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PHE Guidelines for the Public Health Management of Pertussis Incidents in Healthcare Settings

Produced by the Pertussis Healthcare Settings Guidelines Group

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Part 1: Summary of key recommendations

This document provides specific guidance on the management of pertussis incidents in healthcare settings. The following updates the key public health actions based on the 2012 Health Protection Agency (HPA) Guidelines for the public health management of pertussis in healthcare settings (1) and the revised 2016 national Public Health England guidelines for the public health management of pertussis (2).

- revised definitions of the priority groups for public health action in line with the 2016 national guidelines
- in particular the definition of a vulnerable infant which takes into account the latest evidence of the effectiveness of the immunisation programme for pregnant women
- revised definition of the recommended exclusion period, which has been reduced from 5 days to 48 hours after appropriate antibiotic therapy
- updated flow diagrams for management of cases and close contacts (Appendices 1 and 2).

The information presented by this guidance is intended to supplement, not substitute for, the expertise and judgement of healthcare professionals.

1.1 Case management (for all clinically suspected, epidemiologically linked and lab confirmed cases)

- Case management including laboratory testing, antibiotic treatment and identification of household contacts should proceed according to the Public Health England (PHE) guidelines for the public health management of pertussis, hereafter referred to as the PHE guidelines (2).

- Healthcare workers (HCWs) who have been diagnosed with pertussis (either clinically suspected, epidemiologically linked or laboratory confirmed) should be excluded until 48 hours of appropriate antibiotic treatment has been completed **OR** for 21 days from onset of symptoms, if appropriate antibiotic treatment has not been completed.

- Hospitalised patients diagnosed with pertussis (either clinically suspected, epidemiologically linked or laboratory confirmed) should be placed in respiratory isolation during the infectious period.

- As pertussis is a notifiable disease, all cases should be reported to the local Health Protection Team (HPT) as soon as possible. Cases associated with a healthcare

setting should also be reported to the relevant Infection Prevention and Control team (IPCT) and for HCWs, to Occupational Health (OH), even if it is too late for prophylaxis.

- If a woman has confirmed or suspected pertussis during pregnancy she should still be offered the pertussis vaccine as not all women may make sufficiently high levels of antibodies following natural infection that can be passed across the placenta to protect the infant from birth.

1.2 Definitions

Public health action in this guidance applies to clinically suspected, epidemiologically linked or laboratory confirmed cases associated with health care settings. Action should not be delayed until the results of laboratory testing are available.

Infectious period: A case is considered infectious from onset of symptoms until 48 hours of appropriate antibiotic treatment **OR** for 21 days from onset of symptoms if appropriate antibiotic therapy has not been completed.

Significant exposure in a healthcare setting: Unprotected direct face-to-face contact (< 2 metre distance) for greater than a cumulative period of 1 hour with an infectious case **OR** direct contact with respiratory secretions from an infectious case e.g. performing an aerosol-generating procedure or examination of the nose and throat without appropriate personal protective equipment (3). A lower threshold should be considered in some circumstances e.g. where unimmunised or partially immunised infants are exposed (Section 1.4).

Please note, this definition of significant exposure should not be used for contact tracing outside of healthcare settings.

1.3 Priority groups for contact tracing and prophylaxis

Outbreaks of pertussis can occur in healthcare settings. If outbreaks are detected at an early stage, prompt action including chemoprophylaxis and vaccination of close contacts can limit the spread (4,5) and may also be of benefit in reducing transmission to those who are most at risk of severe or complicated infection such as young unimmunised infants born to unvaccinated mothers. Therefore this is recommended in settings where there is a vulnerable person or an individual who may facilitate ongoing transmission to vulnerable groups. The list of priority groups for public health action has been updated from earlier guidance and is based upon identifying groups who are either:

Group 1. At increased risk of severe or complicated pertussis ('vulnerable')
Group 2. At increased risk of transmitting infection to individuals in group 1 (see below)

Group 1: Groups at increased risk of severe or complicated pertussis ('vulnerable')

In light of the high effectiveness of the maternal pertussis vaccine programme in preventing disease for those infants less than 2 months of age, the definition of vulnerable infants has been amended as follows:

- unimmunised infants (born ≤32 weeks) less than 2 months of age regardless of maternal vaccine status OR
- unimmunised infants (born >32 weeks) less than 2 months of age whose mothers did not receive maternal pertussis vaccine after 16 weeks and at least 2 weeks before delivery OR
- infants aged 2 months or over who are unimmunised or partially immunised (less than three doses of DTaP/IPV/Hib up to 1 year of age) regardless of maternal vaccine status.

Group 2: Groups at increased risk of transmitting pertussis to those at risk of severe or complicated infection (Group 1), who have not received a booster dose of pertussis vaccine more than 1 week and less than 5 years ago

- pregnant women (>32 weeks gestation)
- healthcare staff working with infants or pregnant women.

1.4 Identification of contacts for prophylaxis

Prophylaxis should be offered to those in priority groups **WITH** a significant exposure to an infectious case within a healthcare setting. However, the time/duration criteria are only a guide and where unimmunised or partially immunised infants are exposed, a lower threshold should be applied e.g. prophylaxis should be considered for these infants if direct contact with an affected HCW regardless of duration of contact.

1.5 Action for priority contacts identified with a significant exposure

Contacts in the priority groups defined above who have been identified within 21 days of a significant exposure (described in section 2.2) should be offered chemoprophylaxis/ vaccination as outlined below.

1.5.1 Chemoprophylaxis

Chemoprophylaxis should be offered (based on recommendations in the PHE guidelines) (2) to contacts within 21 days of a significant exposure in the following priority groups:

- vulnerable infant contacts (as defined in section 1.3)
- pregnant women (>32 weeks gestation) who have not received a booster dose of pertussis vaccine more than 1 week and less than 5 years ago
- HCW contacts who have not received a booster dose of pertussis containing vaccine more than 1 week and less than 5 years ago.

