

# LRI Children's Hospital

## Investigation and Management of Pertussis in Children

|                            |   |
|----------------------------|---|
| <b>Staff relevant to:</b>  | <b>Clinical staff working within the UHL Children's Hospital.</b> |
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### 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 acute cough for 14 days or more without an apparent cause plus one or more of the following:

- Paroxysms of coughing
- Post-tussive vomiting
- Inspiratory whoop

OR

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

OR

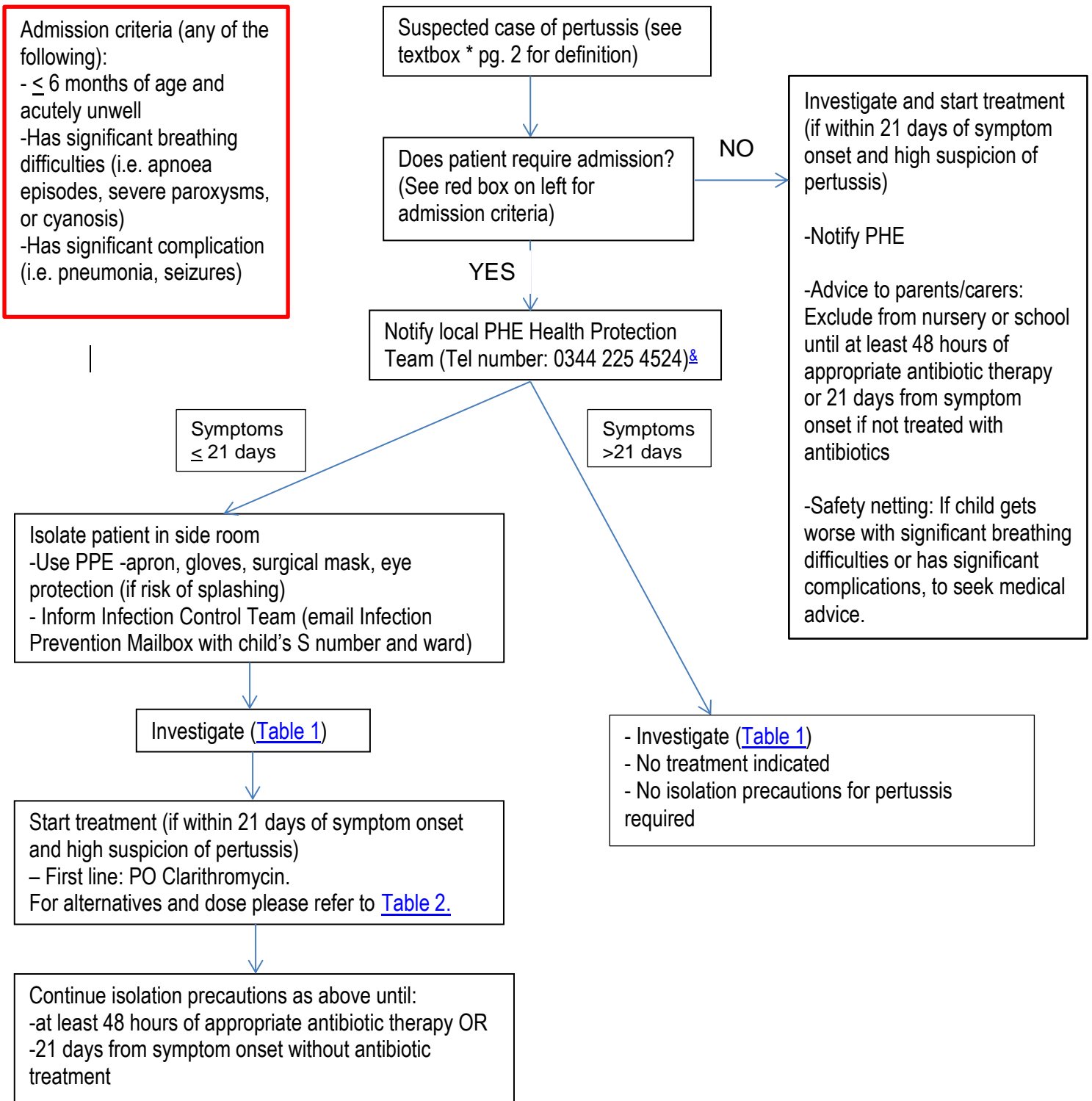
- Someone with signs and symptoms consistent with pertussis that has been in contact with a confirmed case of pertussis in the previous 21 days.

