LRI Children's Hospital

Investigation and Management of Pertussis in Children

Staff relevant to:	**Clinical staff working within the UHL Children's Hospital.**
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Written by:	**Dr S Koo**
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Contents

1. Introduction and who this guideline applies to

Pertussis (whooping cough) is an acute respiratory infection caused by the Gram negative coccobacillus bacteria *Bordetella pertussis*. The organism is transmitted via respiratory droplets from an infected person. After an incubation period of between 7-10 days, the initial catarrhal stage develops into an irritating cough which becomes paroxysmal within 1-2 weeks. The paroxysmal coughing fits are associated with an inspiratory 'whoop' or post-tussive vomiting. The coughing fits may last for up to 2-3 months. Young infants may present with apnoeic episodes without the typical 'whoop'.
This guideline is aimed for use by Clinical staff working with Infants, Children and Young People who have suspected or a confirmed case of pertussis.

This procedure must be used in conjunction with:

Infection Prevention UHL Policy (Trust ref B4/2005)
Consent to Examination or Treatment UHL Policy (Trust ref A16/2002)
Antimicrobial Prescribing UHL Policy (Trust ref B39/2006)

2. Clinical assessment and Investigations.

*When would you suspect pertussis?

Suspect pertussis infection if there is a new onset of cough without an clear alternative cause PLUS one or more of the following:

- Paroxysms of coughing
- Post-tussive vomiting
- Inspiratory whoop
- Cough duration 14 days or more

OR

- Undiagnosed apnoeic attacks in young infants (especially if mother was not vaccinated during pregnancy)

OR

- Someone with signs and symptoms consistent with pertussis that has been in contact with a confirmed case of pertussis in the previous 21 days.

OR

- Someone who is known to be part of any on-going outbreak investigation in a specific group of people (i.e. Children attending same school/nursery)

N/B: Consideration should also be given to children who are partially vaccinated or unvaccinated who have been in close contact with a person (especially household contacts) with an undiagnosed persisting cough which could be consistent with pertussis

2.1 Management of suspected cases of pertussis – patients seen at point of admission

Admission criteria (any of the following):
- ≤ 6 months of age and acutely unwell
-Has significant breathing difficulties (i.e. apnoea episodes, severe paroxysms, or cyanosis)
-Has significant complication (i.e. pneumonia, seizures)

Suspected case of pertussis (see textbox * pg. 2 for definition)

Does patient require admission? (See red box on left for admission criteria)

NO

Investigate and start treatment (if within 14 days of cough onset and high suspicion of pertussis. If there is a vulnerable infant [see definition on pg 6] or pregnant women in household/close contact [see definition on pg 6], then consider treating if within 21 days of cough onset)

-Notify UKHSA

-Advice to parents/carers: Exclude from nursery or school until at least 48 hours of appropriate antibiotic therapy or 14 days from cough onset if not treated with antibiotics

-Safety netting: If child gets worse with significant breathing difficulties or has significant complications, to seek medical advice.

YES

Notify local UKHSA Health Protection Team (Tel number: 0344 225 4524)[&]

Cough duration ≤ 21 days

Cough duration>21 days

Isolate patient in side room
-Use PPE -apron, gloves, surgical mask, eye protection (if risk of splashing)
- Inform Infection Prevention Team (email Infection Prevention Mailbox with child's S number and ward)

Investigate (Table 1)

Start treatment (if within 21 days of cough onset)
– First line: PO Clarithromycin.
For alternatives and dose please refer to Table 2.

Continue isolation precautions as above until:
-at least 48 hours of appropriate antibiotic therapy OR
-21 days from cough onset without antibiotic treatment

- Investigate (Table 1)
- No treatment indicated
- No isolation precautions for pertussis required

If a child presents to primary care with suspected pertussis and does not fulfil criteria for admission, paediatrician to advise GP to investigate and manage in the community as per UKHSA guidelines (see supporting documents and key references)

All children who have been treated for pertussis should be offered pertussis vaccination at the appropriate age.

