

Chapter 10 — Community Setting

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Community pertussis outbreak: when the number of reported cases is higher than what is expected on the basis of previous reports during a non-epidemic period for a given population in a defined time period.

BACKGROUND

Community-wide pertussis outbreaks are often reported during cyclical increases of pertussis every 3-4 years.¹ The occurrence of these outbreaks has been attributed to a variety of factors. Inadequate age-appropriate vaccination was cited as a contributing factor in many of the outbreaks. Among case-patients aged 7 months to 5-6 years with known vaccination status in 4 outbreaks, less than half had received 3 or more doses of DTP.²⁻⁵ In highly vaccinated populations, outbreaks can still occur since the pertussis vaccine is not 100% effective.⁶ Another factor cited was waning immunity, leading to a reservoir of susceptible adolescents and adults who may play a role in transmitting the infection to unimmunized children;⁷⁻⁹ in outbreaks in Michigan and Vermont, adolescents aged 10-19 years had the highest rate of disease.⁹⁻¹⁰ A case-control study in central Wisconsin found that known exposure to a person with pertussis-like illness outside the home was a significant risk factor, and adolescents were 3.2 times more likely than other non-infant age groups to have had such exposure.¹¹⁻¹²

In the U.S., from 1990-1993 the incidence of reported cases was 1.8 per 100,000 and from 1994-1996 it was 2.2 per 100,000.¹ During community outbreaks, the incidence of reported pertussis cases per 100,000 population varied from approximately 8 in Arizona and Chicago (over a 10-month period in 1988 and 1994, respectively) to 404 in Quincy, Illinois (4 months in 1990) (see **Table 10-1** and **Table 10-2**). The number of cases ranged from 72 in Del Rio, Texas in January-August 1985 to more than 350 in the 1983 Oklahoma and 1993 Cincinnati outbreaks. The age-specific incidence rate among infants aged <1 year ranged from 81 per 100,000 in Seattle-King County in 1999 to 1752 in Quincy, Illinois in 1990, compared with an incidence of approximately 50 per 100,000 for the U.S.¹ Although no deaths were reported in any of these documented outbreaks, many infants were hospitalized.

Religious or Philosophical Exemptions from Vaccinations

The lack of vaccination among children with philosophical or religious exemptions likely contributed to 4 pertussis outbreaks in Massachusetts (see **Table 10-3**), each outbreak lasted 2-3 months between 1986 and 1988.¹³ Among the pertussis case-patients, the percentage of those claiming exemptions from pertussis vaccination based on philosophy or religion was significantly greater than the percentage of those immunized (59% vs. 29%, 81% vs. 14%, 93% vs. 7%, 73% vs. 16%). In the two Amish community outbreaks in Delaware (1986) and Kentucky (1996), virtually all members of the community were

unvaccinated. The majority of the pertussis cases occurred among persons aged ≥ 5 years.¹⁴⁻¹⁶

DEFINITION OF OUTBREAK IN A COMMUNITY

A community-wide pertussis outbreak may be declared when the number of reported cases is higher than what is expected on the basis of previous reports during a non-epidemic period for a given population in a defined time period (i.e., historical disease patterns). A community may range from a greater metropolitan area to a group of counties or a larger region.

IDENTIFYING AND INVESTIGATING CASES AND CONTROLS

Given that pertussis is endemic with periodic epidemics every 3 to 4 years, public health officials will need to decide how to allocate limited resources to best control a community-wide outbreak. Additionally, public health officials should consider how best to protect those persons most at risk for severe disease, particularly infants aged <1 year. The epidemiology of the outbreak should be taken into consideration when determining what actions to take. State and local health departments may wish to consider:

1. Surveillance

- a. Consider pertussis in infants aged <1 year as a sentinel event or a marker of undetected disease in the community. Because pertussis can be a severe illness among infants, every case follow-up should include a specific inquiry about any contact with infants.
- b. Initiate active surveillance for pertussis by contacting physicians, health care workers and laboratories on a weekly basis (see **Chapter 6: General Guidelines for Pertussis Case Investigation and Surveillance**).
- c. Confirm the outbreak by positive nasopharyngeal culture results. Isolates should be retained for molecular epidemiologic studies.