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



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 PHE guidelines (see supporting documents and key references)

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

<sup>&</sup>See PHE 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 20 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 PHE 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 effect of antibiotic treatment when given late in the infection is lacking therefore treatment is only recommended if given within 3 weeks of onset of illness.

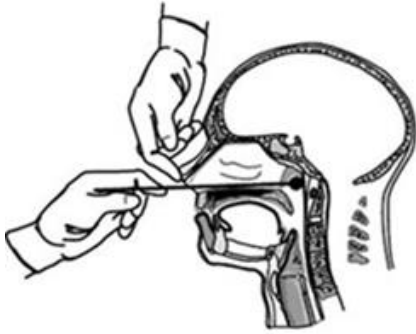
Laboratory confirmation is conventionally performed by culture and isolation of the organism. However sensitivity is dependent on specimen quality and affected by increasing patient age, vaccination status and length of illness. PCR is more sensitive than culture and does not require the organism to be viable (i.e. processing delays or antibiotic therapy). We would therefore suggest using PCR method as first line investigation for pertussis in patients who are unwell and needing ICU care.

**Table 1: Investigation methods based on symptom duration**

| Symptoms $\leq$ 21 days   | Symptoms >14 days   |
|---|---|
| If symptoms had been present between 14-21 days, you could investigate using either pertussis culture/PCR or serological tests (oral fluid testing in the right age group or serum)   |   |
| x2 Pernalasal swabs <sup>£</sup> (see below for technique) or nasopharyngeal swab (to be sent 'dry' i.e. not in transport media) for pertussis culture/PCR  | Oral fluid testing (for detecting anti-pertussis toxin IgG) if 2 to <17 years <sup>&amp;</sup> .<br>The kit will be posted to the patient following notification to PHE   |
| Patient clinically unwell needing ICU care: <ul style="list-style-type: none"> <li>Send X2 pernasal swabs<sup>£</sup> /broncho-alveolar lavage/nasopharyngeal aspirate for pertussis PCR</li> <li>Full blood count (looking for lymphocytosis)</li> </ul> | Serum for serology testing for older children <sup>&amp;</sup><br><br><b><sup>&amp;</sup>Antibody levels are confounded by recent vaccination. Recommended one year after last dose of pertussis containing vaccine</b> |

£ - We are currently performing validation tests on our in-house [PCR](#) assay, hence will require 2 pernasal swabs until these validation tests are complete

### 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 transport medium.
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.