1.5.2 Vaccination

Immunisation should be considered for those who have been offered chemoprophylaxis:

- vulnerable infants (as defined in section 1.3) should complete the primary course with the appropriate vaccine according to the recommended schedule
- a booster dose of pertussis containing vaccine is recommended for pregnant women (> 32 weeks gestation) and HCW contacts who have not received a dose of pertussis containing vaccine in the preceding 5 years and no Td-IPV in the preceding month.

1.5.3 Communication

“Inform and advise” letters should be provided along with the offer of prophylaxis (Appendix 3).

1.6 Action for contacts with significant exposure NOT in priority groups

Contacts with significant exposure who are not in priority groups should be informed and advised to seek medical attention if symptoms develop (template letters included in Appendix 3).

1.7 Case finding and surveillance

The relevant IPCT and OH should be informed of any cases of pertussis that occur in a healthcare setting, even if beyond 21 days of exposure and therefore too late for prophylaxis. The IPCT and OH should carry out case finding for existing cases among patient and HCW contacts and passive surveillance for further cases that may occur.

1.8 Two or more epidemiologically linked cases associated with a healthcare setting

If two or more confirmed or epidemiologically linked cases of pertussis occur in a healthcare setting, an outbreak control team should be convened. If transmission is most likely to have occurred within the healthcare setting, then in addition to the actions taken as per algorithms for single cases, consideration should be given to offering vaccination more widely. The priority is active case finding and therefore in these circumstances a less specific case definition should be used to ensure no cases are missed.

Expert advice on outbreak investigation and response is available from the Immunisation, Hepatitis and Blood Safety Department (IHBSD), PHE Colindale (020 8200 4400) and on laboratory investigation from the Respiratory and Vaccine Preventable Bacteria Reference Unit (RVPBRU), PHE Colindale (020 8327 7887)[1].

[1] **Laboratory confirmation and public health action**
Appropriate public health action should not wait for laboratory results as negative results cannot be used to exclude pertussis infection. At the request of the local Health Protection Team (HPT), the Bordetella Reference Laboratory will prioritise testing for evidence of *B. pertussis infection* in support of outbreaks or incident investigations as appropriate. However, please note these services are not available outside of regular working hours. Please contact RVPBRU on 0208 327 7327 and discuss with senior staff prior to sending specimens.

Part 2: Background, risk of transmission and rationale of action

2.1 Background

Pertussis is an acute respiratory infection caused by the Gram-negative organism *Bordetella pertussis*. Pertussis can affect individuals of any age although the clinical presentation does vary. Young unvaccinated infants are at highest risk of severe complications (including pneumonia, apnoea and seizures) and death. Older vaccinated individuals often present with milder symptoms and atypical features which may go unrecognised leading to delays in treatment and timely public health action to prevent ongoing transmission.

Protection conferred through natural infection or vaccination is not lifelong. The UK childhood immunisation schedule consists of three primary infant doses of pertussis containing vaccine and a preschool booster dose (6). As protection following vaccination wanes over time, susceptible adults in the population can be an important source of infection for infants too young to be afforded direct protection from vaccination. Susceptible adults working in healthcare settings pose a potential risk of transmission to vulnerable infants and incidents in healthcare settings can be both challenging and resource intensive to manage. It is not currently national policy to routinely offer pertussis boosters to UK healthcare staff working in high risk settings.

This document supplements the recommendations in the PHE guidelines on the public health management of pertussis (2). It seeks to provide additional specific guidance for managing incidents associated with healthcare settings based on a review of published literature and international guidance as well as the results of a survey of pertussis incidents in healthcare settings managed by local Health Protection Teams (HPTs, previously called Health Protection Units)[2] in 2011, and updates the 2012 guidance (1).

2.2 Risk of transmission and rationale for public health action in a healthcare setting

Outbreaks of pertussis in healthcare settings and exclusion of affected staff can be disruptive and costly to manage (7). Several instances of pertussis transmission in health care settings have been reported in the literature and include transmission from HCW to HCW (7–10), HCW to patient (8,11,12) as well as patient to HCW (9,13) or a

[2] Note: After April 2013, the functions of local Health Protection Units (HPUs) were transferred to Public Health England Health Protection Teams (HPTs)

mixture of these (14,15). However the greatest risk of nosocomial transmission is likely to be from a HCW to a patient or to another member of staff.

Individuals with pertussis are most infectious in the initial catarrhal stage and during the first three weeks after the onset of cough (16). Pertussis is transmitted by large droplets (17). Traditionally, droplet transmission has been accepted as occurring within 3 feet of the infected patient. However, more recent studies have suggested that droplets can be dispersed to a distance of 6 feet (1.9 metres) during coughing (18). *B. pertussis* DNA has been detected as far away as 4 metres (13 feet) from a patient's bedside for up to 4 days following initiation of therapy although the clinical relevance of this remains uncertain (19). The risk of transmission will therefore be dependent on the type of procedure undertaken and duration and proximity of exposure, with the risk being higher in settings involving close prolonged clinical contact e.g. intensive care and maternity settings.

The recommendations for chemoprophylaxis and post exposure vaccination require consideration of the nature of the healthcare setting where the exposure has occurred including level/proximity of contact, the vulnerability of those exposed and the effectiveness of available interventions.

Young unimmunised infants are at highest risk of severe complications, hospitalisation and death from pertussis. There is very little evidence supporting the increased risk of pertussis in other clinical risk groups such as individuals with underlying respiratory conditions, immunocompromised or pregnant women (20–26). The risk for pregnant women is in late pregnancy and relates to the potential transmission to the newborn. Pregnant women themselves do not appear to be at increased risk of severe pertussis compared with non-pregnant women. Although older children are at a lower risk of severe disease, they pose a risk of onward transmission. However, given the rapid turnover of patients in the paediatric setting, and the likelihood that the majority are likely to be completely or partially immunised, onward transmission within the healthcare setting is unlikely. Therefore chemoprophylaxis for exposed older children in the healthcare setting is not routinely recommended.