[&]See UKHSA website: https://www.gov.uk/guidance/notifiable-diseases-and-causative-organisms-how-to-report

2.2 Background.

Pertussis activity tends to peak every 3-4 years. It can affect people of all ages. The highest incidence is observed in infants under 3 months old. They tend to suffer from severe infection and complications. Mortality is greatest in those less than 6 months of age. Adults and adolescents may be susceptible to the infection due to waning immunity following vaccination and/or natural infection. They usually suffer from a milder disease with persisting cough for weeks.

In the UK, a pertussis-containing vaccine is currently being offered to babies at 2, 3 and 4 months of age. The fourth dose is given as a pre-school booster from 3 years and 4 months. There is currently a vaccination programme for pregnant ladies from 16-32 weeks gestation. Vaccination in pregnancy is important to protect infants from birth until they are able to mount an immunological response to the primary vaccines themselves.

Any suspected case should be reported to the local UKHSA centre. A diagnosis may be made on clinical grounds without the need for laboratory confirmation. **An antibiotic should be administered as soon as possible after onset of symptoms to eradicate the organism and limit on-going transmission.** The benefit of antibiotics on the clinical course of the illness is limited to the early catarrhal phase and certainly within 14 days from onset of cough. Beyond the first 14 days, the main benefit of antibiotic therapy is to reduce transmission to close contacts.

Laboratory confirmation is conventionally performed by culture and isolation of the organism. However sensitivity is dependent on specimen quality and affected by increasing patient age, vaccination status and length of illness. PCR is more sensitive than culture and does not require the organism to be viable (i.e. processing delays or antibiotic therapy).

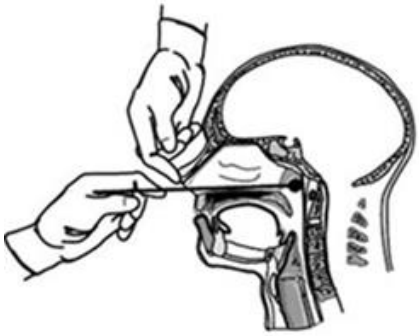
Table 1: Investigation methods based on symptom duration

Symptoms ≤21 days	Symptoms >14 days
If symptoms had been present between 14-21 days, you could investigate using either pertussis PCR or serological tests (oral fluid testing in the right age group or serum)	
X1 Pernasal swab£ for pertussis PCR If Pernasal swab not available, send a nasopharangeal or throat swab in viral transport medium (VTM) for pertussis PCR^	Oral fluid testing (for detecting anti-pertussis toxin IgG) if 2 to <17 years& The kit will be posted to the patient following notification to UKHSA
Patients admitted into hospital: • Send a Pernasal swab£/broncho-alveolar lavage/nasopharyngeal aspirate for pertussis PCR • Full blood count monitoring (for lymphocytosis*) ***Worsening lymphocytosis if a poor prognostic marker**	Serum for serology testing for older children& **&Antibody levels are confounded by recent vaccination. Recommended one year after last dose of pertussis containing vaccine**

£ - This may or may not contain gel-like media

^Please write 'pertussis' or 'pertussis suspected' in clinical details on the request form

2.3 Taking a pernasal swab (adapted from CDC website)



1. Use gloves, surgical mask and eye protection when performing procedure.
2. Sit patient upright and insert tip of the pernasal swab into one nostril, advancing backwards along the floor of the nose until it reaches the back of the nasopharynx. If obstruction is encountered when inserting swab, remove swab and try using the other nostril.
3. Leave the swab in place ideally for at least 10 seconds before removal and placing it into the container.
4. Fill in patient details onto the swab and send to microbiology laboratory with the relevant request form.

2.4 Table 2: Recommended antibiotic treatment for pertussis.

Adapted from UKHSA guidance on the management of cases of pertussis in England during the re-emergence of pertussis in 2024

Refer to BNFc for antibiotic doses

Age group	First line	Second line
Neonates (<1 month)	**PO Clarithromycin** for 7 days	**PO Azithromycin≠ (10mg/kg once daily)** for 3 days OR **PO Erythromycin for 7 days**
Infants (>1 month) and children	**PO Clarithromycin** for 7 days	Consider other oral macrolides: **Erythromycin for 7 days OR** **Azithromycin for 3 days** If macrolides contraindicated or not tolerated: **PO Co-trimoxazole 7 days** NB: Not licensed for infants below 6 weeks of age - Liaise with pharmacy team for dose

≠The recommendation to use azithromycin for infants less than six months of age is based on advice from experts on the Pertussis Guidelines Group and CDC Guidelines

2.5 Chemoprophylaxis for close contacts who has been exposed to a case of pertussis (suspected, confirmed or epidemiologically linked)

The assessment and decision for chemoprophylaxis should be done in conjunction UKHSA and Infection Prevention Team +/- microbiology (if exposure occurred at UHL).

