Public Health England

Protecting and improving the nation's health

Pertussis brief for healthcare professionals

Identify, manage and test cases of pertussis

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Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. We do this through world-leading science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health and Social Care, and a distinct delivery organisation with operational autonomy. We provide government, local government, the NHS, Parliament, industry and the public with evidence-based professional, scientific and delivery expertise and support.

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Background

This document helps health professionals to identify and test cases of pertussis. Pertussis is a notifiable disease and you should continue to report all suspected cases to your local Public Health England (PHE) Centre to ensure contacts are managed promptly.

Pertussis (whooping cough) is an acute respiratory infection caused by the bacteria *Bordetella pertussis*. It usually begins with mild, cold-like symptoms, which develop over one to two weeks into coughing fits that can be severe. The cough can often last for two to three months. In the UK, a pertussis-containing vaccine (Infanrix hexa®) is routinely offered to babies at two, three and four months old and a fourth dose is included with the pre-school booster (Infanrix-IPV® or Repevax®) from 3 years 4 months of age.

Pertussis activity tends to peak every three to four years. In response to an observed increase in laboratory confirmed cases of pertussis above anticipated peak levels, the Health Protection Agency[1] declared a national outbreak in April 2012. Following further increases in disease and a number of deaths in young infants, in October 2012 the Department of Health launched a new temporary vaccination programme for pregnant women. The current programme to vaccinate all pregnant women (from week 20 of pregnancy, although can be given as early as week 16) will be continued until at least 2019 when the programme will be reviewed by the Joint Committee on Vaccination and Immunisation. This immunisation is important to protect infants from birth until they can receive their first primary vaccines at 2 months of age.

Who is affected by pertussis?

Pertussis can affect people of all ages. The highest incidence occurs in infants under three months old, who are too young to be directly protected by routine immunisation and for whom the disease is often severe and even life-threatening. Current high numbers of cases are also being confirmed in adolescents and adults who usually suffer a milder disease with a cough that may persist for many weeks. The reasons for this increase are not completely understood but waning immunity following vaccination and/or natural infection is likely to be a factor, although raised awareness and testing have also contributed to the increase in reported cases amongst adolescents and adults.

[1] The Health Protection Agency was abolished and its functions transferred to Public Health England on 1st April 2013.

What to look out for

You should suspect pertussis infection and report it to your local PHE centre if someone presents with an acute cough lasting for 14 days or more without an apparent cause plus one or more of the following:

- paroxysms of coughing
- post-tussive vomiting
- inspiratory whoop
- undiagnosed apnoeic attacks in young infants

or

- someone with signs and symptoms consistent with pertussis who has been in contact with a confirmed case in the previous 21 days

or

- someone who is known to be part of any ongoing outbreak investigation in a specific group of people. For example, children attending the same school or nursery where pertussis is known to be been circulating

Managing a suspected pertussis case

Children with clinically suspected or laboratory confirmed pertussis should be excluded from schools or nurseries until they have completed 48 hours of appropriate antibiotic therapy (see Table 1). Those who are not treated with antibiotics should be excluded for 21 days from onset of symptoms. Administer antibiotics as soon as possible after onset of illness in order to eradicate the organism and limit ongoing transmission.

Please see table 1 overleaf on page 5

Table 1. Recommended antibiotic treatment and post exposure prophylaxis by age group[2]

Age group	Clarithromycin*	Azithromycin*	Erythromycin	Co-trimoxazole*[3]
Neonates (<1 month)	Preferred in neonates 7.5mg/kg twice a day for 7 days	10mg/kg once a day for 3 days	Not recommended due to association with hypertrophic pyloric stenosis	Not licensed for infants below 6 weeks
Infants (1 month – 12 months) & Children (>12 months)	**1 month to 11 years**: **Under 8kgs** 7.5mg/kg twice a day for 7 days **8-11kg** 62.5mg twice a day for 7 days **12-19kg** 125mg twice a day for 7 days **20-29kg** 187.5mg twice a day for 7 days **30-40kg** 250mg twice a day for 7 days **12 to 17 years**: 500mg twice a day for 7 days	**1 to 6 months**: 10mg/kg once a day for 3 days **> 6 months**: 10mg/kg (max 500mg) once a day for 3 days	**1–23 months:** 125mg every 6 hours for 7 days≠ **2 to 7 years**: 250mg every 6 hours for 7 days≠ **8 to 17 years**: 500mg every 6 hours for 7 days≠	**6 weeks to 5 months**: 120mg twice a day for 7 days **6 months to 5 years**: 240mg twice a day for 7 days **6 to 11 years**: 480mg twice a day for 7 days **12 to 17 years**: 960mg twice a day for 7 days
Adults	500mg twice a day for 7 days	500mg once a day for 3 days	500 mg every 6 hours for 7 days≠	960mg twice a day for 7 days
Pregnant women[4]	Not recommended	Not recommended	Preferred antibiotic: not known to be harmful	**Contraindicated in pregnancy**

≠ Doses can be doubled in severe infections
* Please note that the doses for treatment and prophylaxis are the same for all ages

[2] The above information has been taken from BNF 75 (March 2018) and BNF for Children 2017-18. 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. Azithromycin and co-trimoxazole doses are extrapolated from treatment of respiratory tract infections.