2. Pertussis Alerts

- a. Alert health care providers of the outbreak and provide them with education on pertussis signs and symptoms, diagnosis, treatment and the importance of reporting suspected cases to public health authorities so that close contacts may receive prophylaxis and so that appropriate public health action may be undertaken. Emphasize the importance of protecting infants aged <1 year and encourage providers to recommend that parents keep infants away from individuals with a cough illness. Remind providers that very young infants may have a non-classical presentation (e.g., gagging or apnea) and that immunized children and adults also get pertussis. See **Appendix 10-1: Sample Letter to Local Medical Community Alerting**

Them to Pertussis Outbreak in the Community and Appendix 10-2: Sample Letter to Health Care Provider.

- b. Send periodic pertussis alerts, if necessary, to clinics, physician offices, hospitals (e.g., postpartum units), and emergency departments. Obstetricians, midwives and pediatricians may want to inquire about coughing illness in household contacts of women near term or in the households of infants.
- 3. Public Education**
- Employ the media, press conferences, bulletins, educational conferences and/or fact sheets to (see **Appendix 10-3: Sample Letter to Parent/Guardian for Pertussis in a School, Appendix 10-4: Sample News Release, and Appendix 10-5: Sample Fact Sheet**):
1. Inform the public, particularly parents with very young children, about the pertussis outbreak.
 2. Encourage the public to see a health care provider for evaluation of an unexplained acute cough illness, and to have children age-appropriately vaccinated with DTaP.
 3. Alert parents to keep infants aged <1 year, particularly those aged <6 months, away from persons with a cough illness.

CONTROL MEASURES

1. Treatment and Chemoprophylaxis

- a. **Cases.** Antimicrobial treatment should be initiated as soon as pertussis is suspected in a patient or a health care worker. The antimicrobial agent of choice is erythromycin. Initiating treatment ≥ 3 weeks after cough onset has limited benefit to the patient or contacts. However, treatment is recommended up to 6 weeks after cough onset in high-risk cases. For dosage and duration of therapy and further information, see **Chapter 3: Treatment and Chemoprophylaxis.**
- b. **Contacts.** If pertussis is highly suspected in a patient, chemoprophylaxis of all close contacts and high-risk contacts with erythromycin is recommended regardless of their age and vaccination status. Initiating chemoprophylaxis ≥ 3 weeks after exposure has limited benefit for the contacts. However, chemoprophylaxis should be considered for high-risk contacts up to 6 weeks after exposure. For more information, including information about chemoprophylaxis of neonates see **Chapter 3: Treatment and Chemoprophylaxis**

2. Vaccination

If logistically possible and deemed to be appropriate, based on the epidemiology of

the outbreak (e.g., many cases among infants), state or local health departments may wish to consider:

- c. Administering DTaP on an accelerated schedule, giving the 1st, 2nd and 3rd doses at 6, 10 and 14 weeks of age with a minimum interval of 4 weeks between doses (see **Chapter 4: Use of Pertussis Vaccines in Outbreaks**).
- b. Administering the 4th and 5th DTaP doses to children aged <7 years at minimum intervals:
 - giving the 4th dose immediately if the child has been exposed to pertussis and at least 6 months have elapsed since the 3rd dose, the child is ≥ 12 months of age, and
 - giving the 5th dose if the child is at least four of age and the child has received at least 4 doses of DTaP.

3. Isolation

- a. Symptomatic patients should refrain from public activities and the workplace for the first 5 days of a full course of antimicrobial treatment.
- b. Symptomatic persons who do not take antimicrobial treatment should refrain from public activities and the workplace for 21 days from onset of cough.

