams for discussion or co-ordinated response.

4. Laboratory testing

Laboratory testing guidelines

Health practitioners should **notify** the local medical officer of health **on suspicion** of pertussis during the initial assessment of the person.

In periods of low pertussis activity, the medical officer of health or other public health service staff may discuss urgent cases with the on-call clinical microbiologist, where there is a high index of suspicion for pertussis, so that laboratory staff are aware of the urgency and can prioritise the sample for **prompt processing**. Testing may not be necessary for cases with an epidemiological link to a confirmed case.

In periods of high pertussis activity, testing may not require discussion with the medical officer of health. Testing should be **prioritised towards protecting high priority contacts** from infection - especially infants and pregnant people. Testing is not required for cases with an epidemiological link to a confirmed case.

For further guidance on the groups that should continue to be tested in periods of high pertussis activity, please refer to Guidance for prioritisation of testing in periods of high pertussis activity. Local testing advice is available on Community HealthPathways.

Samples and timing

Test	Sample	Timing	Specific guidance
Polymerase chain reaction (PCR)	Nasopharyngeal swab in viral transport media (VTM) or dry swab if no VTM available.	Less than 3 weeks from symptom onset.	Positive results are more likely within 10-14 days of symptom onset.
	Nasopharyngeal aspirate in VTM or sterile container if no VTM available.		

Test	Sample	Timing	Specific guidance
	Throat swab in VTM or dry swab if no VTM available (less desirable than nasopharyngeal swab).		
Serology (IgG)	3.5 mL SST serum (preferred)/500 µL microsample serum	More than 3 weeks from symptom onset.	Not available for acute diagnosis or assessment of immune status. May be available to assist with public health directed outbreak management, on discussion.

Note: There are several laboratory tests available for the diagnosis of pertussis and the timing of the test impacts on its sensitivity. A **negative test does not necessarily rule out pertussis**: consider exposure, clinical compatibility, the test used and the timing of the test. For further testing advice please contact the clinical microbiologist. There is **no reliable serological test** for acute infection or immunity to pertussis. For urgent polymerase chain reaction (PCR) processing the medical officer of health should discuss with the clinical microbiologist.

Test types and availability

1) Bordetella pertussis polymerase chain reaction (PCR)

Bordetella pertussis PCR is the **recommended** test for diagnosing pertussis in people where the symptoms have been present for **less than 3 weeks**. Positive results are more likely within 10-14 days of symptom onset. After 4 weeks of cough, the amount of bacterial DNA in the nasopharynx rapidly diminishes, increasing the risk of a false-negative result. PCR testing ensures a fast turnaround time when rapid confirmation of the diagnosis is likely to change management of the case or their contacts.

2) Serology

Most laboratories in Aotearoa New Zealand do not offer serology testing for B. pertussis. Serology is **not recommended,** except when requested by a medical officer of health after discussion with a clinical microbiologist if the use of a PCR test is not possible. This is because the sensitivity and specificity of serology is low and cannot be used as a confirmatory test of infection or vaccination. The presence of B. pertussis IgG is not a reliable indicator for a person's immune status and should not be used in this context.

3) Culture

Culture is no longer routinely performed for diagnostic purposes. PCR testing is between two and six times more sensitive than culture and is the preferred diagnostic method.

5. Case classification

Clinical criteria

A clinically compatible case is characterised by a new onset **cough** without a clear alternative cause and one or more of:

- **paroxysms** of cough
- cough ending in **vomiting**
- inspiratory **whoop**
- **apnoea** or **cyanosis** (in infants aged under 12 months).

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.

Epidemiological criteria

An 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) has **laboratory definitive** evidence of pertussis.

Laboratory criteria

Laboratory definitive evidence:

- Detection of Bordetella pertussis nucleic acid by **polymerase chain reaction (PCR),** OR
- Isolation of B. pertussis

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

Confirmed: a person who has **laboratory** definitive evidence; OR, a person who has a **clinically compatible** illness AND who has an **epidemiological link** to a confirmed case.

Probable: a person who has a **clinically compatible illness** AND either has:

- a **cough** lasting **14 days** or more OR
- exposure as part of an **outbreak** (i.e. an institutional outbreak or community-wide outbreak [when there is limited access to testing]).

Under investigation: a person who has been notified, but **information is not yet available** to classify further.

Not a case: a person who has been investigated and subsequently found **not to meet the case definition**.

6. Cultural and social context

It is critical that a manaaki-centred, and driven, approach underpins all response and engagement mechanisms. Through best practice and culturally appropriate manaaki/wellbeing approaches that respond to the needs of Māori and Pacific people relationships and trust can be established and strengthened between public health services, cases and wider contacts.

