



Arizona Vaccine News

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PERTUSSIS EDITION

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EPIDEMIOLOGY, DIAGNOSIS, AND TREATMENT OF PERTUSSIS

Epidemiology of Pertussis

- Pertussis outbreaks tend to occur every 3-5 years.
- Pertussis is highly contagious through respiratory droplets.
- The incubation period of pertussis is 7-21 days.
- Immunity from pertussis vaccine wears off with time, so most adults and teenagers are susceptible to pertussis unless they have had a Tdap vaccine.

Diagnosing and Treating Pertussis

- Full blown whooping cough is fairly easy to diagnose when there are severe paroxysms of coughing, often accompanied by post-tussive vomiting or an inspiratory whoop.
- Providers need to be aware of the subtle early symptoms of pertussis: a cough that has been increasing over a week or more in an otherwise afebrile and nontoxic patient.
- If you suspect that a patient could have pertussis, notify your county or tribal health department for assistance in testing and epidemiologic investigation. Obtain a nasopharyngeal swab for pertussis culture and/or polymerase chain reaction (PCR).
- A macrolide antibiotic is the treatment of choice for suspected or confirmed pertussis (azithromycin, clarithromycin, or erythromycin).
- Do not wait for the results of laboratory testing before starting antibiotic treatment.

CDC Video Demonstrating Specimen Collection for Pertussis

- This CDC video shows the proper way to collect a nasopharyngeal specimen for pertussis testing (culture and/or PCR).
- Contact a commercial laboratory to obtain swabs and transport media for testing.
- Notify your county or tribal health department when you are considering the diagnosis of pertussis and/or when you are testing for pertussis.

<http://www.cdc.gov/pertussis/clinical/diagnostic-testing/specimen-collection.html>

Serology Is Not a Good Tool for Diagnosis of Acute Pertussis

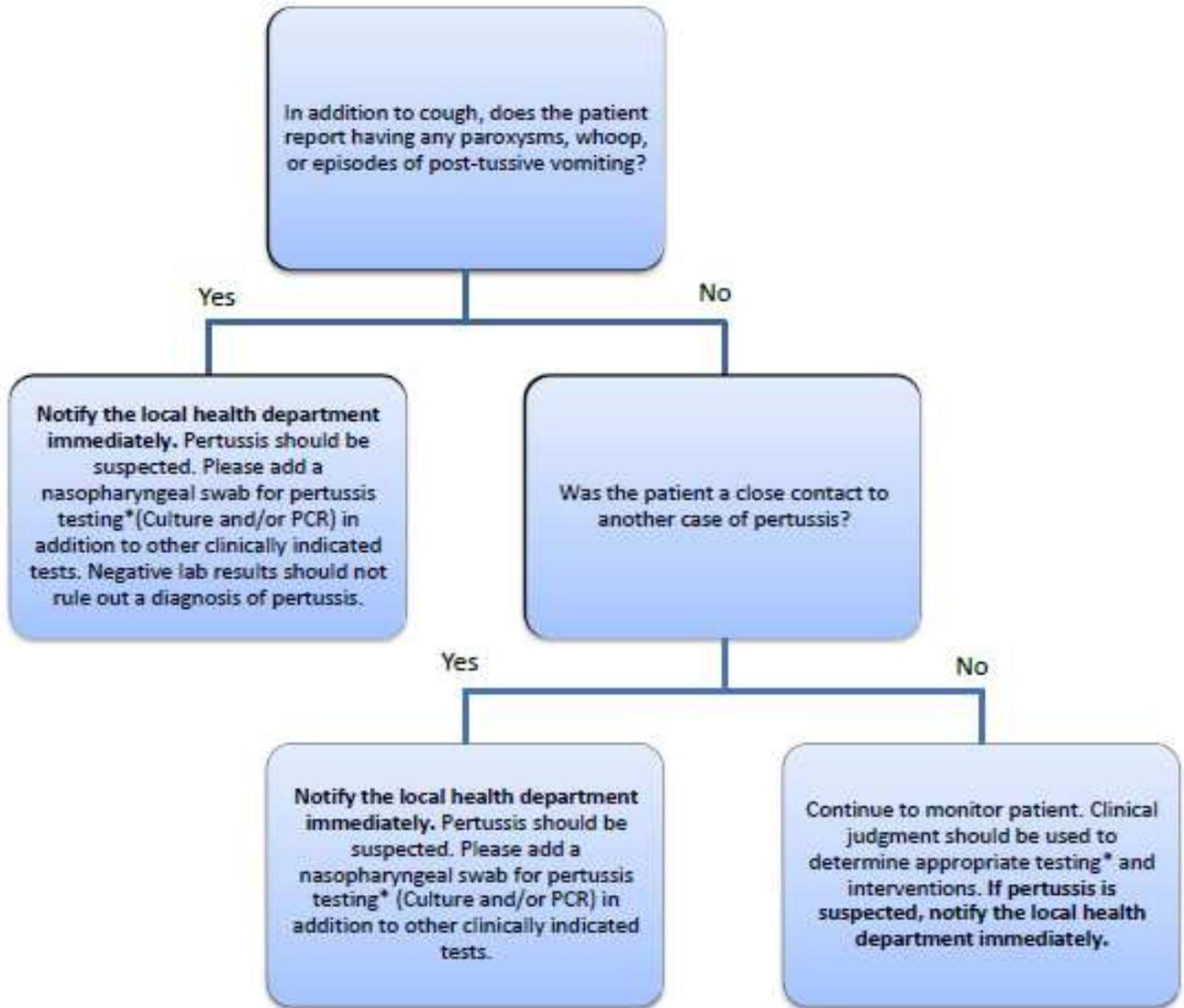
- There has been an increase in providers ordering serology to diagnose pertussis.
- The diagnostic tests of choice for acute pertussis are nasopharyngeal swabs for culture and/or PCR.
- Serology has limitations because commercially available serologic tests are not FDA approved and antibody levels may not be elevated in the first few weeks of pertussis.