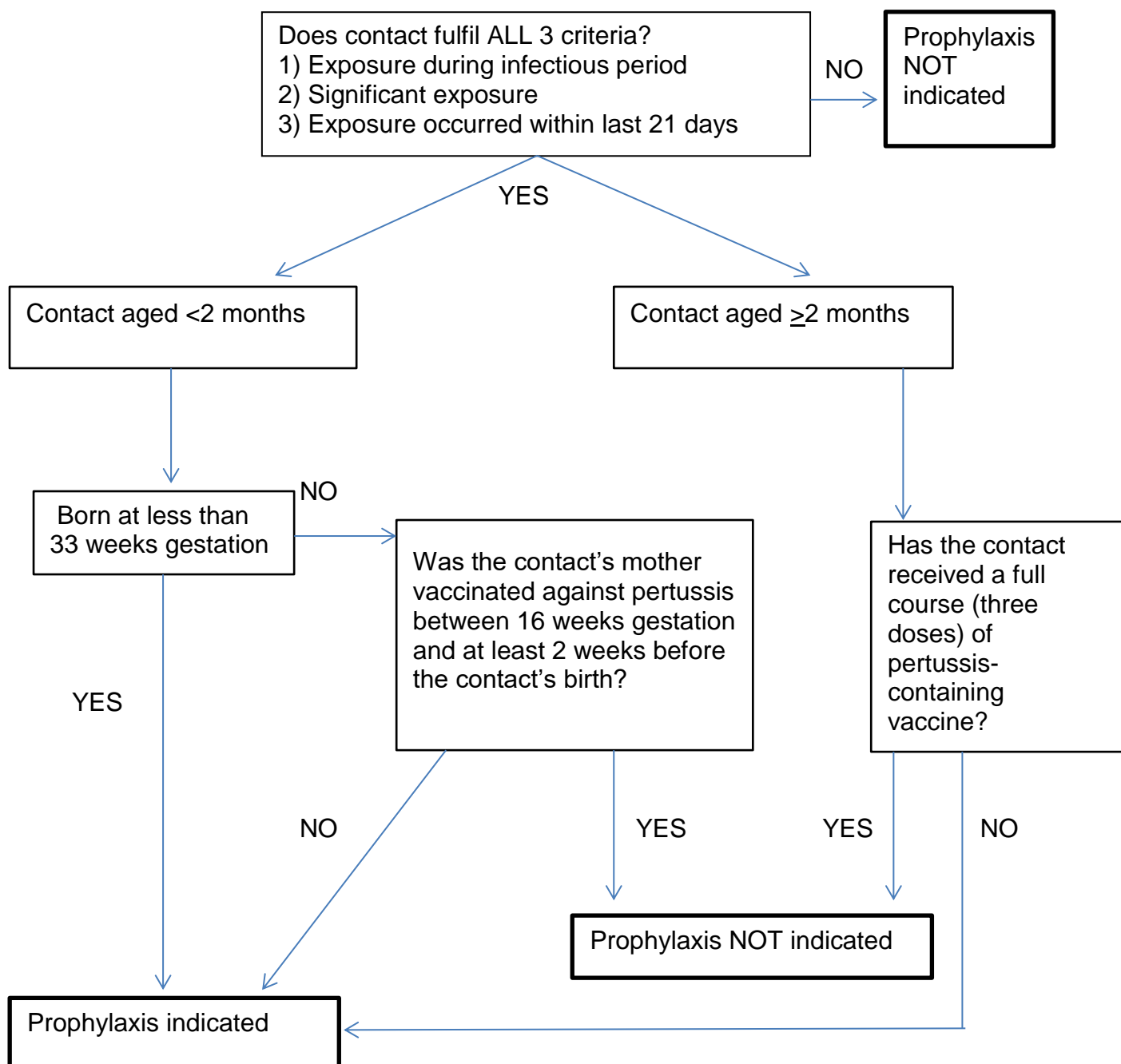
Adapted from Public Health England's Pertussis Brief for Healthcare Professionals (May 2018)

Refer to BNFC for antibiotic doses

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

<sup>≠</sup>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 Decision flowchart for paediatric contacts of a confirmed case of pertussis



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

**Choice (duration and dose) of antibiotics for prophylaxis is the same as for treatment of pertussis ([see Table 2](#)).**

| <b>2.6 Definition</b> |  |
|-----------------------|--|
| Infectious period     | From onset of symptoms until 48 hours of appropriate antibiotic treatment or for 21 days from onset of symptoms if they have not received appropriate antibiotic therapy.  |
| Significant exposure  | Being within 2m from index case for > 1 hour without PPE. If index case was in Intensive Care/High Dependency Care/ Neonatal Unit, risk assessment will need to be discussed with microbiology and infection control team to determine need for wider prophylaxis. |

### 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 brief for healthcare professionals, May 2018.
2. Public Health England, Guidelines for the Public Health Management of Pertussis in England, updated May 2018.
3. Public Health England, Guidelines for the public health management of pertussis incidents in Healthcare Settings, November 2016.
4. CDC website on pertussis. January 2016. Available on: <http://www.cdc.gov/pertussis/index.html>
5. BNFC. Available from BNFC online.

### 6. Key Words

Pertussis, vaccination, whooping, cough.

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**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.**

| <b>Contact and review details</b>  |                                      |
|--|--------------------------------------|
| <b>Guideline Lead (Name and Title)</b><br>S.Koo Consultant microbiologist  | <b>Executive Lead</b><br>Chief Nurse |
| <p><b>2.1 amended infection control team contact details from extension number to email address</b></p> <p><b>Added link to gov.uk guidance for notifiable diseases</b></p> <p><b>2.2 Removed reference to review of pregnancy vaccination programme</b></p> <p><b>Table 1: Investigations amended to incorporate the requirement for 2 pernasal swabs for pertussis culture &amp; PCR</b></p> <p><b>Added statement - <a href="#">if symptoms had been present between 14-21 days, you could investigate using either pertussis culture/PCR or serological tests (oral fluid testing in the right age group or serum)</a></b></p> |                                      |