The evidence of benefits of chemoprophylaxis is limited to close prolonged household type contact, evidence of effectiveness is limited outside of these settings (4). The primary accelerated infant vaccination schedule in the UK is highly effective in preventing severe complications in infants and young children (27). The current schedule (primary schedule plus preschool booster) is thought to provide protection in children until at least 10 years of age (27). Although the duration of protection from boosters administered in adolescence and adulthood has not been clearly established, post exposure vaccination has the potential to provide longer term protection against current and future exposures. The use of pertussis booster vaccination in a hospital

outbreak in the USA demonstrated rapid antibody responses and the potential to reduce susceptibility of the population within 1-2 weeks (5).

In light of the above evidence, these guidelines restrict the use of wider chemoprophylaxis and vaccination to healthcare settings where the risks from pertussis transmission are highest i.e. settings involving infants and pregnant women. In all other healthcare settings, case management and provision of information and advice to contacts with significant exposure to seek health advice if they develop symptoms are recommended. Chemoprophylaxis and post exposure vaccination is NOT recommended in healthcare settings where pregnant women or infants are not involved.

The two main scenarios considered here are:

1. The index case in a HCW
2. The index case is a hospitalised patient.

The following pages go through the risk assessment and management of cases and contacts for each of these scenarios. These are summarised in flow charts in Appendix 1 and 2. It is advised that the flow charts be read in conjunction with the full guidelines. Sample letters for HCW and patient contacts are included in Appendix 3.

Part 3: Definitions

3.1 Case definitions

Suspected case of pertussis:

- any person in whom a clinician suspects pertussis infection **or**
- any person 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

AND

- absence of laboratory confirmation
- no epidemiological link to a laboratory confirmed case.

Confirmed case of pertussis:

- Any person with signs and symptoms consistent with pertussis with:-
  - *B. pertussis* isolated from a respiratory sample (typically an NPA or NPS/PNS (or throat swab) **or**
  - anti-pertussis toxin IgG titre >70 IU/ml from a serum or >70 aU from an OF specimen (19) (in the absence of vaccination within the past year[3]) **or**
  - *B. pertussis* or *Bordetella spp*. Polymerase Chain Reaction (PCR) positive in a respiratory clinical specimen.

Epidemiologically linked case of pertussis:

- a suspected case with signs and symptoms consistent with pertussis, but no laboratory confirmation, who was in contact with a laboratory confirmed case of pertussis in the 21 days before the onset of symptoms.

3.2 Priority groups for public health action

Priority groups for consideration of prophylaxis in healthcare settings are as below, based on current PHE guidelines on the public health management of pertussis (2).

[3] This is currently under review and will be modified as more data is available.

Group 1: Groups at increased risk of severe or complicated pertussis ('vulnerable')

- unimmunised infants (born ≤32 weeks) less than 2 months of age regardless of maternal vaccine status OR
- unimmunised infants (born >32 weeks) less than 2 months of age whose mothers did not receive maternal pertussis vaccine after 16 weeks and at least 2 weeks before delivery OR
- infants aged 2 months or over who are unimmunised or partially immunised (less than three doses of DTaP/IPV/Hib up to 1 year of age) regardless of maternal vaccine status.

Group 2: Groups at increased risk of transmitting pertussis to those at risk of severe or complicated infection (Group 1), who have not received a booster dose of pertussis vaccine more than 1 week and less than 5 years ago

- pregnant women (>32 weeks gestation)
- healthcare staff working with infants or pregnant women.

3.3 Infectious period

A case is considered infectious 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.

Chemoprophylaxis/vaccination should therefore be considered for contacts in priority groups with significant exposure if **BOTH** these conditions are met:

- Exposure occurred during infectious period
- Prophylaxis can be offered within 21 days of last exposure (incubation period)

3.4 Significant exposure in a healthcare setting

Unprotected[4] direct face-to-face contact (< 2 metre distance) for greater than a cumulative period of 1 hour with an infectious case

OR

[4] Unprotected exposure refers to exposure in absence of appropriate PPE. Appropriate PPE for respiratory infections transmitted by droplet route includes surgical mask and use of gloves and apron if appropriate (29,30).

Direct contact with respiratory secretions from an infectious case e.g. performing aerosol-generating procedures or examination of the nose and throat without appropriate personal protective equipment (PPE).

The 2 metres (6.5 feet) distance is based on the evidence that coughing can result in dispersal of droplets up to a distance of 2 metres (section 2.2). The 1 hour cut-off is arbitrary, based on the lower risk to transient contacts, and is consistent with other international guidelines (28). However the time/distance criteria should be used as a guide and a lower threshold may be considered in some circumstances. For example where an infected HCW has provided direct clinical care to hospitalised infants (unimmunised/partially immunised), prophylaxis may be offered to these infants even when the duration of contact is less than 1 hour. Such circumstances should be discussed with the local HPT.

Part 4: Case Management

Public health action should proceed on all clinically suspected, epidemiologically linked and laboratory confirmed cases of pertussis. Public health action should not be delayed until the results of laboratory testing are available. For details of case management, refer to the current PHE guidelines (2).

4.1 Exclusion

If the case is a HCW, they should be excluded from work as soon as a diagnosis of pertussis is suspected, until 48 hours of appropriate antibiotic treatment is completed or for 21 days from onset if not treated. If the case is a hospitalised patient, they should be placed in respiratory isolation until 48 hours of treatment is completed or for 21 days from onset if not treated. HCWs looking after patients with pertussis should wear appropriate PPE (29,30).