Table 10-1. Selected Characteristics of Community Outbreaks of Pertussis in the US, 1965-1996 (Published Reports)

Study Site	Period	Setting	Case Definition		Age Distribution			Hospitalizations		Percentage of Cases with ≥ 3 Doses of DTaP or n (%)
			Confirmed n (%)	Other n (%)	Age	n	Incid. per 10 ⁵	All Cases n (%)	Cases <7m old n (%)	
Kent County, Michigan (9)	Jan - Sept 1965	County	112 (57) positive culture	83 (43) clinical diagnosis	<1 y	15	161			
					1-4 y	29	79			
					5-9 y	28	66			
					10-19 y	84	139			
					20+ y	39	18			
					Overall	195	53.3			
Oklahoma (3)	1983	State	179 (51) positive culture and/or DFA test	35 (10) clinical diagnosis; 137 (39) cough ≥ 2 weeks & epi-link to a case	<1 y	121	81.8	77 (22)	(54)	67/138 (49) of cases aged 7 months to 6 years
					1-14 y	160	9.9			
					15+ y	70	2.9			
					Overall	351	11			
Seattle-King County, Washington (2)	Jan - Oct 1984	County	30 (18) positive culture	79 (49) probable by positive DFA test; 53 (33) possible by symptoms & epi-link to a confirmed or probable case	<6 m	22		12 (7)	10 (83)	29/60 (48) of cases aged 7 months to 6 years
					6-11 m	11				
					1-4 y	46				
					5-9 y	19				
					10-14 y	18				
					15+ y	46				
					Overall	162	12.2			

Table 10-1. Selected Characteristics of Community Outbreaks of Pertussis in the US, 1965-1996 (Published Reports)										
Study Site	Period	Setting	Case Definition		Age Distribution			Hospitalizations		Percentage of Cases with ≥ 3 Doses of DTP or DTaP n (%)
			Confirmed n (%)	Other n (%)	Age	n	Incid. per 10 ⁵	All Cases n (%)	Cases <7m old n (%)	
Wisconsin (11-12)	May - Dec 1985	3 Rural County	161 (100) positive culture		<1 y	17	496			
					1-4 y	20	127			
					5-9 y	11	62			
					10-19 y	52	150			
					20-49 y	43	46			
					50+ y	18	32			
					Overall	161	73			
Missouri (4)	1989	State	92 (65) positive culture	49 (35) positive DFA test or clinical diagnosis	<1 y	85	113.2	71/125 (57)		11/66 (17) of cases aged 7 months to 5 years
					1-4 y	44	14.7			
					5-9 y	6	1.6			
					10-14 y	1	0.3			
					15+ y	3	0.1			
					Overall	141	3.5			
Cincinnati (17)	1993	City	223 (63) positive culture	64 (18) positive DFA test; 65 (19) clinical diagnosis	<7 m	122		80/255 (31)	(66)	103/126 (82) of cases aged 7 months to 5 years
					7 m-5 y	153				
					6-12 y	40				
					13+ y	37				
					Overall	352	20.7			
Chicago (5)	July 1993 - April 1994	City	80 (37) positive culture	138 (63) probable by clinical diagnosis of cough ≥ 2 weeks	<6 m	88	374.5	90 (41)	68/96 (71) ≤ 3 m	45/93 (48) of cases aged 7 months to 5 years
					6-11 m	43	183			
					12-23 m	27	56			
					2-5 y	32	18.6			
					6-9 y	12	7.5			
					10+ y	15	0.6			
					Overall	218	7.8			
Vermont (10)	1996	State	160 (57) positive culture; 5 (2) PCR; 115 (41) cough ≥ 2 weeks & epi-link to a case		<1 y	12	183	12 (4)		14/19 (74) of cases aged 7 months to 4 years
					1-4 y	32	112			
					5-9 y	42	101			
					10-19 y	129	153			
					20+ y	65	15			
					Overall	280	47.6			