- As pertussis can be severe and usually requires a period of isolation, it can be a distressing time for whānau. The following approaches should be prioritised when engaging with cases and caregivers:
  - Ensuring Māori and Pacific equity leadership to support decision making.[3]
  - Understanding and elevating the fundamental needs and priorities of whānau will help with finding the most effective and appropriate approach to engage and follow up with the case and/or their caregivers.
  - Allow plenty of time to connect and communicate with the case and/or their caregivers, and to understand which of their close contacts may need to be followed up.
  - Although pertussis is a vaccine-preventable disease, there are many reasons that someone may not have been immunised (including barriers to care). Consider using this opportunity to explore the reasons that cases may not have been vaccinated and address any barriers or concerns.
- Request an interpreter if needed

[3] After the 2024-5 NPHS reset, this will be available from elsewhere in Health NZ | Te Whatu Ora – details will be confirmed.

7. Management of case

The goal of public health action for pertussis is to reduce onward transmission to **protect individuals at risk of severe pertussis outcomes**, especially **infants who have received fewer than 3 doses of a pertussis-containing vaccine**. Therefore, cases should be prioritised for follow-up if they or their contacts are:

- **Infants** aged under 12 months who have received **fewer than 3 doses** of a pertussis-containing vaccine, especially those aged under 6 months and/or Māori and Pacific infants.
- **Pregnant** people in their last trimester of pregnancy, especially **Māori and Pacific** pregnant people.
- People who **regularly interact with groups at high risk of severe outcomes** from pertussis (e.g. healthcare workers who regularly interact with infants aged under 12 months and/or pregnant people in their third trimester).
- People with **health conditions that put them at risk of severe disease** (e.g. respiratory and/or immunocompromising conditions).

Notification and clinician management

Pertussis outbreaks stretch resources in both primary care and public health. Effective case and contact management depends on shared understanding and effective information exchange between the two, as now outlined in both the updated Communicable Disease Control Manual chapter and the new national Community HealthPathways pertussis page.

1. General practitioner:
   - **Identifies** a confirmedor probable case
   - Calculates **infectious period**
   - Asks:
     - if the case works or spends extended time with **vulnerable people outside the household**, e.g. healthcare worker with infants or young children, early childhood centre, aged residential care.
     - if the case's **household members** include:
       - infants younger than 12 months.
       - pregnant people in their third trimester.
       - people at risk of severe disease, e.g. respiratory and/or immunocompromising conditions.
       - people who regularly **interact with groups at high risk of severe outcomes** from pertussis