For more information on the laboratory diagnosis of pertussis, see

<http://www.cdc.gov/pertussis/clinical/diagnostic-testing/diagnosis-confirmation.html>

Algorithm for Pertussis Laboratory Testing (Cough Illnesses)

*Typical characteristics of pertussis include a worsening cough
in a non-toxic and afebrile patient.*



** Serologic testing is not the preferred method of testing for pertussis.*



*ADHS Algorithm for Pertussis Laboratory Testing (Cough Illnesses)
Supplemental Information*

Updated 3/1/2011

A high index of suspicion combined with early clinical diagnosis, treatment, and reporting of suspected cases is recommended for optimal control of pertussis infection. Providers are asked to report to their local health department as soon as pertussis is suspected and especially if testing is ordered, so that the health department may promptly initiate investigation and, if needed, begin control measures.

1. Consider pertussis in patients that present with or report history of cough and at least one of the following:
 - Cough that is increasing in severity
 - Cough that includes history of paroxysms, post-tussive vomiting, and/or inspiratory whoop
 - Cough with cyanosis
 - Cough in patients with close contacts who are also having or recently had similar pertussis-like symptoms. These could be family contacts, friends, school contacts, or work contacts.
 - Any other presentation that would increase clinical suspicion of pertussis infection, such as sleep disturbance or exhaustion attributed to coughing attacks.

2. If pertussis is suspected:
 - Report suspected case to your local health department, who can advise regarding testing and can assist with contact investigation and contact prophylaxis if needed.
 - Collect nasopharyngeal swabs for pertussis culture and/or PCR. Swabs and appropriate media can be obtained by contacting your local commercial laboratory. Culture and PCR are the methods of testing preferred by the Arizona Department of Health Services. Serologic testing is not a replacement for culture or PCR testing. For instructions on how to appropriately take and submit a nasopharyngeal swab, please see the link to CDC instructional videos located at the end of this document in the "Additional Resources" section.
 - On a case by case basis, nasopharyngeal swabs for pertussis culture testing may be requested at the Arizona State Public Health Laboratory. Testing can be arranged by contacting your local health department.
 - If pertussis is suspected, physicians should prescribe antibiotics to reduce the severity and duration of symptoms and decrease communicability. The following antibiotics are recommended for pertussis treatment: azithromycin, erythromycin, and clarithromycin. Where possible, please remember to collect nasopharyngeal specimens for pertussis testing prior to prescribing antibiotics. Treatment of suspected pertussis should be started immediately and not deferred due to pending laboratory tests. More information regarding treatment of pertussis cases may be obtained by contacting your local health department or by consulting the CDC MMWR release on pertussis treatment in the "Additional Resources" section at the end of this document.
 - If you are aware of any contacts to the suspected case that have symptoms suggestive of pertussis, please notify your local health department of these contacts so that they may investigate.
 - CDC recommends that close contacts of pertussis cases received antimicrobial therapy. If possible, physicians may want to consider providing prophylaxis to family members of a suspected pertussis case.

