Pertussis Surveillance Training Program for Public Health

Immunization Division
Texas Department of Health

Complications

Infants with pertussis are at highest risk:

- 59% Hospitalization
- 12% Pneumonia
- 1% Seizures
- 0.2% Encephalopathy
- 0.7% Death

What is Whooping Cough?

- Pertussis=Whooping Cough
- Caused by *Bordetella pertussis* (bacteria)
- Young infants at greatest risk
- Milder disease in adolescents, adults, and those partially protected by vaccination
- Growing public health problem in Texas and the United States

Infant Deaths 1999 – May, 2002

Clinical Features of Pertussis

- Toxin-mediated disease
- Incubation period 5-21 days
- Fever absent or minimal
- Catarrhal stage 1 - 2 weeks
- Paroxysmal stage 1 - 6 weeks
- Convalescence stage weeks to months

Pertussis in Adolescents and Adults

- Waning immunity
- Milder disease
- Persistent cough (>7 days)
- Often first case in household

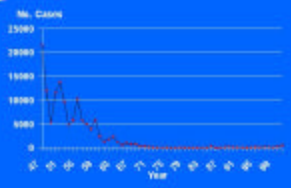
Sounds of Pertussis

Pertussis in Adults—Mild?

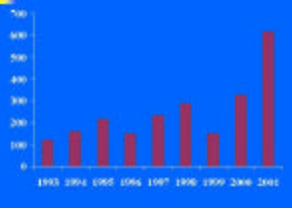
Transmission of Pertussis

- Humans are the only reservoir
- Transmission by respiratory drops
- Highly communicable
- Most infectious during initial stage

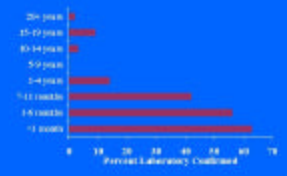
Pertussis Trends Texas, 1947-2001



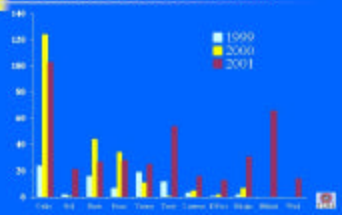
Pertussis Trends Texas, 1993-2001



Laboratory Confirmed Pertussis by Age Group, Texas, 2001



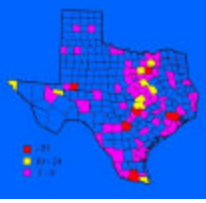
Pertussis Trends Selected Counties, Texas



Role of Physician

- Diagnosis based on clinical course
- Testing for pertussis
- Treatment with appropriate antibiotic
- Prophylaxis of all household members
- Vaccination of all family members age <7 years
- Notification of local health department

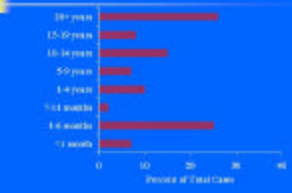
Pertussis Cases Reported in 2001



Physician Diagnosis of Pertussis

- Based upon characteristic history and physical exam
  - Paroxysmal cough
  - Inspiratory whoop
  - Post-tussive vomiting
  - Apnea/cyanosis
- Elevated white blood cell count with a lymphocytosis
- Confirmed with laboratory testing

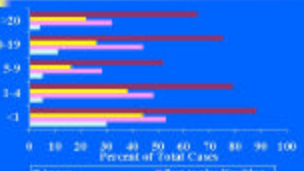
Pertussis by Age Group Texas, 2001



Laboratory Tests

- Culture is "Gold Standard"
- PCR
- DFA
- Serological testing
- Lab tests may be negative for patients with pertussis
- Culture results may not be available for 7-10 days

Pertussis Symptoms by Age Group, Texas, 2001



Specimen Collection

- Isolation most successful during catarrhal stage—within first 3 weeks
- Success declines with prior antibiotic treatment
- Specimens from posterior nasopharynx
- Use Dacron or calcium alginate swabs
- Selection media—Regan-Lowe or freshly prepared Bordet-Gengou