All children should receive pertussis vaccination at the appropriate age regardless of whether or not they are given prophylaxis.

2.6 Definition	
Infectious period	From onset of cough until 48 hours of appropriate antibiotic treatment or for 21 days from onset of cough if they have not received appropriate antibiotic therapy.
Close contact	Prolonged (for example, overnight) contact with a case. This include family members or people living in the same household.
Vulnerable infant	• Unimmunised infants (born at less than 32 weeks) under 2 months of age regardless of maternal vaccine status • Unimmunised infants (born from 32 weeks) under 2 months of age whose mothers did not receive maternal pertussis vaccine after 16 weeks and at least 2 weeks before delivery • Infants from 2 months to less than 5 months of age, regardless of maternal vaccination status or gestational age at delivery • Infants from 5 months to less than 1 year of age who have received less than 3 doses of pertussis-containing vaccine, regardless of maternal vaccination status or gestational age at delivery.
Suspected case of pertussis	Any person with new onset cough without a clear explanative cause and one or more of the following features: paroxysms of coughing, post-tussive vomiting, inspiratory whoop and cough of duration of 14 days or more, in the absence of laboratory confirmation or epidemiologically link to a laboratory confirmed case.
Confirmed case of pertussis	A person with signs and symptoms consistent with pertussis AND culture/PCR positive for B pertussis or anti-pertussis toxin IgG titre positive in serum/oral fluid test (in the absence of vaccination in the last year)
Epidemiologically linked case of pertussis	Any person with signs and symptoms consistent with pertussis and was in close contact with a laboratory confirmed case of pertussis in the 21 days before onset of their cough (in the absence of laboratory confirmation)

3. Education and Training

None

4. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Investigation, Treatment & Notification completed in all cases as per guideline	Case audit	Consultant microbiologist	5 Yearly	Departmental practice meeting

5. Supporting Documents and Key References

1. Public Health England, Pertussis background information on prevention and management, February 2013.
2. UKHSA. Guidance on the management of cases of pertussis in England during the re-emergence of pertussis in 2024 (updated June 2024). Available on: Pertussis: guidelines for public health management - GOV.UK (www.gov.uk)
3. CDC website on pertussis – specimen collection. August 2022. Available on: https://www.cdc.gov/pertussis/clinical/diagnostic-testing/specimen-collection-diagnosis.html#specimen-collection
4. UKHSA. Pertussis (whooping cough) vaccination programme for pregnant women: information for healthcare practitioners, updated 6th September 2021. Available on: Pertussis (whooping cough) vaccination programme for pregnant women: information for healthcare practitioners - GOV.UK (www.gov.uk)
5. BNFc. Available from BNFc online.

6. Key Words

Pertussis, vaccination, whooping, cough.

The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.
As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

Contact and review details	
Guideline Lead (Name and Title) S. Koo Consultant microbiologist	**Executive Lead** Chief Nurse
Changes made Jan 2024 Corrected gestation for vaccination during pregnancy Addition of dosage of azithromycin for neonates in table as not available on BNFc Change of PHE to UKHSA throughout document. Updated references	
Changes made in June 2024 Flowchart 2.1: Symptoms onset – changed to new definition of cough onset; changes to recommendation regarding exclusion, changes to recommendations regarding eligibility for antibiotic therapy for pertussis cases (for patients not admitted to hospital). Treatment for pertussis cases left at 21 days from onset of cough in patients admitted (to decrease risk of transmission within hospital). Updated recommendation for investigation inc nsaopharangeal/throat swabs in VTM for pertussis PCR, statement about monitoring of lymphocytosis as a prognostic marker Included definition for confirmed, suspected, epidemiological link cases, vulnerable infant, close contact References updated Decision flowchart for chemoprophylaxis removed – statement that risk assessment/decision will be done in conjunction with UKHSA, infection prevention team +/- microbiology	