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4.2 Laboratory confirmation and public health action

The choice of testing method will depend on the age of the case and their duration of symptoms. For detailed information on the appropriate methods for confirming suspected cases, please refer to the current PHE guidelines (2). For further advice, please contact the RVPBRU, PHE Colindale on 020 8327 7327. Please note that the sensitivity and specificity of these tests are not 100%. Therefore negative results cannot be used to exclude pertussis infection. Public health action should proceed based on a risk assessment of the clinical and epidemiological factors (based on the case definitions stated in section 3.1).

4.3 Treatment

Antibiotic therapy should be instituted according to current PHE guidelines (2).

If a woman has confirmed or suspected pertussis during pregnancy she should still be offered the pertussis vaccine as not all women may make sufficiently high levels of antibodies following natural infection that can be passed across the placenta to protect the infant from birth.

4.4 Notification

As a notifiable disease, all cases of pertussis should be reported to the local HPT. Cases associated with a healthcare setting should also be reported to the relevant infection prevention and control team (IPCT) and for HCWs, to occupational health (OH)

even if it is too late for prophylaxis. This will heighten awareness and enable the IPCT and OH to detect and manage any further cases early.

4.5 Management of household contacts

Identification and management of household contacts should proceed according to current PHE guidelines (2) and will be undertaken by the local HPT. Household contacts who have symptoms suggestive of pertussis should be advised to seek medical attention and to avoid visiting the case in hospital until they have been assessed and managed appropriately.

Part 5: Clinical Scenarios

5.1 Scenario 1, Single case in a Healthcare Worker

(Clinically suspected /epidemiologically linked or laboratory confirmed)[5]

5.1.1 Background

Inform the relevant IPCT and OH department, and ensure the local HPT are aware. The IPCT and/or OH will be responsible for case finding and passive surveillance for early detection of any further cases. The IPCT and OH should be informed even if it is beyond 21 days of exposure and too late for post exposure prophylaxis.

The priority is case finding and therefore in these circumstances a less specific case definition should be used; a low threshold is recommended for referral of symptomatic contacts to a clinician for assessment, and for reporting to the IPCT.

5.1.2 Risk assessment

i. Does the HCW provide care to priority group patients, i.e. pregnant women or infants?
ii. Has the HCW worked during the infectious period?
iii. Can action be taken for contacts (as defined below in section 5.1.3) within 21 days of exposure to the HCW case?

If yes to all of the above, then the need for wider chemoprophylaxis and vaccination should be considered. If not then inform and advise contacts with significant exposure to seek medical attention if they develop symptoms suggestive of pertussis (Appendix 3). HCW contacts who develop symptoms should also inform OH.

Identification of contacts in priority groups with significant exposure in the healthcare setting and provision of information to contacts identified in order to facilitate early diagnosis should be carried out even if it is too late for chemoprophylaxis.

5.1.3 Identification of contacts in the healthcare setting for post-exposure prophylaxis

HCW contacts

HCWs who had greater than 1 hour of cumulative contact at a distance of less than 2 metres (6.5 feet) with the affected HCW whilst infectious **AND** who will be working with

[5] See Appendix 1 for flow chart, to be read in conjunction with the text in this document

infants and/or pregnant women providing direct clinical care in the subsequent 3 weeks need to be identified.

Patient contacts

Patients exposed to the affected HCW during the infectious period should be identified from the priority groups defined in Section 1.3 with significant exposure to the index case (<2 metre/>1 hour).

Post exposure prophylaxis should be offered to those identified as recommended in section 6. Any other contacts identified that had significant exposure (1 hour) but are not in priority groups (as defined in Section 3), do not require prophylaxis. They should be informed and advised to seek early medical attention if they develop symptoms suggestive of pertussis (see Appendix 3).

5.2 Scenario 2, Single case in a hospitalised patient

(Clinically suspected /epidemiologically linked or laboratory confirmed)[6]

5.2.1 Case finding and surveillance

Inform the relevant IPCT and OH department, and ensure the HPT are aware. The IPCT and/or OH will be responsible for case finding and surveillance for early detection of any further cases.

The priority is case finding and therefore in these circumstances a less specific case definition should be used; a low threshold is recommended for referral of symptomatic contacts to a clinician for assessment, and for reporting to the IPCT.

5.2.2 Risk assessment

i. Can action be taken within 21 days of exposure?
ii. Is there a possibility that infants, pregnant women (>32 weeks gestation) or HCWs working with either of these two groups have had significant exposure during the infectious period? (i.e. a period when respiratory isolation has not been implemented).

If yes to both of the above, then the need for wider chemoprophylaxis and vaccination should be considered. If not then inform and advise contacts with significant exposure to seek early medical attention if they develop symptoms suggestive of pertussis. HCW contacts who develop symptoms should also inform OH.

[6] See Appendix 1 for flow chart, to be read in conjunction with the text in this document

Identification of contacts in priority groups with significant exposure in the healthcare setting and provision of information to contacts identified in order to enable early diagnosis should be carried out even if it is too late for post-exposure prophylaxis.

5.2.3 Identification of contacts in the healthcare setting for post-exposure prophylaxis

Significant exposure to other patients or staff will not occur where a case has been in respiratory isolation from the time of admission and in these circumstances no postexposure prophylaxis is required.

HCW contacts

HCWs with significant exposure (<2 metre/>1 hour) to the affected patient whilst infectious without wearing appropriate PPE AND who will be working with infants and/or pregnant women providing direct clinical care in the subsequent 3 weeks need to be identified.

Patient contacts

Patients who had exposure to the index case during the infectious period should be identified from the vulnerable groups defined in section 1.3 with significant exposure to the index case (<2 metre/>1 hour).

5.3 Special Settings

(Neonatal Intensive Care Unit (NICU)/Special Care Baby Unit (SCBU) Paediatric Intensive Care Unit (ITU)/ High Dependency Unit (HDU) settings)

For a child admitted to NICU/ SCBU/Paediatric HDU or ITU with pertussis, a risk assessment needs to be undertaken to determine the need for wider prophylaxis. This will include identifying whether the case was ventilated, if this was a closed or open circuit and whether there is a possibility of breaks in the ventilatory circuit leading to exposure risk. If in doubt, contact the local HPT for assistance in risk assessment.