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

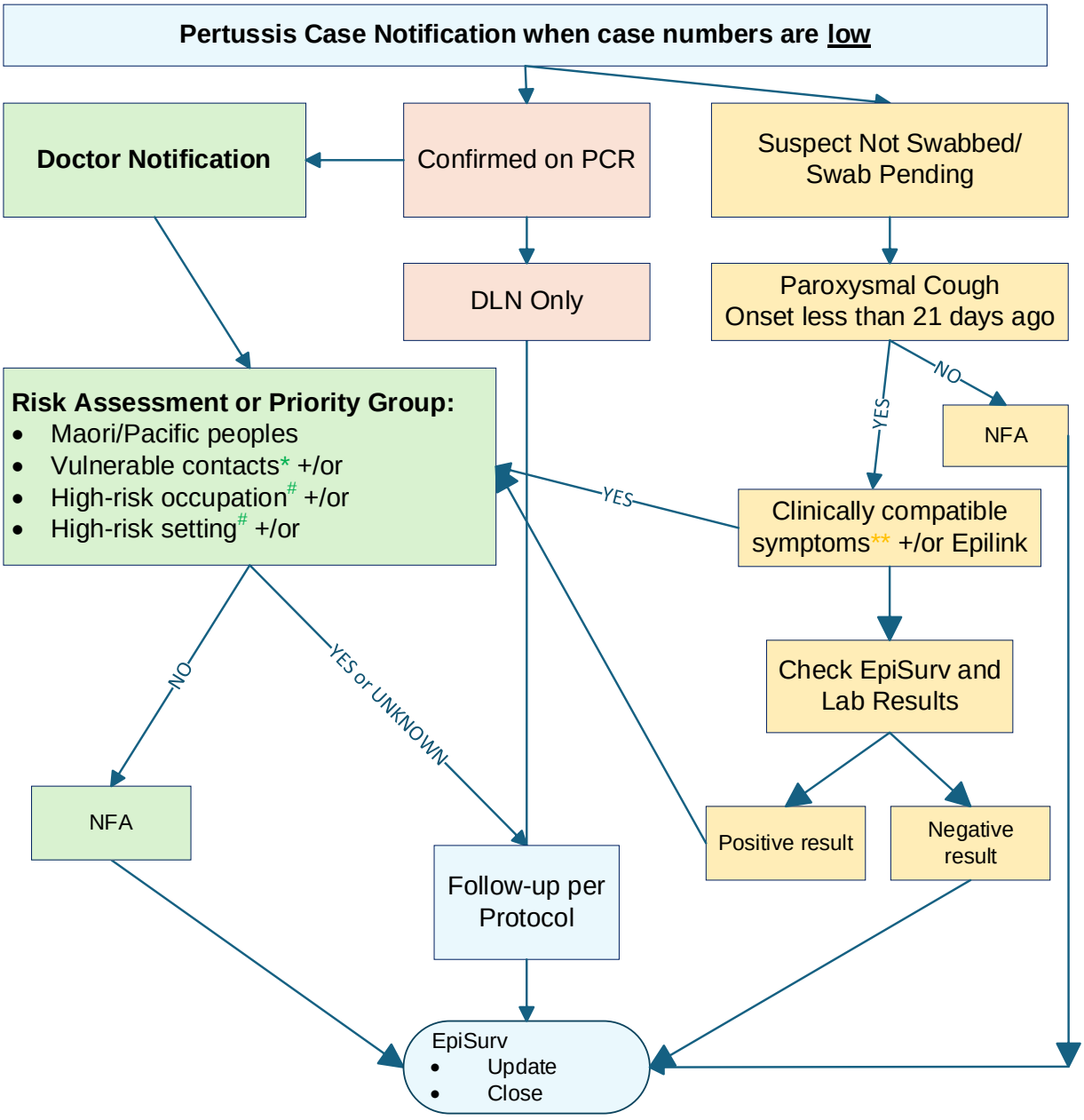
3. Public health:
   - Receives notification
   - Follows up:
     - Any notifications where **case and contact details** are **incomplete**
     - Any **household or other close contacts** identified by GP who **require further follow-up**
     - Any situations where the **case has worked with or spent extended time with vulnerable people outside the household**
   - For **hospital notifications** (less common), Te Mana Ora would conduct case interview and follow up household and other contacts.

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.
- The decision for which Figures (1 or 2) to be used, will be made by the TLs and duty MOH. This will also be communicated to the Teams via email.
- Use the pertussis case triage to guide prioritisation of cases for follow-up.
- If indicated by the triage, use **text messaging** to gather further information about high-priority contacts for public health follow-up.
- **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 3)
- Determine **infectious period**
- **Determine contact management** (see Management of contacts). **Discuss with medical officer of health** if:
    - **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**[4] 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**

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

Figure 1: Pertussis case triage at times of low case numbers



*Vulnerable Contacts -
- Infants under 12 months old
- Pregnant people (in last month of pregnancy)
- Immunocompromised people, chronic respiratory conditions, congenital heart disease

#High-Risk Occupation/Setting -
- ECE, Healthcare, ARC

**Clinically compatible symptoms -
Cough + one or more of:
- Paroxysms of cough
- Cough ending in vomiting
- Inspiratory whoop
- Apnoea or cyanosis (in infants aged under 12 months)

NB: Hospital Doctors and TeleHealth Services do not use HealthPathways.
Consider using Mtxt for uncontactable cases (3 attempts). Send Mtxt + case closed.

