

The Newcastle upon Tyne Hospitals NHS Foundation Trust

Management and post exposure prophylaxis for Suspected Cases of Whooping Cough Policy

Effective: July 2009

Review: July 2012

1. Introduction

Bordetella pertussis (Whooping Cough) is a highly contagious human pathogen transmitted by the respiratory route through direct contact with respiratory secretions or large aerosol droplets (which would theoretically fall to the ground within a few metres). Up to 90% of susceptible household contacts acquire the disease.

There is a risk of transmission to any unimmunised contact and any immunised contact who is greater than 5 years from the last immunisation (e.g. all adults and any child over the age of 5). Infants and young children are frequently infected by older children and adults with mild or atypical illness.

Adults in particular may have mild symptoms, but any secondary case may still act as a source to further individuals. Infection in neonates and infants may be atypical and a high index of suspicion should be maintained so infection control procedures can be implemented.

Incubation is usually 7-10 days (range 6-20). The classic disease has three stages, catarrhal, paroxysmal cough and convalescent –with classic duration of 6-10 weeks. Disease in infants younger than 6 months is usually atypical with apnoea as the most common manifestation.

Pertussis is a serious infection with high mortality in neonates and infants (1.3% in cases less than 1 month of age) and significant morbidity in all children. Older children and adults have mild illness. Infectivity is highest in the first week of the illness (the coryzal phase) but continues for up to 21 days. Infectivity continues for the first 5 days of macrolide treatment.

Full immunisation is initially effective, but immunity is not long lived, and after 5 years there is a risk of infection which may be mild, but may be a source of transmission to others. Therefore all staff (parents and visitors) are at risk of acquisition and subsequent transmission.

In the health care setting infection control procedures are necessary to prevent:

- secondary cases in exposed vulnerable patients and
- acquisition by staff who may then further transmit pertussis to at risk patients (or personal household members)

Asymptomatic carriage does occur, but is not thought to be a source of transmission.

1.1 Diagnosis

Routine diagnosis is by culture on special media, but this is insensitive and slow. The majority of neonatal and infant cases are not confirmed (only 2 of 17 in the PHLS study). Polymerase chain reaction of NPAs or pernasal swabs is more rapid and sensitive. However, specimens have to be posted to London and the diagnostic service is only available on weekdays.

2. Outbreaks and hospital transmission

2.1 Large numbers of staff acquisitions and outbreaks in health institutions have been reported. Staff have been shown to act as vectors for additional nosocomial cases and to family members, etc. For example, an ECMO therapist acquired pertussis (Toronto) while putting child on ECMO and staying during one 12-hour shift.

2.2 Transmission and outbreaks result from:

- Failure to recognise and isolate infected infants and children
- Failure to recognise and treat cases in staff
- Failure to institute control measures rapidly .

2.3 Prophylaxis to prevent secondary acquisition and subsequent transmission to vulnerable individuals:

- Erythromycin prophylaxis has been proposed as a means of preventing the acquisition of pertussis in exposed individuals in the household. A number of individual studies have shown benefit (less than the protection conferred by vaccine) to those having prolonged 'household' type contact and concluded that infants and neonates would be most likely to benefit. Small studies have shown both azithromycin and clarithromycin prophylaxis to also be effective. Adults usually have mild illness and should be considered for prophylaxis in situations where they will come into contact with (i.e. put at risk) vulnerable neonates and unimmunised infants.

Specific side effects may occur in infants less than 6 weeks of age where an association between orally administered erythromycin and infantile hypertrophic pyloric stenosis has been reported. Azithromycin is therefore a recommended alternative by CDC and Neonatal Formulary.

3. The Risk of Transmission can be reduced by these control measures:

3.1. Isolation. All confirmed and suspected cases should be managed in respiratory isolation if possible (this may not be possible when ECMO is needed), for the first 21 days of the illness or until 5 days of erythromycin treatment has been completed.

3.2. Respiratory protection. High efficiency masks should be worn by staff during close contact, i.e. during suctioning, intubation and bronchial lavage.

3.3. Antibiotic treatment/prophylaxis should be:

- Given to index cases, parents (if attending hospital or in contact with other at-risk individuals) and high risk siblings (e.g: under 4 months old, unvaccinated, immune deficiency, respiratory disease)
- Offered to staff who have had significant exposure and will be working with other vulnerable individuals in the period between 7 days from the first contact to 14 days after the last.
- Offered to other exposed patients who shared a hospital room overnight or are within 2-3 meters on CICU/PICU. Risk of pyloric stenosis must be discussed.