If a risk is deemed to exist, given the vulnerability of the patient population, prophylaxis is recommended for infants specified in the vulnerable group defined in section 1.3 within the same bay as the case (regardless of the time/duration of exposure).

Chemoprophylaxis and/or vaccination should be offered to those identified as recommended in section 6. Any other contacts identified that had significant

exposure (<2 metre/>1 hour) but are not in priority groups (as defined in section 3), do not need prophylaxis. They should be informed and advised to seek early medical advice if symptoms appear.

There may also be complex questions arising from exposures in the NICU setting given the vulnerability of the patient population and nature of HCW contacts. A range of additional considerations may include the role of chemoprophylaxis for new admissions and the scheduling of the first dose of vaccines for infants on NICU. For further advice, please discuss with colleagues in the Immunisation, Hepatitis and Blood Safety Department (IHBSD), PHE Colindale (020 8200 4400).

Household contacts of cases who have symptoms suggestive of pertussis should be advised to seek medical attention and to avoid visiting the case in hospital until they have been assessed and managed appropriately. Risk assessment may also be required around the exposure of HCWs and patients to a symptomatic household contact who may have spent a considerable period in a high risk setting whilst themselves infectious (15).

5.4 Non-healthcare settings

The definition of a significant exposure stated in these guidelines (<2 metre/>1 hour) should only be applied for settings where healthcare staff are providing clinical care to patients. In potential exposures outside of the home and healthcare environments, such as in antenatal classes, judgement should be used as to the likelihood of significant exposure risk, but wider prophylaxis is generally not recommended in other settings.

Part 6: Chemoprophylaxis and vaccination

6.1 Chemoprophylaxis

Chemoprophylaxis should be offered (based on recommendations in current PHE guidelines (2) to contacts identified with significant exposure in the following groups:

- vulnerable infants as defined in section 1.3 admitted to the same bay should be offered prophylaxis
- pregnant women (>32 weeks gestation) who have not received a booster dose of pertussis-containing vaccine more than 1 week and less than 5 years ago, with significant exposure to the index case (<2 metre/>1 hour)
- HCW contacts who have not received a booster dose of pertussis-containing vaccine more than 1 week and less than 5 years ago.

6.2 Vaccination

Immunisation should be considered for those who have been offered chemoprophylaxis:

- unimmunised and partially immunised infants should complete the infant schedule with the appropriate vaccine
- a booster dose of pertussis containing vaccine is recommended for pregnant women (> 32 weeks gestation) and HCW contacts who have not received a dose of pertussis containing vaccine in the preceding 5 years and no Td-IPV in the preceding month.

Chemoprophylaxis is not recommended for fully immunised infants (who have received 3 doses of pertussis-containing vaccine).

Vaccine for outbreaks should be sourced directly from the manufacturers (Repevax®, Sanofi Pasteur MSD Limited, and Boostrix®-IPV, GlaxoSmithKline UK). Where vaccine cannot be directly supplied please contact the national immunisation team for further advice.

Part 7: Surveillance

OH and the relevant IPCT should be informed of any cases of pertussis occurring in healthcare settings. All contacts identified with significant exposure should be informed and advised of symptoms to enable early detection of illness. The IPCT/OH will need to undertake passive surveillance amongst staff and patients to ensure early detection and management of any further cases. This would normally be for a period of 42 days (two incubation periods) from onset of symptoms in the index case.

Note: Although chemoprophylaxis is likely to be more effective when implemented early, it is not 100% effective. Vaccination does not provide 100% protection against infection;
immunity takes 1-2 weeks to develop and is known to wane over time. Therefore a diagnosis of pertussis should still be considered in an exposed individual who develops signs and symptoms compatible with pertussis, despite receiving chemoprophylaxis and despite previous vaccination.

If further clinically suspected cases arise during the surveillance period (42 days from onset of index case), testing should be discussed with the Respiratory and Vaccine Preventable Bacteria Reference Unit (RVPBRU), PHE Colindale (020 8327 7887) [7]. However, public health action including exclusion and treatment of cases should proceed based on clinical diagnosis.

[7] **Laboratory Confirmation and Public Health action**
Appropriate Public Health action should not wait for laboratory results as negative results cannot be used to exclude pertussis infection. At the request of the HPT, the Bordetella Reference Laboratory will prioritise testing for evidence of *B. pertussis infection* in support of outbreaks or incident investigations as appropriate. However, please note these services are not available outside of regular working hours. Please contact RVPBRU on 0208 327 7327 and discuss with senior staff prior to sending specimens

Part 8: Two or more epidemiologically linked cases of pertussis in a healthcare setting

If two or more confirmed or epidemiologically linked cases of pertussis occur in a healthcare setting, an outbreak control team should be convened. An appropriate outbreak control team is likely to include:

- Director of Infection Prevention and Control
- Hospital Microbiologist (if different)
- Infection control nurse
- Consultant/s from relevant clinical specialties
- Occupational health physician / nurse
- HPT representative
- Screening and Immunisation team representative
- Communications

Outbreak Control Team (OCT) risk assessment should consider the following:

i. Are any of the cases confirmed?
ii. Is transmission likely to have occurred in the healthcare setting or in the community?
iii. Is the transmission from HCW to HCW/HCW to patient/or patient to HCW?
iv. What was the nature of contact between the cases?
v. Is there a risk of ongoing transmission in the setting?

Attempts should be made to confirm diagnosis following discussion with the Respiratory and Vaccine Preventable Bacteria Reference Unit (RVPBRU), PHE Colindale (020 8327 7827) [8].

If transmission is most likely to have occurred within the healthcare setting, then in addition to the actions taken as per algorithms for single cases, consideration should be given to offering vaccination more widely.