Figure 2: Pertussis case triage at times of high case numbers

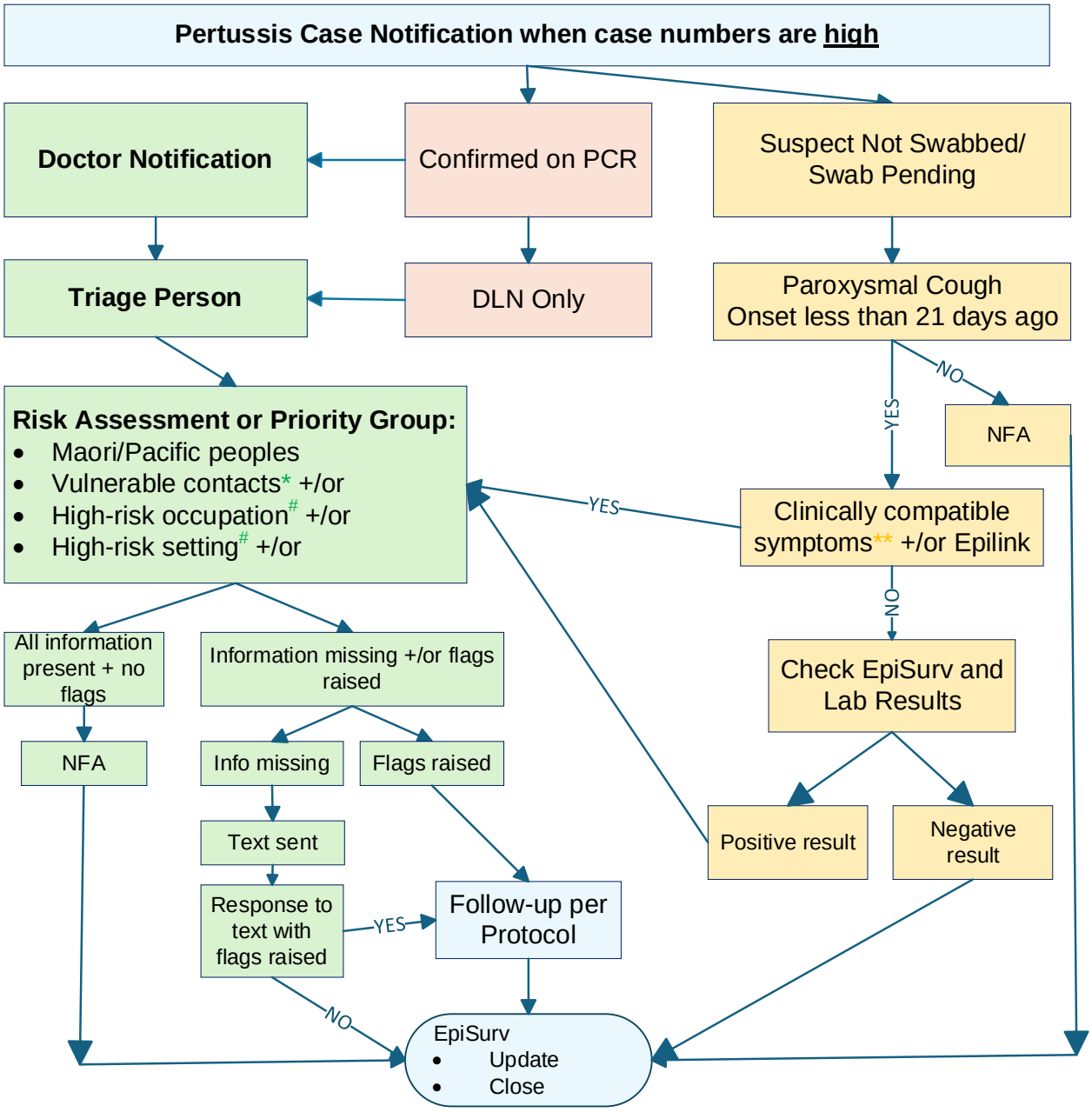


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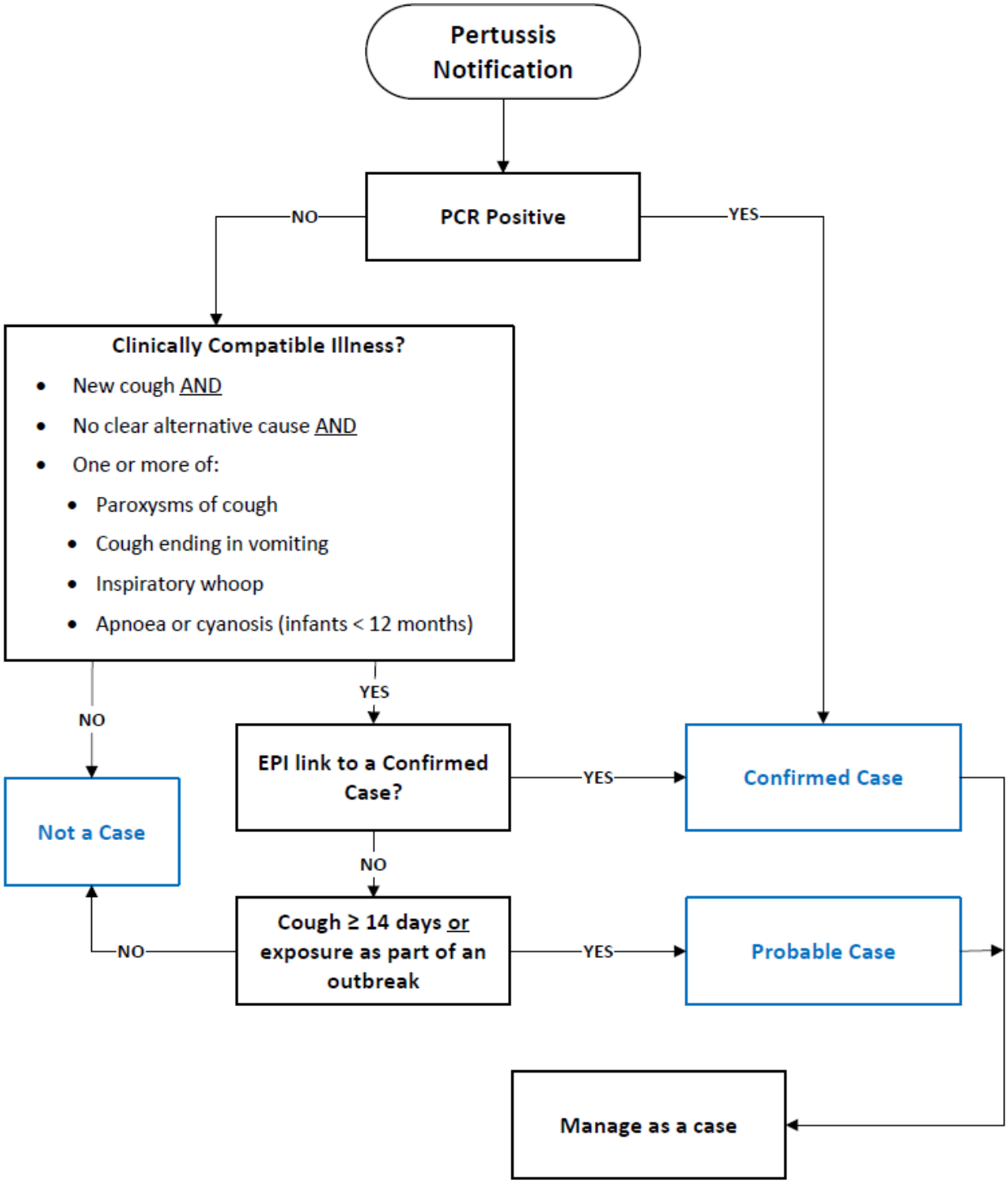
Figure 3: Pertussis case classification