3.4 Exposed staff should be monitored. Between 7 days from first contact to 14 days from last possible contact, staff with respiratory symptoms should report to Occupational Health, be excluded from work, commenced on clarithromycin and submit a pernasal swab. They should remain off work until shown to be non-infected, or to have completed 5 days antibiotic.

- Index cases are infectious within the first 21 days of the illness or until 5 days of erythromycin/macrolide therapy has been completed
- Spread is by respiratory droplets transmitted during close contact. Unprotected exposure to respiratory droplets should be avoided.
- Antibiotic prophylaxis may prevent secondary cases. It should be given to the index case, their parents (as they are often the source) and high risk siblings and offered to exposed inpatients and staff. Please contact the CCDC to arrange treatment of household contacts, and Occupational Health for staff.
- Exposed individuals should be aware of the exposure and monitored for respiratory symptoms. Infection in adults are usually mild, but infected individuals are still infectious and should not work. Incubation is usually 7-10 days (range 6-20).

4. Drug dose^{5,7}

For treatment:

- Erythromycin 40-50mg/Kg per day in 4 divided doses for 14 days.
Alternatives:
- Clarithromycin 500mg 12 hourly for 7 days
- Azithromycin 500mg day 1, then 250mg daily from day 2-5

For prophylaxis:

Patients:

- Erythromycin 250mg 4 times a day for 14 days.
 - Clarithromycin 500mg 12 hourly for 7 days
 - Azithromycin 500mg day 1, then 250mg daily from day 2-5
- Staff
- Owing to the high incidence (30%) of adverse effect associated with erythromycin, we recommend Clarithromycin 500mg 12 hourly for 7 days

For patients and staff unable to take macrolides, cotrimoxazole for 14 days may be considered as an alternative.

See *Childrens BNF for Paediatric dosing*.

5. What constitutes a significant contact?

- Household members
- Others sleeping in the same institution e.g. within the same room/bay
- Significant occupational exposure (defined below)

6. High-risk occupational exposure has been defined in a number of ways:

- Unprotected intensive (i.e. close, face to face) contact with a patient who has a clinical syndrome highly suggestive of pertussis³
- Performing a complete examination, suctioning, intubation, bronchoscopy; without wearing a respiratory protective device¹
- Unmasked direct contact with respiratory secretions or large aerosol droplets inhalation from infected persons⁴
- Face to face contact for 10 minutes with patient coughing e.g. examining, suctioning, intubating or patient care for extended period e.g. 12 hour shift²
- Close contact: institutions with overnight stays e.g. hospital ward⁶

For NUTH Trust it has been decided currently to define close contact for staff as:

- Those staff having unprotected contact with respiratory droplets through actions such as suctioning, intubation or bronchial lavage.

7. Immunisation

Pertussis vaccination is effective but immunity is not long lived. Booster vaccinations have been shown to increase immunity. However, vaccine is only available as a combined vaccine with diphtheria and tetanus and therefore has an appreciable incidence of side effects in adults. While there is no single

component acellular pertussis vaccine available, immunisation is not available as an infective control strategy.

8. Face masks

Respiratory protective face masks are recommended for the prevention of acquisition. Some policies required exposed individuals to wear similar face masks when contacting patients, until they have completed 5 days of prophylaxis, and continuously at work for 14 days if they don't take prophylaxis.

9. Monitoring

Infection Prevention and Control will monitor the policy in conjunction with Occupational Health Services (for staff) on a case by case basis and will address any issues not currently applied with and will monitor until patient / staff discharge.

As a Notifiable Disease statutory documentation would also be completed by the Consultant in Charge as and when informed by microbiology.

Policy Author. Consultant Microbiologist

References

1. Management of Healthcare Workers Exposed to Pertussis. D J Weber, W A Rutala. Infection Control and Hospital Epidemiology 1994: 15; 411-415
2. Nosocomial Acquisition of Pertussis Diagnosed by PCR Infection Control and Hospital Epidemiology 1997: 18; 715-716 (A therapist who put the child on ECMO and spent one 12-hour shift with the child developed symptomatic pertussis diagnosed by PCR. 46 staff given chemoprophylaxis defined close contact as: Face to face for 10 minutes with patient coughing e.g. examining, suctioning, intubating, patient care for extended period e.g. 12 hour shift)
3. CDC Personnel Health Guidelines American Journal of Infection Control 1998: 26; 289-354 (CDC guidelines HICPAC no role for whole cell vaccine; acellular vaccine – no recommendation chemoprophylaxis should be offered to all close contacts (who are > 5 years from immunisation). Symptomatic personnel excluded from patient care until 5 days after start of appropriate treatment)
4. Standardised Management of Patients and Employees Exposed to Pertussis D J Haiduven et al. Infection Control and Hospital Epidemiology 1998: 19; 861-864 (Strict guidelines with enforced prophylaxis, and wearing of masks; exclusion from work if refuse)
5. 2006. The Red Book. Report of the Committee on Infectious Diseases American Academy of Pediatrics (Recommends azithromycin, clarithromycin, erythromycin as first line therapy. Same agents and doses for treatment and prophylaxis.)