Active surveillance will need to be in place to detect new cases early to enable quick

[8] **Laboratory Confirmation and Public Health action**
Appropriate Public Health action should not wait for laboratory results as negative results cannot be used to exclude pertussis infection. At the request of the HPT, the Bordetella Reference Laboratory will prioritise testing for evidence of *B. pertussis infection* in support of outbreaks or incident investigations as appropriate. However, please note these services are not available outside of regular working hours. Please contact RVPBRU on 0208 327 7327 and discuss with senior staff prior to sending specimens

diagnosis, exclusion or isolation and treatment. The priority is active case finding and therefore in these circumstances a less specific case definition should be used to ensure no cases are missed.

Expert advice on outbreak investigation and response is available from the Immunisation, Hepatitis and Blood Safety Department (IHBSD), PHE Colindale (020 8200 4400) and on laboratory investigation from the Respiratory and Vaccine Preventable Bacteria Reference Unit (RVPBRU), PHE Colindale (020 8327 7887).

Acknowledgements

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Norman Fry, head and clinical scientist, Vaccine Preventable Bacteria Section; deputy head, RVPBRU, Reference Microbiology Services, PHE Colindale
Paul Heath, professor in paediatric infectious diseases, honorary consultant, St. George's Hospital, London
David Jenkins, consultant medical microbiologist and lead infection control doctor, University Hospitals of Leicester NHS Trust, British Infection Association
Lesley McFarlane, health protection practitioner, East Midlands South HPT
Giri Shankar, consultant in communicable disease control, Norfolk, Suffolk and Cambridgeshire HPT
Elizabeth Sheridan, consultant microbiologist and head of HCAI and AMR, PHE Colindale
Kathy Wakefield, health protection/infection prevention manager and immunisation lead, Rotherham Public Health, Infection Prevention Society
William Wolfare, consultant in communicable disease control, PHE Manchester

The following individuals provided specialist advice:
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Rachel Heathcock, consultant in communicable disease control, South East London HPT
Gillian Marsh, senior health protection nurse practitioner, Cheshire and Merseyside PHE Centre
William Newsholme, consultant in infectious diseases and lead infection control doctor, Guy's & St Thomas' NHS Foundation Trust

Abbreviations

DTaP/IPV	Diphtheria/tetanus/acellular pertussis/inactivated polio vaccine
GP	General Practitioner
HPA	Health Protection Agency
HPT	Health Protection Team
IHBSD	Immunisation, Hepatitis and Blood Safety department
IPCT	Infection Prevention and Control Team
JCVI	Joint Committee on Vaccination and Immunisation
NHS	National Health Service
NPA	Nasopharyngeal aspirate
NPS	Nasopharyngeal swab
OF	Oral fluid
OH	Occupational Health
PCR	Polymerase chain reaction
PHE	Public Health England
PNS	Pernasal swab
RVPBRU	Respiratory and Vaccine Preventable Bacteria Reference Unit
Td/IPV	Tetanus/low dose diphtheria/inactivated polio vaccine
Tdap	Tetanus, diphtheria and pertussis
UK	United Kingdom