Supplemental Information to Algorithm for Pertussis Laboratory Testing (continued)

The diagnosis of pertussis is challenging for the following reasons:

- Pertussis culture, although considered the gold standard laboratory test for the pertussis, tends to have low specificity with culture positive rates as low as 30%. Culture yield can be affected by many factors including specimen collection, isolation techniques, transportation method, and patient's vaccine history. In addition, culture results may take as long as 2 weeks. Treatment of suspect pertussis should not be delayed due to pending laboratory results.
- Pertussis PCR is recommended in addition to, but not as a replacement for, pertussis culture because PCR results may be positive when the culture is negative. All laboratory results should be interpreted based on the patient's complete clinical picture.
- Serologic tests are not recommended for confirmation of pertussis infection as the tests cannot differentiate recent, past, or current infection from vaccine response. There is no FDA-approved serologic test for pertussis diagnosis.
- The clinical presentation of *B. pertussis* infection may be variable, with patients not exhibiting all symptoms characteristic of pertussis upon examination. Patients should be considered for pertussis testing based on the history provided, even if they are not coughing in the office.

Early detection and reporting of suspected pertussis cases in both children and adults assists in controlling the spread of the bacteria before it can reach vulnerable populations. Notification of the local health department allows for the rapid prophylaxis of close contacts, if deemed appropriate by public health officials.

Although recent vaccination with a pertussis containing vaccine does not rule out a diagnosis of pertussis, vaccination remains the most effective way to prevent pertussis. Assuring that your patients are up to date with their pertussis immunizations offers them optimum protection against *B. pertussis* infection and can prevent your patients from transmitting pertussis to others.

Additional Resources:

1. CDC, *Epidemiology and Prevention of Vaccine-Preventable Diseases*, 11TH Edition, May 2009. Available online at: <http://www.cdc.gov/vaccines/pubs/pinkbook/pink-chapters.htm>
2. CDC MMWR, "Recommended Antimicrobial Agents for Treatment and Postexposure Prophylaxis of Pertussis, 2005 guidelines", Available online at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5414a1.htm>
3. Videos and documentation from the CDC for the appropriate collection pertussis specimens for culture and PCR is available online at: <http://www.cdc.gov/pertussis/clinical/diagnostic-testing/specimen-collection.html>

PERTUSSIS VACCINATION

Immunity Following Pertussis Infection Is Not Permanent

- Teenagers or adults with a history of pertussis still need a single dose of Tdap since immunity following pertussis infection is not permanent.
- When young children have had a documented pertussis infection, they may receive just diphtheria and tetanus vaccine (DT) instead of the pertussis vaccine (DTaP) to finish their childhood tetanus and diphtheria vaccination series. However, even pertussis-infected children will need a Tdap booster as a teenager.
- When a child is suspected to have had a pertussis infection, but the laboratory testing was negative, it is reasonable to use DTaP to complete their childhood tetanus and diphtheria series.

See Epidemiology and Prevention of Vaccine-Preventable Diseases, 11th ed., Pertussis, pages 210 & 213. <http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/pert.pdf>

How to Prevent Pertussis among Pregnant and Postpartum Women and Their Infants

- Give unimmunized mothers Tdap before discharge from the hospital or birthing center.
- If Tdap cannot be administered to the mother at or before discharge, give Tdap as soon as feasible after discharge.
- Tdap is safe to give to a mother who is breastfeeding.
- In special situations where a pregnant woman is at increased risk for pertussis, Tdap may be given during the second or third trimester of pregnancy.
- Unimmunized women who are considering pregnancy should receive Tdap.
- All family members and caretakers of newborns should have pertussis vaccination before the baby is born, or as soon as possible thereafter.

MMWR May 30, 2008. Prevention of Pertussis, Tetanus, and Diphtheria among Pregnant and Postpartum Women and Their Infants.