Appropriate Positioning of Nasopharyngeal Swab

Adolescent Case Report

- 12 year-old female index case in school
- Onset of April 23rd, paroxysmal cough started April 30th, diagnosis on May 18th
- Initially diagnosed and treated for cough due to allergies
- Nineteen additional probable cases (adolescents and adults) were identified
- Treatment offered to over ninety close contacts

Diagnosis and Management Problems

- Distinguishing from other upper respiratory infections
- Ruling out pertussis based on vaccination history
- Waiting for laboratory results to begin treatment of patient AND contacts
- Waiting for laboratory results to notify local health authority
- Failing to treat close contacts based on vaccination history

Remember…

- Adults with pertussis may only present with a prolonged cough
- Adolescents and adults are common source for infants and children
- Vaccinated adolescents and adults are susceptible due to waning immunity
- Vaccinated persons may have pertussis

Infant Case Report #1

- 7-week-old Hispanic female with history of cough lasting 3 weeks taken to ER mid-May
- Symptoms: paroxysmal cough, inspiratory whoop, post-tussive vomiting, and apnea
- DFA and culture positive
- Recovered after treatment with erythromycin
- Discharged from hospital in early June
- Source appeared to be 15-year-old mother with cough illness that started one week prior to infant's cough onset

Role of Public Health

- Investigate all suspected cases
- Ensure all close contacts are treated when appropriate
- Collect and analyze surveillance data
- Publicize information on pertussis

Infant Case Report #2

- Cough onset-Jan. 18th when infant was 1 month old
- Treated for ear infection and runny nose.
- Cough became paroxysmal Jan. 24th
- Treated with omnicef, albuterol, nystatin, nose drops
- Seen by physicians 4 times and 3 different clinics prior to ER visit
- By fourth visit on Jan 29th symptoms included vomiting and mild to moderate distress with cough

Importance of Reporting

- Reporting suspected cases helps identify outbreaks (two or more related cases) quickly
- Triggers public health response

Infant Case Report #2

- Waited 5 hours in the ER and then transferred twice--hospitalized Feb. 5th
- Symptoms: paroxysmal cough, inspiratory whoop, post-tussive vomiting, apnea, and cyanosis
- DFA and PCR positive from NP specimen
- Died Feb. 8th.
- 11 close contacts and several secondary
- Adolescent with paroxysmal cough with post-tussive vomiting 18 days prior to the infant

Report Immediately…

When pertussis is suspected! Call:

1-800-705-8868

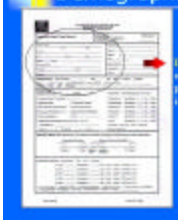
OR

1-800-252-9152

Pertussis Investigation

- Follow the TDH *Vaccine-Preventable Disease Surveillance Guidelines*
- Use the current version posted at http://www.tdh.state.tx.us/immunize/docs/guide2000.pdf

Demographic Information

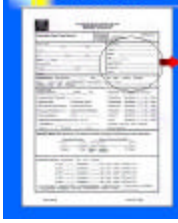


DEMOGRAPHICS: When a suspected Pertussis case is first reported, make certain that the patient's demographic information is collected, i.e. name, address, date of birth, etc.

Pertussis Investigation

- Investigate all suspected cases of pertussis promptly
- Begin a Case Track Record (CTR) and report preliminary information to TDH
- Identify exposed contacts
- Provide or coordinate prophylaxis of all close contacts including appropriate antibiotics and pertussis vaccine
- Test or coordinate testing of symptomatic contacts (prior to treatment if possible, or within 2 days)

Reported by and Report Given to



REPORTED BY: When a suspected Pertussis case is first reported, make certain that you collect the name and agency of the person reporting, and the date the report is taken.
REPORT GIVEN TO: If the report does not belong to you, list the name, organization, and telephone of the person you have given the report to for investigation and for the report immediately.
REMEMBER THAT TDH SHOULD BE INFORMED OF ALL SUSPECTED PERTUSSIS CASES REPORTED TO YOUR OFFICE.