Table 10-2. Selected Characteristics of Community Outbreaks of Pertussis in the US, 1985-1999 (Unpublished Reports)										
Study Site	Period	Setting	Case Definition		Age Distribution			Hospitalizations		Percentage of Cases with ≥ 3 Doses of DTP or DTaP n (%)
			Confirmed n (%)	Other n (%)	Age	n	Incid. per 10 ⁵	All Cases n (%)	Cases <7m old n (%)	
Del Rio, Texas (18)	Jan - Aug 1985	Air Force Base	4 (6) positive culture	35 (49) probable by positive DFA test; 33 (46) possible by symptoms	<1 y 1-4 y 5-9 y 10-19 y 20-29 y 30+ y Overall	5 24 8 9 13 13 72		1 (1)	0	24/29 (83) of cases aged 7 months to 6 years
Arizona (19)	Jan - Oct 1988	State	68 (24) positive culture	219 (76) cough ≥ 2 weeks or paroxysmal cough ≥ 1 week	< 1 y 1-4 y 5-9 y 10-14 y 15-19 y 20+ y Overall	85 82 38 28 17 37 287	129.8 31.4 12.8 11.2 6.7 1.5 8	48/216 (22)	38 (79) <1 y	
Quincy, Illinois (20)	May - Aug 1990	City		131 (83) cough ≥ 2 weeks; 27 (17) suspected by cough <2 weeks [9/53 (17) positive culture]	<1 y 1-4 y 5-9 y 10-14 y 15-19 y 20-29 y 30-39 y 40+ y Unk. Overall	11 35 39 17 5 22 11 11 7 158	1752 1594 1476 601 125 300 232 60 404	9 (6)		29/35 (83) of cases aged 7 months to 4 years
Seattle-King County, Washington (21)	Jan - March 1999	County	40 (2) positive culture	184 (58) positive DFA test; 95 (30) epi-link	<1 y 1-4 y 5-9 y 10-14 y 15-19 y 20-29 y 30-39 y 40-49 y 50+ y Overall	16 38 76 103 25 9 21 27 4 319	81 46 62 85 22 4 7 9 1 19	8 (3)	3 (38)	32/42 (76) of cases aged 7 months to 4 years

Study Site	Period	Setting	Case Definition		Age Distribution			Hospitalizations		Percentage of Cases with ≥ 3 Doses of DTP or DtaP n (%)
			Confirmed n (%)	Other n (%)	Age	n	Incid. per 10 ⁵	All Cases n (%)	Cases <7m old n (%)	
Kent County, Delaware (14-15)	March - June 1986	Amish Comm.		156 (100) cough ≥ 2 weeks	<6 m 6-11 m 1-4 y 5-9 y 10-14 y 15-19 y 20+ y Overall	8 7 42 60 27 4 8 156		3/15 (20) <1 y		
Massachusetts (13)	Aug - Sept 1986	School	3/4 positive culture, 4/16 positive DFA test, and/or 2/2 serology	cough ≥ 2 weeks or paroxysmal cough ≥ 1 week & epi-link to lab-confirmed case	<18 y 18+ y Overall	17 8 25				24/49 (49) of students with exemptions due to philosophical reasons
Massachusetts (13)	May - July 1987	School	6/10 positive culture and/or 6/10 positive DFA test	cough ≥ 2 weeks or paroxysmal cough ≥ 1 week & epi-link to lab-confirmed case	<18 y 18+ y Overall	21 5 26				
Massachusetts (13)	Nov - Dec 1987	School	3/3 positive culture and/or 3/3 positive DFA test	cough ≥ 2 weeks or paroxysmal cough ≥ 1 week & epi-link to lab-confirmed case	<18 y 18+ y Overall	14 2 16				13/16 (81) students with religious exemptions or unimmunized
Massachusetts (13)	Oct - Nov 1988	School	2/32 positive culture and/or 7/25 positive DFA test	cough ≥ 2 weeks or paroxysmal cough ≥ 1 week & epi-link to lab-confirmed case	<18 y 18+ y Overall	44 2 46				115/207 (56) students with religious exemptions or unimmunized
Kentucky (16)	Feb - May 1996	Amish Comm.	7 (7) positive PCR; 96 (93) cough ≥ 2 weeks & epi-link to a case		<5 y 5+ y Overall	34 69 103		1/103 (1)	1 (100)	1/103 (1) case aged 2 vaccinated