<http://www.cdc.gov/mmwr/PDF/rr/rr5704.pdf>

Differences between ACIP and FDA Recommendations on Tdap

- There are two pertussis vaccines licensed by the Food and Drug Administration (FDA) for use in teenagers and adults. Boostrix[®] is licensed for ages 10-64 years, and Adacel[®] is licensed for ages 11-64 years.
- The Advisory Committee on Immunization Practices (ACIP) now recommends that the adolescent/adult pertussis vaccine (Tdap) can be used in children ages 7-9 years and in adults who are 65 years and older, even though this differs from the package inserts. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6001a4.htm?s_cid=mm6001a4_w
- Dr. William Atkinson and Dr. Andrew Kroger of the CDC point out that ACIP recommendations represent the standard of care for vaccination practice in the United States. Therefore, when there is a difference between ACIP recommendations and the vaccine package insert, their advice is that (in general) one should follow the recommendations of ACIP rather than the information in the vaccine package insert.

See Needle Tips, January 2011, page 1:

http://www.immunize.org/nslt.d/n47/n47.pdf?utm_source=Needle+Tips+Announcement&utm_campaign=f2c966c6c1-Needle+Tips+Announcement+January+2011&utm_medium=email

All Health Care Providers (HCPs) Need Tdap

- Only about 16% of HCPs in the United States have received Tdap.
<http://www.jointcommission.org/tdap>.
- ACIP voted in February 2011 for HCPs of all ages to receive a single dose of Tdap as soon as is feasible if they have not previously received it, regardless of the time since the last tetanus-diphtheria (Td) vaccine dose.
<http://www.cidrap.umn.edu/cidrap/content/other/news/feb2311acip.html>

NATIONAL INFANT IMMUNIZATION WEEK (NIIW) April 24-30, 2011

Arizona's NIIW Message: Surround Our Babies with Vaccinated Families

- Arizona has been chosen as the focus state for 2011 NIIW
- Arizona's 2011 NIIW message is **the importance of protecting infants by immunizing all contacts of infants against pertussis**—otherwise known as “cocooning.”
- Reasons that cocooning is needed
 - 75% of infants with pertussis are infected by a family member
 - 76% of infants with pertussis are infected by an adolescent or adults.
 - Only 6% of US adults have received a pertussis vaccine booster (Tdap)
- Representatives from the Centers for Disease Control and Prevention (CDC), the US-Mexico Border Health Commission, and the Pan American Health Organization (PAHO) will be in Arizona to participate with the Arizona Department of Health Services (ADHS), local health departments, and community partners in NIIW activities

Materials to Help Spread the Word about NIIW

- A toolkit has been developed to promote pertussis vaccination in the community.
- Celebrate NIIW by sending family and friends an e-card promoting pertussis vaccine.
- Check out all of the tool kit at <http://www.whyimmunize.org/national-infant-immunization-week>

PERTUSSIS AND PERTUSSIS VACCINE LITERATURE

Parental Refusal of Pertussis Vaccination Is Associated with an Increased Risk of Pertussis Infection in Children

- Children who had not been vaccinated against pertussis were 23 times more likely to get pertussis than those who had been vaccinated
- 11% of all pertussis cases were attributed to parental vaccine refusal

See *Pediatrics*. June 2009. <http://pediatrics.aappublications.org/cgi/reprint/123/6/1446>

Hospital Explains How It Offered Pertussis Vaccine “Cocooning”

- A Houston hospital implemented a 2 year program to give pertussis vaccine (Tdap) to mothers and family contacts
 - Of 11,174 postpartum women, 75% received Tdap before discharge.
 - Of 1860 identified contacts, 91% received Tdap.
 - The estimated annual cost for such a program was \$160 per infant.

See the abstract in *Clinical Infectious Diseases*, January 2011.

<http://cid.oxfordjournals.org/content/52/2/157.abstract>

Rule Out Pertussis in Unvaccinated Infants Admitted for Bronchiolitis

- Finnish investigators tested for *Bordetella pertussis* and viral infections in 142 infants less than 6 months old who were hospitalized for bronchiolitis.
- Co-infection with *B. pertussis* was present in 8.5% (N=12).
- Coughing spells were more common in pertussis positive infants (41.7%) than in pertussis negative infants (14.7%). Otherwise, there were no clinical differences for those with only viral infections compared with those with co-infection.
- Pertussis should be considered in all unvaccinated infants admitted for lower respiratory tract infections.