Laboratory Tests

- The test of choice is culture and/or PCR
- TDH currently provides culture and DFA tests but plans to change to culture and PCR
- Regan Lowe transport media is available from TDH (overnight upon request, 512-458-7661) and some local health departments, commercial labs, and hospitals
- Test or coordinate testing of symptomatic contacts coughing less than 3 weeks
- Test is more likely to yield positive results if taken early in infection (<1 week of cough)

Clinical Data

CLINICAL DATA: Collect as much of the clinical data as possible. Check all symptoms described. The cough duration must be completed at the final interview. The final interview or follow up should be done at least 2 weeks after the initial report. If the patient is still coughing fill in >9 days for cough duration.

Close Contact Examples

- All household contacts
- Contacts who spend 2 or more hours per day in the same room
- Social contacts who visit face to face
- Students who car-pool together or sit together on a bus
- Health care workers who provide direct care or are exposed to respiratory secretions

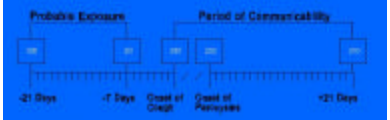
Treatment, Outcome, and Physician's Diagnosis

TREATMENT: If the suspected case has been treated with antibiotic(s), specify the antibiotic(s), the date(s) started, and how many days the medication(s) were actually taken. At the final interview, ask how many days were completed and whether alternative medications were started.
OUTCOME: If the patient dies, be sure to notify TDH Immunization Division as soon as possible. Write the date of death by the outcome.
PHYSICIAN DIAGNOSIS: Please note the physician diagnosis if it is available.

Pertussis Case Track Record

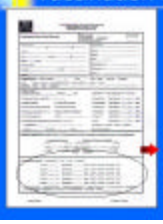
- A Case Track Record (CTR) or Investigation Form is required for all suspected cases of Pertussis and their symptomatic contacts
- In addition to the CTR, a copy of lab results should be included for tests performed at labs other than TDH
- The CTR should be completed within 30 days of the initial report

Infection Timeline



INFECTION TIMELINE: Fill in the infection timeline tool and use this information when asking about the exposure history, close contacts, and activities where possible spread may have occurred.

Vaccination History

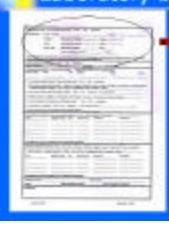


VACCINATION HISTORY: CDC is now requesting complete vaccine histories on all cases reported through NETSS. Include the Manufacturer, Lot numbers, and Type on the CTR. If the patient has not been vaccinated, please indicate the reason.

Investigator's Name and Comments

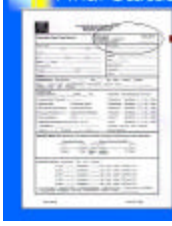
INVESTIGATOR'S NAME: The actual investigator investigating the initial report must fill out this section. If TDH has a question or needs to verify information, the investigator listed in this section will be contacted for clarification. Note that the final interview should occur after the cough has ended or has a duration of at least 2 weeks. Fax a copy of completed CTRs to TDH at (512) 458-7544.
COMMENTS: List any additional comments as necessary.

Laboratory Data



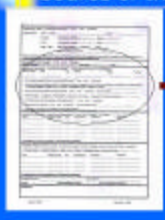
LABORATORY DATA: If lab testing has been done, specify the name of the Lab, type of lab test done, date specimen was collected, and the result(s). Submit a copy of lab results for tests performed at labs other than TDH. Please note that the PCR test is not listed on the CTR, but should be noted under laboratory data and considered as a valid Pertussis lab test.

Final Status and NETSS



FINAL STATUS: TDH makes the final decision on the status of the case.
Confirmed: Cases that are laboratory confirmed and cases with a cough duration ≥ 2 weeks that are directly (first generation) linked to laboratory-confirmed cases.
Probable: Sporadic cases that meet the clinical case definition and close contacts that have a cough lasting ≥ 2 weeks.
Ruled Out: Cases with a cough duration ≥ 2 weeks (unless culture positive), and isolated cases that do not meet the clinical case definition.
NETSS #: The number given to the case report entered in NETSS and transmitted to CDC on a weekly basis.