Appendix 10-1. Sample letter to the local medical community alerting them to a pertussis outbreak in the community²²

Dear Dr. _____,

Pertussis cases are occurring in (*name of community*). Therefore, the health department recommends the following:

- Consider pertussis when evaluating any infant, child, youth, or adult with an acute cough illness characterized by prolonged cough or cough with paroxysms, whoop, or post-tussive gagging/vomiting. Infants may present with apnea and/or cyanosis.
- Report known or suspected cases promptly to the health department. (*Add phone*

number or other details)

- Unvaccinated infants may have a marked lymphocytosis indicative of pertussis, but the diagnostic gold standard for pertussis is a positive culture result. The preferred method to obtain a specimen is with a nasopharyngeal aspirate; however, a nasopharyngeal Dacron™ swab could also be used. Swabs or aspirate should be placed in Regan Lowe transport media if direct inoculation of selective media is not possible. The direct fluorescent antibody (DFA) stain of a nasopharyngeal swab is unreliable so this test should not be used to confirm pertussis. PCR testing of nasopharyngeal swabs and serologic tests may be available in some commercial labs, but both tests are not standardized. However, if the PCR test is considered valid by public health authorities, a positive result may be used to laboratory-confirm pertussis.
- Treatment for pertussis, as well as chemoprophylaxis for exposed persons, consists of 14 days of erythromycin or trimethoprim-sulfamethoxazole. Clarithromycin or azithromycin should only be used if these antibiotics cannot be tolerated.
- Hospitalized patients with known/suspected acute pertussis should be in respiratory isolation (droplet precautions) for at least the first 5 days of antimicrobial treatment. Isolation of patients is not feasible. However, patients should be encouraged to refrain from contact outside the household for the first 5 days of antimicrobial treatment.
- Exposed susceptible persons should receive chemoprophylaxis. Exposure is defined as face-to-face contact, direct contact with respiratory, oral, or nasal secretions, or being in the same room or ward with a coughing pertussis case-patient. Because the protective efficacy of pertussis immunization wanes after the last vaccine dose, the great majority of teenagers and adults are susceptible to pertussis, even if they were immunized in early childhood. Further, exposed medical facility staff who continue to work should be queried daily for at least 21 days after exposure about possible pertussis symptoms -- acute cough, cough with paroxysms, whoop, or post-tussive gagging/vomiting. Persons with these symptoms should be given leave from work and allowed to return to work when they are well, another diagnosis is established, or they have been on appropriate antimicrobial treatment for ≥ 5 days.

Appendix 10-2. Sample letter to a health care provider²³

Dear Physician:

_____ is being referred to you for chemoprophylaxis against pertussis because he/she may have clinical symptoms compatible with pertussis or has had close contact with a diagnosed case of pertussis. The current recommendation of the Centers for Disease Control and Prevention and the American Academy of Pediatrics indicate

erythromycin or trimethoprim/sulfamethoxazole as the drugs of choice for treatment of diagnosed cases and prophylaxis of household/close contacts, **regardless of age or immunization status.**

The recommended dosages are as follows:

<u>Erythromycin</u>			
Children:	40-50 mg/kg/day		} in four divided
Adults:	1-2 grams/day		} oral doses
-OR-	<u>Trimethoprim/Sulfamethoxazole</u>		
Children:	Trimethoprim -	8 mg/kg/day	}
	Sulfamethoxazole -	40 mg/kg/day	} in two divided
Adults:	Trimethoprim -	320 mg/day	} oral doses
	Sulfamethoxazole -	1,600 mg/day	}

Treatment should be continued for 14 days. All cases and their household/close contacts should receive erythromycin regardless of age or immunization status. Pertussis immunity is not absolute (100%) and may not prevent infection. Older children and adults with mild illness can transmit the infection. Symptomatic children and/or adults may return to school or work after completing the first 5 days of medication, but the full 14 days of treatment must be completed.