Restriction

- Any person **awaiting a pertussis test result** should be advised to **stay at home** and away from work, school, early childhood services, or other institutions while they await their test results.
- Infectious cases should be **excluded** from **work, school, preschool, and child-care**, and have **restricted** attendance at other settings, especially where there are infants or pregnant people in their third trimester, until they are no longer infectious, i.e. until whichever comes first of:
    - **21 days** after the onset of any **cough**, or
    - **14 days** after the onset of **paroxysmal cough** (if the onset is known), or
    - they have completed at least **2 days** of a treatment course of **azithromycin,** or **5 days** of a **different antibiotic** (co-trimoxazole or erythromycin).

In hospital settings, management of infectious cases should also include droplet precaution measures and accommodation in a single room. Some contexts may require restriction of infectious cases in hospital settings for longer than 2 days, even when azithromycin is prescribed. The appropriate timeframe for restriction in these contexts is at the discretion of the Infection Prevention Control (IPC) team and will be determined by an IPC risk assessment.

Treatment

The benefits of treatment for pertussis are greatest when antibiotics are initiated **as soon as possible** after symptom onset. The recommended antibiotics for treatment of pertussis are **azithromycin or cotrimoxazole** (see Table 3).

Antibiotic therapy administered within the **first 1-2 weeks** of symptoms (in the catarrhal stage) may **modify the clinical course** of the illness (based on suboptimal evidence). Antibiotic therapy administered after the onset of the paroxysmal cough does not reduce duration of illness.

Treatment for pertussis **reduces the time a case is infectious**. For the purpose of reducing transmission, antibiotic therapy is recommended for cases up to 3 weeks after the onset of cough.

There is no evidence that initiating treatment after 21 days following the onset of cough will modify the clinical course of the illness or reduce infectivity.

Antibiotics may be indicated **before test results are received** (or in situations where testing is not being done) if the clinical history is strongly suggestive of pertussis or the person is at high risk of severe or complicated disease (e.g. an infant).

Table 3: Recommended dosage of antibiotic therapy for cases

Antibiotic	Dosage
Azithromycin* (preferred antibiotic)	**Infant under 6 months** 10 mg/kg (max 500 mg) once daily, for 5 days **Infant/child 6 months and over** Day 1: 10 mg/kg (max 500 mg) as a single dose Day 2–5: 5 mg/kg (max 250 mg) once daily **Older child/adult** Day 1: 500 mg as a single dose Day 2–5: 250 mg once daily
Co-trimoxazole** (if macrolide allergic)	**Infant/child 2 months and over** 24 mg/kg (maximum 960 mg) twice daily for 14 days **Older child/adult** 960 mg twice daily for 14 days

Antibiotic	Dosage
* Erythromycin for 14 days can be used as an alternative to azithromycin - see New Zealand Formulary for Children for dosing **Co-trimoxazole is contraindicated for children aged under 2 months	

Infants must be closely observed while on any of these antibiotic treatments. Azithromycin is associated with hypertrophic pyloric stenosis in infants aged under 6 weeks. Therefore, monitoring all cases for complications is recommended for 4 weeks after completing treatment.