See *Pediatric Infectious Disease Journal*, November 2010.

http://journals.lww.com/pidj/Abstract/2010/11000/Bordetella_pertussis_Infection_Is_Common_in.8.aspx

HOW TO FIND Tdap FOR ADULTS

All Adults Need Tdap

- Pertussis (whooping cough) can infect people of any age and can be lethal to babies and young children.
- Until recently, pertussis vaccines were only approved for use in children up to 6 years of age. However, immunity from pertussis vaccines wears off with time.
- In 2005, a pertussis vaccine was approved for use in people 10-64 years of age (Tdap).
- Only about 6% of adults in the US have received Tdap. (2009 National Health Interview Survey <http://www.cdc.gov/vaccines/stats-surv/nhis/2009-nhis.htm>)
- Tdap may be given to all adults, **including those over 64 years old**, according to CDC's Advisory Committee on Immunization Practices (ACIP) http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6001a4.htm?s_cid=mm6001a4_w

Challenges in Finding Locations for Adult Tdap

Important Points to Consider

- The retail cost for Tdap may range from \$60-\$70.
- Not all health insurance plans cover immunizations such as Tdap. Check with your health insurance company to see what is covered in your plan.
- Some health care providers may not carry Tdap in their offices.
- Arizona pharmacies with certified pharmacists can give most vaccines to adults without a doctor's prescription. However, some pharmacies may require a prescription in order to give Tdap to someone 65 years or older.
- Pharmacies often do not have contracts with insurance companies, so people who get vaccinated in pharmacies may need to pay for the vaccine out-of-pocket.
- Tdap is not routinely given to pregnant women but can be given in special circumstances <http://www.cdc.gov/mmwr/PDF/rr/rr5704.pdf>
- Teenagers and young adults up through 18 years old who do not have insurance coverage for vaccines can get Tdap without charge through the federally funded Vaccines For Children (VFC) program through county health departments, pediatricians, and family practice physicians.
- Federally Qualified Health Centers usually carry Tdap vaccine and may be able to work with people to adjust the price based on the person's ability to pay.

Resources for Getting Tdap for Adults

The following locations may have Tdap. Have patients call these locations for more details about Tdap availability, age ranges, ability to take insurance, cost, hours of operation, and addresses.

- Private physicians, travel clinics, immunization clinics, urgent care clinics, and walk-in clinics.
- Pharmacies with vaccine-certified pharmacists.
- County health departments.
- Indian Health Service facilities.
- Federally Qualified Health Centers <http://findahealthcenter.hrsa.gov>.

Ways to Purchase Tdap

- There are two pertussis vaccines with FDA approval for ages 10-64 years: Boostrix® (GlaxoSmithKline) and Adacel® (Sanofi Pasteur).
- Manufacturer information and resources about Boostrix® can be found at www.helppreventwhoopingcough.com or through customer service representatives at 888-825-5249.
- Manufacturer information and resources about Adacel® can be found at <http://www.adacelvaccine.com> or through customer service representatives at 1-800-372-6634, or for Maricopa County, at 602-639-0448.

ADDITIONAL PERTUSSIS VACCINE RESOURCES

Td/Tdap vaccination standing orders

- Standing orders for tetanus/diphtheria vaccine (Td) or Tdap for children ages 7 and older can be found at www.immunize.org/catg.d/p3078a.pdf
- Standing orders for tetanus/diphtheria vaccine (Td) or Tdap for adults can be found at www.immunize.org/catg.d/p3078.pdf

CDC Documents for Prevention and Treatment of Pertussis

- "Pertussis" in "Epidemiology and Prevention of Vaccine-Preventable Diseases." (CDC) <http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/pert.pdf>
- Recommended Antimicrobial Agents for Treatment and Postexposure Prophylaxis of Pertussis. MMWR December 9, 2005. <http://www.cdc.gov/mmwr/PDF/rr/rr5414.pdf>
- Preventing Tetanus, Diphtheria, and Pertussis among Adolescents: Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis Vaccines. March 24, 2006. <http://www.cdc.gov/mmwr/PDF/rr/rr5503.pdf>
- Preventing Tetanus, Diphtheria, and Pertussis among Adults: Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis Vaccine. December 15, 2006. <http://www.cdc.gov/mmwr/PDF/rr/rr5517.pdf>

- Please feel free to distribute ADHS' *Arizona Vaccine News* to any of your partners who may be interested. Past issues of *Arizona Vaccine News* can be found at: <http://www.azdhs.gov/phs/immun/index.htm>