A booster dose of DTaP vaccine is also recommended for any contact less than seven years of age who has not completed the four-dose primary immunization series or who has not received a dose of DTaP within three years before exposure.

Any questions or concerns regarding these recommendations should be directed to the _____ at _____.

Sincerely,

XXXXXXXXXXXXXXXXXXXX

Appendix 10-3. Sample letter to parent/guardian for pertussis in a school²⁴

Dear Parent/Guardian:

School records show that your child has not received all the vaccine shots against pertussis (whooping cough). This vaccine is usually given as part of the diphtheria-tetanus-pertussis (DTaP) vaccine.

We have had [*# of cases*] of [*confirmed, suspected*] pertussis reported in our school. Pertussis is a highly contagious disease that is spread through the air by cough. Pertussis begins with cold symptoms and a cough which becomes much worse over 1-2 weeks. Symptoms usually include a long series of coughs (“coughing fits”) followed by a whooping noise. However, older children, adults and very young infants may not develop the whoop. There is generally no fever. People with pertussis may have a series of coughs followed by vomiting, turning blue, or difficulty catching breath. The cough is often worse at night and cough medicines usually do not help alleviate the cough.

If your child has been around someone with pertussis, we will contact you and recommend that you see your child’s doctor. Sometimes a child can get sick with pertussis after being around someone with pertussis. This is especially true when the child has not received all the pertussis vaccine shots.

If your child has a high chance of getting sick, the doctor can give antibiotics to lower that chance. If your child is already sick, giving antibiotics early can help your child get well faster and lower the chances of spreading the disease to others.

Please consider the following [*state*] Department of Health recommendations:

1. Infants under one year, and particularly under six months, are most likely to experience severe illness if they develop pertussis. When possible, young infants should be kept away from people with a cough. **Infants with any coughing illness should be promptly evaluated by their doctor.**
2. Pertussis vaccine is only given to children under age 7 years. If you have children less than 7 years of age who have not been completely immunized against pertussis (particularly infants under one year) we recommend you talk to your child’s doctor about the benefits of vaccination.
3. If your child comes down with cold symptoms that include a cough, talk to your child’s doctor without delay. Tell him/her that there has been pertussis identified in your child’s school and that your child has not been fully immunized against this disease.

Appendix 10-4. Sample news release²³

There has been an increase in the number of whooping cough cases, also known as pertussis, in *[area]*. Thus far in *[year]*, *[number]* cases of whooping cough have been reported, according to Dr. _____, *[name of division]*. The ages of these cases range from *[age to age]*.

Health officials are concerned because of the increase in cases during the most recent weeks and the low level of protection among very young children in *[state]*. According to a Department of Health survey, only *[number]* percent of *[state]*'s children received their basic Diphtheria, Tetanus and Pertussis immunization series by 15 months of age.

Whooping cough can be a very serious disease, particularly for infants less than one year of age. Since it is quite contagious, the disease can easily spread through the air from a sick person during talking, sneezing or coughing. The illness starts with symptoms similar to a common cold. Children suffering from whooping cough often develop coughing fits, especially at night, giving a high-pitched "whoop" sound. The "whoop" is a sign that the person is struggling to breathe between coughs. The disease can be very severe and, although deaths are rare, they do occur, especially in infants less than one year of age.

Of the *[number]* cases, *[percentage]* were not fully vaccinated for their age. Therefore, these cases occurred as a result of a failure to vaccinate and not because of vaccine failure. Making sure that children receive all their shots on time is the best way to control this disease in the future. Children should receive four doses of DTaP vaccine by 15 months of age and an additional dose of DTaP before they start school.

Parents are urged to check their children's shot records to be sure they have received all their shots. If they are not sure their children are completely immunized, they should contact their family doctor or the *[Public Health Clinic]* to bring their children's immunization up to date as soon as possible.

Adults and children 7 years and older usually develop a much milder form of pertussis. Anyone who is suspected of having whooping cough or who is exposed to a person with the disease should be seen by their physician.