See the New Zealand Formulary, New Zealand Formulary for Children and medicine data sheets for more details, including the use of antibiotics during pregnancy, or consult an infectious diseases physician or obstetrician.

Advice to case

- Provide the case or relevant caregiver with the **case information letter and pertussis information sheet** which provides guidance on pertussis, isolation requirements and precautions that can prevent transmission to others. The case or relevant caregiver should be advised **about the nature of the infection and the mode of transmission.** All case information letters, and the pertussis information sheet can be accessed here.
- In particular, it is important that the case understands:
    - which individuals are at high risk of severe disease and to **avoid contact with infants, and women in their last trimester of pregnancy** until they are no longer infectious
    - that protection from immunisation or infection is not lifelong and **the importance of timely immunisation** as per the National Immunisation Schedule and that **immunisation in every pregnancy** is recommended.
- Where the case is a **healthcare worker** in a setting where there is an occupational health team, they should inform occupational health.

8. Management of contacts

Approach

The public health response to a pertussis outbreak aims to **protect individuals who are most vulnerable to severe illness:** infants under 12 months and people with chronic respiratory disease, congenital heart disease or immune deficiency. It can have at best a marginal impact on pertussis spread in the wider community.

Immunisation of pregnant people and on-time immunisation of infants are the most important preventive measures. During pertussis outbreaks, booster immunisation for other vulnerable individuals, and people who have regular contact with vulnerable individuals is a further important protection.

Evidence for effectiveness of chemoprophylaxis is limited, and during an epidemic many vulnerable people will be repeatedly exposed to pertussis, so use of chemoprophylaxis is limited to the highest-risk situations (see below).

Definitions

For the purposes of public health management:

Infectious period

The infectious period is from start of the catarrhal stage until 3 weeks after the onset of paroxysmal cough.

Close contact

A close contact can be defined as someone who has been in close proximity (**within 2 metres**) of the index case for **one hour or more**, during the case's **infectious period** (including household contacts or those who have stayed overnight in the same room).

Due to their risk of severe disease, infants aged **under 6 months** who are exposed to an infectious case for **less** than one hour may warrant being considered a close contact.

Classification of any close contacts should consider the factors which impact the likelihood of the close contact developing severe disease, and the risk factors for the close contact spreading pertussis to those at risk of developing severe disease.

Factors which impact the likelihood of the **close contact developing severe disease**:

- Age.
- Immunisation status[5] (including antenatal immunisation status if pregnant or infant aged under 6 months).
- Ethnicity.
- Living with a chronic respiratory and/or immunocompromising condition.

Risk factors for the **close contact spreading pertussis** to those at risk of developing severe disease:

- Whether they are pregnant (and if so, whether they are in their last trimester of pregnancy).
- Whether they routinely work with children aged under 12 months, pregnant people, or others at high risk of severe pertussis outcomes.
- Whether they live with children aged under 12 months, pregnant people, or others at risk of severe outcomes from pertussis.

Laboratory investigation is not advised for close contacts unless it has a significant impact on public health management.

At risk and priority populations

The primary goal of public health action with pertussis is to **protect people at risk of severe disease,** especially **infants who have received fewer than 3 doses of a pertussis-containing vaccine**. Intensive public health follow up is not required for all contacts, but care should be taken to ensure **high priority close contacts** (see Table 4) are followed up for **consideration of prophylactic antibiotics**. For these groups, public health action should be initiated as soon as possible, and ideally within one day of notification.

High priority contacts for public health action **may be identified and managed in primary care** (at the time the case is identified) or in public health services (when the case is notified).

Table 4: High priority close contacts and recommendations for prophylactic antibiotics

Risk group	High priority close contacts include:	Antibiotic consideration
Groups at high risk of severe outcomes from pertussis	Infants aged under 6 months regardless of immunisation status, especially Māori and Pacific infants Infants aged 6-12 months who have received fewer than 3 doses of a pertussis-containing vaccine, especially Māori and Pacific infants*	Should receive prophylactic antibiotics
	People with a health condition that may be exacerbated by a pertussis infection (e.g., chronic respiratory and/or immunocompromising conditions)	Should be considered for prophylactic antibiotics on a case-by-case basis (consider degree of contact, and whether they have received a pertussis-containing vaccine in the last 5 years*)
Groups at risk of	People who work with, or care for, people at high	Should receive prophylactic