[3] Consider if macrolides contra-indicated or not tolerated.

[4] For pregnant contacts, a risk assessment would need to be done to looks at the risk and benefits of antibiotic therapy/prophylaxis. The aim of treating/prophylaxing women in pregnancy is to prevent transmission to the newborn infant, and should be considered in those who have not received a pertussis containing vaccine more than one week and less than five years prior. Where possible, pregnant women should begin treatment at least three days prior to delivery.

Laboratory tests for pertussis

Culture

Take cultures by nasopharyngeal swabs (NPS) / pernasal swabs (PNS) / nasopharyngeal aspirates (NPA). Do not take throat swabs or anterior nasal swabs.

Sample the posterior nasopharynx using a NPS/PNS (typically flexible ultrafine twisted wire shaft with nylon/Rayon swab). The Copan-style swab is also acceptable for an NPA. The PNS needs to be gently pushed along the floor of the nasal cavity towards the posterior wall of the nasopharynx as this is where the *B. pertussis* bacteria are most likely to be found. After sampling, place the PNS for culture in transport media and transfer it without delay to the local hospital laboratory for processing.

The sensitivity of nasopharyngeal culture is affected by patient age (it decreases as people get older), vaccination status and length of illness. The sensitivity also decreases with time after onset and is highly dependent on specimen quality. Timing the specimen collection is important: sensitivity decreases substantially, from approximately 60% within 1 week of symptom onset to culture to 10% or less after 4 weeks. This means it is vital to have accurate details about the onset of symptoms on the patient request form.

Oral fluid testing (for detecting the anti-pertussis toxin IgG)

PHE introduced oral fluid testing across England and Wales from January 2013. This test is offered to seek laboratory confirmation of clinically suspected cases in people aged between 2 and under 17 years of age who have had cough for more than 14 days and have NOT received a pertussis vaccine in the past year. Local PHE Health Protection Teams (HPTs) send these kits in response to any such cases reported to them who have been coughing for more than 14 days. They will also post the kit directly to patient’s home or to a health professional if preferred. Taking the oral fluid sample is straightforward and clearly explained in the instructions included with each kit.

It takes time to receive the results, so before they become available you should clinically manage patients appropriately.

Serology testing (for detecting the anti-pertussis toxin IgG)

Serological testing is used to seek laboratory confirmation of cases where the date of onset of cough has been more than 14 days before specimen collection. It detects

antibodies to pertussis toxin and a level (PT IgG) above 70 international units per millilitre (IU/ml) is considered evidence of recent infection (in the absence of vaccination within the past year). This method is predominantly used to confirm cases in older individuals (over 16 years old).

Polymerase chain reaction (PCR)

PCR is usually more sensitive than culture as the organism does not need to be viable, however, PCR is less likely to be positive in patients with symptom duration of more than 21 days. A PHE pilot comparing the use of NPS/PNS and throat swabs in primary care for pertussis PCR found all swab types to be acceptable. While NPS are preferable for PCR testing, throat swabs may be used if NPS are not available, especially in community settings.
Take samples for PCR as for culture above, but send them “dry” if possible (that is, not in transport media). NPS/PNS for PCR sent in transport media will still be tested.

Since 2014, regional PHE laboratories offer a pertussis PCR service for patients in all age groups in both hospital and primary care settings. From January 2015, the *B. pertussis* PCR for routine diagnostic use is no longer offered by the Bordetella Reference Laboratory at the Respiratory and Vaccine Preventable Bacteria Reference Unit (RVPBRU) Colindale, London.

Test method	Patient criteria	Sample	Access	RVPRBU
Culture	Suspected cases in all age groups with cough symptoms <21 days duration	NPS/NPA/PNS	NHS laboratories	Confirmed isolates to be sent to RVPBRU
PCR	Suspected cases in all age groups with cough symptoms <21 days duration	NPS/PNS preferred; throat swab acceptable for community patients	Regional PHE laboratories	Positive samples to be referred to RVPBRU
Oral fluid	Suspected cases in 2 to <17 years with cough duration >14 days*	OF kit	OF kit sent to patient upon notification to PHE HPT	Samples tested and reported by RVPBRU
Serology	Suspected cases with cough duration >14 days*	Serum	Charged for service at RVPBRU	Samples tested and reported by RVPBRU

* Antibody levels confounded by recent vaccination. Recommended one year after last dose of pertussis vaccine.

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