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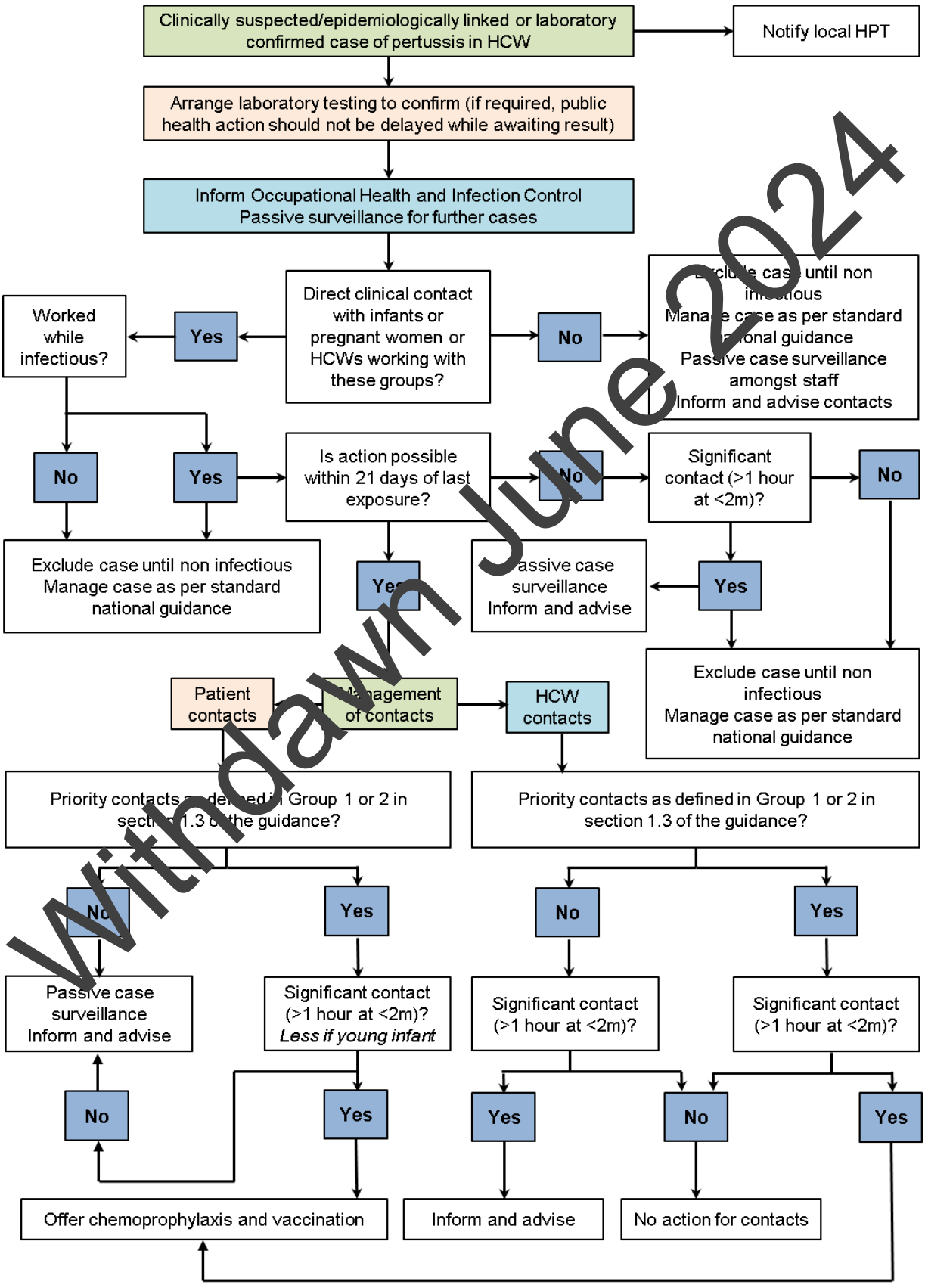
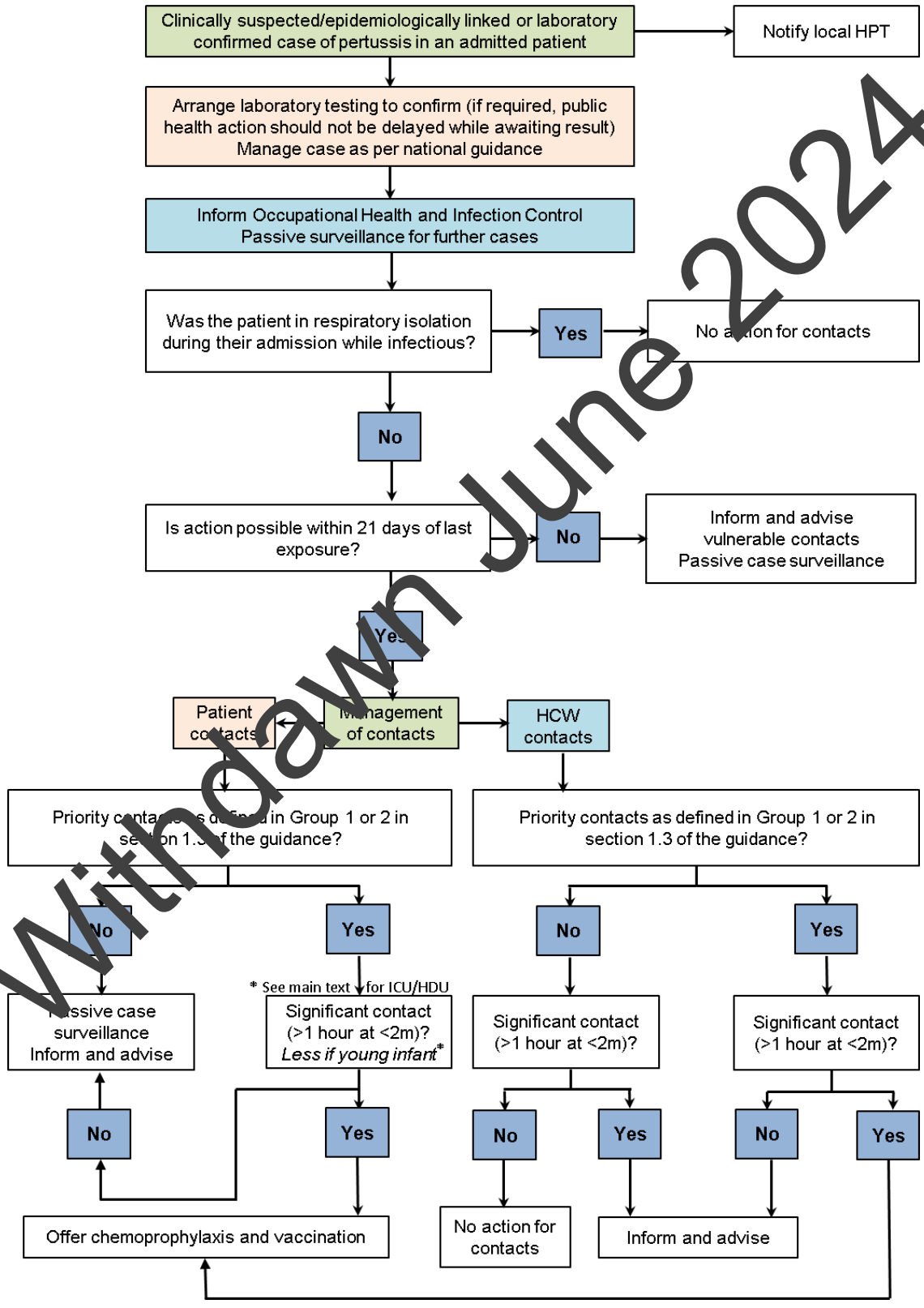
Appendix 1: Flow chart for HCW index case



Appendix 2: Flow chart for hospitalised patient index case



Appendix 3: Letters for contacts

A3.1 Letter for parents/guardians whose child has been in contact with a case and does not require chemoprophylaxis

Dear Parent/Guardian,

Your child has been identified as a contact of a case of whooping cough (pertussis) at XXX hospital/centre/practice.

Whooping cough is a lung infection caused by Bordetella pertussis bacteria. Whooping cough usually begins like a common cold with a runny nose, low fever, sneezing and mild occasional coughing. Over the next one to two weeks, this progresses to fits of coughing which may be followed by choking and/or vomiting. The cough often comes in short bursts followed by a gasp for air (when the characteristic whooping noise may be made) and the feeling of not being able to catch your breath. Whooping cough doesn't always cause the typical whoop or vomiting after coughing.