[5] Note: Pertussis-containing vaccines take approximately 2 weeks to confer protection from time of vaccination

Risk group	High priority close contacts include:	Antibiotic consideration
spreading pertussis to individuals at a high risk of severe outcomes from pertussis	risk of severe outcomes from pertussis (especially people who routinely work with infants aged under 12 months and/or pregnant peoples) People who live with individuals at high risk of severe pertussis outcomes (especially household members where there is an infant aged under 12 months or a pregnant person)	antibiotics if they have not received a pertussis-containing vaccine in the last 5 years
	Pregnant people in their third trimester of pregnancy	Should receive prophylactic antibiotics

* Note: Pertussis-containing vaccines take approximately 2 weeks to confer protection from time of vaccination

Investigation

Also see Case Investigation above.

- When this has **not already occurred** in primary care, on notification of a probable or confirmed case of pertussis, **people meeting the high priority criteria**[6] (as per Table 4) **should be identified and contacted** for provision of health information, where possible, and the provision of chemoprophylaxis, where appropriate.
- 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.**

Restriction

All close contacts (high priority or otherwise) should be advised that **isolation is not necessary unless they develop symptoms,** and to **seek medical attention and avoid attending early childhood services, school, work or community gatherings if they become symptomatic**. It is important to clearly explain that the early stage of pertussis is indistinguishable from those of minor respiratory tract infections (i.e. colds) and this is when cases are at their most infectious.

Additional restrictions may be advised by the local medical officer of health in partnership with equity leadership, particularly where there is a significant risk of transmission to individuals at high risk of severe outcomes from pertussis.

Prophylaxis

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

- 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.**

[6] Note: the Communicable Disease Manual states: When this has not already occurred in primary care, on notification of a probable or confirmed case of pertussis, people **meeting the close contact definition** should be identified and contacted for provision of health information, where possible, and the provision of chemoprophylaxis, where appropriate. However, in an epidemic situation public health action focuses on those at highest risk.

Immunisation

Raising general awareness and promoting on-time and catch-up immunisation is important.

- While contact tracing, **advise any unimmunised or partially-immunised close contacts to complete their immunisations** as per the National Immunisation Schedule, especially pregnant people and infants aged under 12 months.

Immunisations on the National Immunisation Schedule are funded, including antenatal immunisation (recommended from 16 weeks' gestation in every pregnancy). There are also groups for whom vaccination is recommended but not necessarily funded, including healthcare workers (every 5-10 years depending on their role).

Further information about pertussis immunisation can be found in the Immunisation Handbook including information on the National Immunisation Schedule, antenatal, and recommendations for healthcare workers).

Advice to close contacts

- The following information should be conveyed to close contacts **verbally, and in writing** via a contact information letter and the pertussis information sheet (accessible here):
  - They should self-monitor for **symptoms**, and seek medical advice and avoid high-risk contacts/settings if they do develop symptoms.
  - They are **not required to isolate unless they develop early symptoms (**including a mild fever, runny nose, and non-specific cough).
  - If they are not fully immunised according to the National Immunisation Schedule, they should consider becoming **immunised.**

9. 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 NPHS:

- 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 2020 (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.

[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.

- 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.

10. 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.