6. Dodhia, H.; Crowcroft, N. S.; Bramley, J. C.; Miller, E. UK guidelines for use of erythromycin chemoprophylaxis in persons exposed to pertussis.
Journal of Public Health Medicine. 24(3):200-206, September 2002..
(Recommends prophylaxis for vulnerable individuals and close contacts who will contact vulnerable individuals [although does not address healthcare workers specifically])
7. Estimating the burden of Bordetella pertussis presenting to PICUs and wards in London to inform vaccination policy in the United Kingdom. Nov 1998 – Nov 2000 Final report prepared by Dr N S Crowcroft, Immunisation Division, CDSC, PHLS. Aug 2001 (Infants < 5 months with respiratory failure; apnoea or bradycardia; near miss SIDS; resp insufficiency requiring admission to PICU but excluding persistent pulmonary hypertension of the new-born, meconium aspiration, hyaline membrane disease and resp failure due to a known structural problem. NPAs for culture, PCR and serology 127 recruited in PICU 17 pertussis (13%) of which only 7 were clinically suspected The parent was the source in 9 and another child in household was source in 6. Only 2 culture positive (mean duration of illness to taking specimens was 18 days) Some asymptomatic contacts were PCR or serology positive. Asymptomatic carriage therefore does not occur. Majority of cases admitted to ICUs are unsuspected and if the study had not been underway would not have been investigated or diagnosed)
8. MMWR December 9, 2005 / 54(RR14);1-16
http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5414a1.htm?s_cud=rr5414a1_e. Treatment and prophylaxis recommendations and tables.
9. Bamberger E, Sruogo I. What is new in Pertussis? Eur J Pediatr. 2008;167:133-139. Update on diagnosis, treatment and immunisation strategies including adult immunisation.

THE NEWCASTLE UPON TYNE HOSPITALS NHS FOUNDATION TRUST
IMPACT ASSESSMENT – SCREENING FORM A

This form must be completed and attached to any procedural document when submitted to the appropriate committee for consideration and approval.

Policy Title:	Management and post exposure prophylaxis for Suspected Cases of Whooping Cough Policy	Policy Author:	Consultant Microbiologist
		Yes/No?	You must provide evidence to support your response:
1.	Does the policy/guidance affect one group less or more favourably than another on the basis of:	NO	
	• Race	No	
	• Ethnic origins (including gypsies and travellers)	No	
	• Nationality	No	
	• Gender	No	
	• Culture	No	
	• Religion or belief	No	
	• Sexual orientation including lesbian, gay and bisexual people	No	
	• Age	No	
	• Disability – learning difficulties, physical disability, sensory impairment and mental health problems.	No	
2.	Is there any evidence that some groups are affected differently?	No	
3.	If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?	No	
4(a).	Is the impact of the policy/guidance likely to be negative? (If "yes", please answer sections 4(b) to 4(d)).	No	
4(b).	If so can the impact be avoided?		
4(c).	What alternatives are there to achieving the policy/guidance without the impact?		
4(d).	Can we reduce the impact by taking different action?		

Comments: This policy aims to limit spread of pertussis in the hospital environment and recommends prophylaxis to all with high risk exposure with no differentiation or selection.	Action Plan due (or Not Applicable):
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Name and Designation of Person responsible for completion of this form: Dr Julia Clark Date: ...02/07/09.....

Names & Designations of those involved in the impact assessment screening process: Consultant ID Physician (Paediatrics)

(If any reader of this procedural document identifies a potential discriminatory impact that has not been identified on this form, please refer to the Policy Author identified above, together with any suggestions for the actions required to avoid/reduce this impact.)

Page 1 of 7 For advice on answering the above questions please contact Helen Lamont, Director of Nursing, or, Christine Holland, Senior HR Manager. On completion this form must be forwarded electronically to Steven Stoker, Clinical Effectiveness Manager, (Ext. 24963) steven.stoker@nuth.nhs.uk together with the procedural document. If you have identified a potential discriminatory impact of this procedural document, please ensure that you arrange for a full consultation, with relevant stakeholders, to complete a Full Impact Assessment (Form B) and to develop an Action Plan to avoid/reduce this impact; both Form B and the Action Plan should also be sent electronically to Steven Stoker within six weeks of the completion of this form.