As your child has been in contact with a case, there is a small possibility that your child may develop whooping cough.

If your child is well and has been fully immunised/ is over 1 year old (DELETE AS APPROPRIATE), the risk from the recent contact is low and, we would not recommend antibiotics at this stage based on the national guidance. Please check that their immunisations are up to date (if unsure, check in their red book or with your GP or health visitor).

If your child is unwell or develops a cough illness in the next 3 weeks, please contact your general practitioner. They will arrange appropriate testing for whooping cough and management.

Further information on pertussis is available from:

http://www.nhs.uk/Conditions/Whooping-cough/Pages/Introduction.aspx
or
https://www.gov.uk/government/collections/pertussis-guidance-data-and-analysis

Yours faithfully,

XXX

A3.2 Letter for parents/guardians whose infant has been in contact with a case and requires immunisation/chemoprophylaxis

Dear Parent/Guardian,

Your child has been identified as a contact of a case of whooping cough (pertussis) at XXX hospital/centre/practice.

Whooping cough is a lung infection caused by Bordetella pertussis bacteria. Whooping cough usually begins like a common cold with a runny nose, low fever, sneezing and mild occasional coughing. Over the next one to two weeks, this progresses to fits of coughing which may be followed by choking and/or vomiting. The cough often comes in short bursts followed by a gasp for air (when the characteristic whooping noise may be made) and the feeling of not being able to catch your breath. Whooping cough doesn't always cause the typical whoop or vomiting after coughing.

As your child has been in contact with a case, there is a possibility that your child may develop whooping cough.

To reduce the risk, we recommend that your child has a short course of antibiotics. Your child should attend for their routine immunisations as usual as the vaccines offer long term protection for your child against whooping cough. If your child is over 4 months and has not received 3 doses of a pertussis containing vaccine (the normal schedule includes pertussis vaccines at 2, 3 and 4 months), we will arrange for your child to complete this schedule/ please contact your GP or health visitor. ADD DETAILS OF ARRANGEMENTS.

If your child is unwell or develops a cough illness in the next 3 weeks, please contact your general practitioner. They will arrange appropriate testing for pertussis and management.

Further information on pertussis is available from:

http://www.nhs.uk/Conditions/Whooping-cough/Pages/Introduction.aspx
or
https://www.gov.uk/government/collections/pertussis-guidance-data-and-analysis

Yours faithfully,

XXX

A3.3 Letter for HCWs that have been in contact with a case but do not require immunisation/chemoprophylaxis

Dear,

You have been identified as a contact of a case of whooping cough (pertussis). Although the risk that you will develop whooping cough is low, we are writing to you to provide information about whooping cough and what you should do in the unlikely event that you develop symptoms.

Whooping cough is a respiratory infection caused by Bordetella pertussis bacteria. Whooping cough usually begins like a common cold with a runny nose, low fever, sneezing and mild occasional coughing. Over the next one to two weeks, this progresses to fits of coughing which may be followed by choking and/or vomiting. The cough often comes in short bursts (paroxysms) followed by a gasp for air (when the characteristic whooping noise may be made) and the feeling of not being able to catch your breath. Whooping cough doesn't always cause the typical whoop or vomiting after coughing.

Whooping cough most commonly affects infants and is most serious in this group. Whooping cough does, however, also occur in older children, adolescents and adults. Across the UK, the number of cases of whooping cough in these older age groups is currently high.

If a healthcare worker develops whooping cough, they may transmit whooping cough to vulnerable patients, particularly young children and pregnant women.

In line with national guidance, antibiotics and immunisation is being offered to those with close contact with the case and who are due to work with children or pregnant women in the next 3 weeks. Based on the information available to us, you are not part of this group and thus do not require antibiotics or immunisation as a result of the recent contact.

If you develop a cough illness in the next 3 weeks, please contact occupational health on XXXXXXXXXX to ensure appropriate testing for whooping cough and management.

Further information on pertussis is available from:

http://www.nhs.uk/Conditions/Whooping-cough/Pages/Introduction.aspx
or
https://www.gov.uk/government/collections/pertussis-guidance-data-and-analysis

Yours faithfully,

XXX

A3.4 Letter for HCWs that have been in contact with a case and require immunisation/chemoprophylaxis

Dear,

You have been identified as a contact of a case of whooping cough (pertussis). Although the risk that you will develop whooping cough is low, we are writing to provide you with information about the infection and how you can protect yourself and your patients.

Whooping cough is a respiratory infection caused by Bordetella pertussis bacteria. Whooping cough usually begins like a common cold with a runny nose, low fever, sneezing and mild occasional coughing. Over the next one to two weeks, this progresses to fits of coughing which may be followed by choking and/or vomiting. The cough often comes in short bursts (paroxysms) followed by a gasp for air (when the characteristic whooping noise may be made) and the feeling of not being able to catch your breath. Whooping cough doesn't always cause the typical whoop or vomiting after coughing.

Whooping cough most commonly affects infants and is most serious in this group. Whooping cough does, however, also occur in older children, adolescents and adults. Across the UK, the number of cases of whooping cough in these older age groups is currently high.

If a healthcare worker develops whooping cough, they may transmit whooping cough to patients, particularly young children and pregnant women.

As you have been in close contact with a case and you are due to work with infants or pregnant women in the next 3 weeks, we recommend that you have a short course of antibiotics and a booster dose of vaccine (if you have not had a pertussis vaccine in the last 5 years) . ADD DETAILS OF ARRANGEMENTS.

If you develop a cough illness in the next 3 weeks, please contact occupational health on XXXXXXXXXXX to ensure appropriate testing for whooping cough and management.

Further information on pertussis is available from:

http://www.nhs.uk/Conditions/Whooping-cough/Pages/Introduction.aspx
or
https://www.gov.uk/government/collections/pertussis-guidance-data-and-analysis

Yours faithfully,

XXX