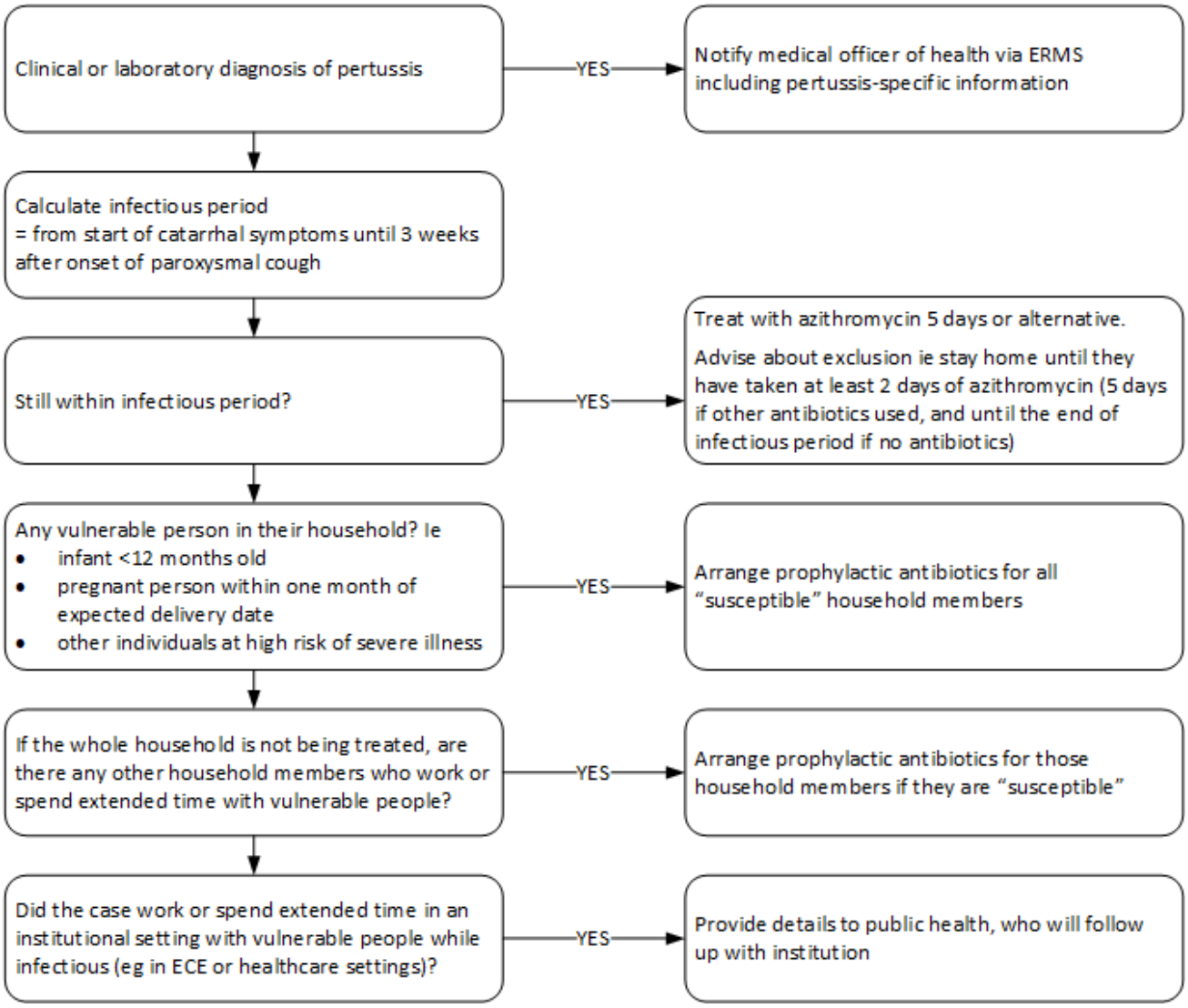
11. Reporting

- Enter case details on **EpiSurv.**
- If a cluster of cases occurs, contact 0800GETMOH - CD option, and outbreak liaison staff at ESR, and complete the Outbreak Report Form**.**
- **Document** your response to each **action point** (marked with this arrow) in this protocol

12. 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. 2024. https://www.health.gov.au/resources/publications/pertussis-whooping-cough-cdna-national-guidelines-for-public-health-units?language=en

13. 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.

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)	V7, 03/04/2025
Document Controller receives EDMS notification of CD approval – Complete **electronic** document control tasks, incl.: header; footer; EMDS document properties/metadata. Check Te Mana Ora policies and procedures site page links are valid, and add new links as required. Create .pdfs (for external links), and save to CFS folders: • Protocols – Y:\CFS\Quality\Archive\Protection\IntranetPROTOCOLS • Fact Sheets –Y:\CFS\Quality\Archive\Protection\FactSheets • Once a new or reviewed document has been approved, upload pdf version to: • Protocols – Surveillance (PHU server) website and Microsoft Teams on-call documentation group. • Fact Sheets – CPH website or links are checked to MoH website	Quality Coordinator (QC)	V7, 03/04/2025
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 or Team Leader	V7, 03/04/2025
Once process finalised, **move** any original draft documents saved in CFS locations to: Y:\CFS\Quality\Archive\Protection\ComDisProtocolsArchive	QC	V7, 03/04/2025
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 v4: new advice added re restriction for those awaiting pertussis test result, as per CD Manual update December 2023	PHS	V4, 11/04/2024
Major update notes v5: substantial updates throughout to reflect changes in interim update to CD Manual, and incorporation of advice for general practitioner investigation and management into national HealthPathways	PHS	V5, 19/12/2024
Minor update notes v6: further updates as per CD Manual updates: case classification, laboratory testing	PHS	V6, 18/03/2025
Minor update notes v7: further updates to wording and diagrams for consistency with 19 December 2024 CD Manual updates	PHS	V7, 03/04/2025
Minor update notes v8: Extra point added to Implementation section noting decision by TLs/duty MOH for which chart to use. Figure 1 & 2. Flowcharts updated to reflect low/high response.	PHS	V8, 11/04/2025