For more information call the *[name of division at telephone number]*.

Appendix 10-5. Sample fact sheet²⁵**FACT SHEET****Pertussis
(Whooping Cough)**

What is pertussis?

Pertussis, also called “whooping cough,” is a very contagious disease caused by bacteria (germs). Pertussis is usually mild in older children and adults, but it often causes serious problems in very young children (i.e., infants less than one year of age).

What are the symptoms of pertussis?

Pertussis symptoms have two stages. The first stage (which lasts 1 to 2 weeks) begins like a cold, with a runny nose, sneezing, mild fever, and cough which slowly gets worse. The second stage is marked by uncontrolled coughing spells and a whooping noise (in young children) when the person inhales. During severe coughing spells, a person may vomit or become blue in the face from lack of air. Between coughing spells, the person often appears to be well. The coughing spells may be so bad that it is hard for babies to eat, drink or breathe. This coughing stage may last for 6 or more weeks. Adults, teens, and vaccinated children often have milder symptoms that mimic bronchitis or asthma. Some infants may only have apnea (failure to breathe), and may die from this.

How is pertussis spread?

The germs that cause pertussis live in the nose, mouth and throat, and are sprayed into the air when an infected person sneezes, coughs or talks. Other people nearby can then inhale the germs. Touching a tissue or sharing a cup used by someone with pertussis can also spread the disease. The first symptoms usually appear about 7 to 10 days after a person is exposed. Infants often get pertussis from older children or adults.

Who gets pertussis?

Pertussis is most common among infants less than a year old, but anyone can get it. Pertussis can be hard to diagnose in very young infants, teens and adults because their symptoms often look like a cold with a nagging cough.

Is pertussis dangerous?

It can be, especially for infants. Pertussis can cause breathing problems (apnea), pneumonia, and swelling of the brain (encephalopathy), which can lead to seizures and

brain damage. Pertussis can also cause death (rarely), especially in very young infants.

How is pertussis diagnosed?

A doctor may think a patient has pertussis because of the symptoms, but a sample of mucus must be taken from the back of the nose for testing. This sample is then tested by a laboratory to determine whether the patient has pertussis.

How is pertussis treated?

Antibiotics can make the disease milder if they are started early enough, and will help to prevent transmission of the illness to others. Anyone who is exposed to pertussis should also be given antibiotics to prevent the disease, even if they were vaccinated. In addition, it is helpful to get plenty of rest and fluids. Treatment for young children may include supportive therapy such as fluids, oxygen, and mild sedation to help the child during the prolonged period of coughing.

Can pertussis be prevented?

Yes, there is a vaccine to prevent pertussis. It is given along with diphtheria and tetanus vaccines in the same shot (called DTaP). Five doses of vaccine, given in a series starting at 2 months of age, are needed to protect a child from pertussis. The vaccine works for most children, but it wears off after a number of years. The vaccine is not given to persons 7 years of age or older.

Is the pertussis vaccine safe?

Yes, it is safe for most people. Some children will get a slight fever and be cranky for a day or two after getting a DTaP shot. Some children will have a sore spot and some swelling or redness where the shot was given. Only rarely will a child have a more serious side effect, such as prolonged crying, convulsions or high fever. DTaP (diphtheria, tetanus and acellular pertussis vaccine) is less likely to cause side effects than the DTP (diphtheria, tetanus and whole-cell pertussis vaccine) and is now used routinely in the United States. However, following the 4th and 5th DTaP doses there are more local reactions (pain, redness, or swelling at the site of injection) compared with the first 3 DTaP doses.

Though there is a very slight risk of problems caused by the vaccine, pertussis or whooping cough is extremely serious. It can last for weeks or months and lead to serious complications. Pertussis causes about 10-20 deaths each year in the United States. That is why experts recommend that all infants and children be given a full series of DTaP

vaccine unless there is a medical reason not to receive the vaccine.

Where can you get more information?

Your doctor or nurse

Your local or state health department (listed in the telephone book under government)

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