Source of Infection

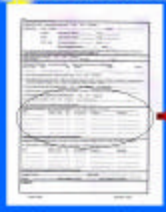


SOURCE OF INFECTION: If the source of infection is a known or suspected case, make certain that the name of contact is listed. Gather as much of the information as possible. Write the name of the school, child-care facility, work place, etc where exposure may have occurred.

Clinical Case Definitions

- For endemic or sporadic cases, a cough illness lasting at least 2 weeks with one of the following and without other apparent cause (as reported by a health professional):
  - Paroxysms of cough
  - Inspiratory whoop
  - Post-tussive vomiting
- For outbreak settings, including all household exposures, use the outbreak definition of:
  A cough illness lasting at least 14 days

Household Contacts

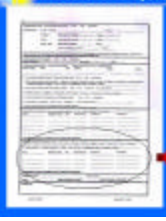


HOUSEHOLD CONTACTS: List all contacts in the household. Include their pertussis vaccination history. If the contact is symptomatic, a separate CTR must be completed on that contact. All household contacts of a known or suspected case should be prophylaxed (unless it has been more than 3 weeks since their exposure and they still have no symptoms). If a contact is prophylaxed, list the type of antibiotic prescribed and the date. If the contact is not treated, state the reason for not treating. If you run out of space, place information on a separate sheet of paper and attach it to the CTR.

Case Classification: Confirmed

- *Bordatella pertussis* is isolated by culture
- Positive PCR test and cough ≥ 14 days
- Patient is directly (first generation) linked to a laboratory-confirmed case and has a cough lasting ≥ 14 days

Possible Spread Contacts



POSSIBLE SPREAD CONTACTS: List all close contacts under possible spread contacts. Call TDH VPD surveillance staff or refer to the the CDC *Guidelines for the Control of Pertussis Outbreaks* [illegible] for assistance in determining close contact criteria in special settings. Provide the same information and follow up for close contacts as described above for household contacts.

Case Classification: Probable

- Symptoms meet the clinical case definition, but case is not laboratory confirmed, or epidemiologically linked to a laboratory-confirmed case
- Positive PCR test and cough <14 days
- Patient is epidemiologically linked to a probable case or indirectly to a confirmed case and has cough ≥ 14 days

Evaluation of Surveillance

- Close contacts identified within and outside of the household
- CTR completed on all coughing contacts
- Close contacts prophylaxed
- Vaccination history completed
- Specimens submitted for persons coughing < 3weeks

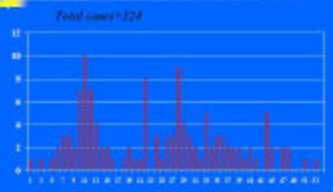
Outbreak in Dallas 2000 Control Measures

- Alerted area ERs
- Sent letter to providers in the area
  - Consider Pertussis as possible diagnosis
  - Report suspected cases
  - Provide prophylaxis
- Publicized outbreak
- Organized in-services
- Worked with community
  - Counsel those in contact with suspected cases
  - Culture and treat household contacts
  - Distribute Pertussis Fact Sheet

QUESTIONS?

If you have any questions pertaining to the CASE TRACK RECORD, please contact our office at 1-800-252-9152.

Outbreak in Dallas Distribution of 2000 cases



Outbreak Response

- Letter to area physicians
- Notification of hospitals
- Letter to parents from school health officials
- Press release
- Coordination with surrounding counties
- Active surveillance

Strategies to Battle Pertussis

- Maintain high DTaP coverage
- Educate
- Intensify community surveillance
- Prompt reporting of suspected cases
- Ensure prompt treatment of all cases and their close contacts
- Improve public health communication systems

Active Surveillance

- Alert area physicians, hospital infection control and emergency room staff, and urgent care facilities
- Include reporting criteria and contacts
- Call a sample of area hospitals, physicians, schools, and laboratories and ask about possible pertussis activity

Challenges

- Vaccine shortages
- Low vaccination coverage levels
- Community outreach
- Coordinated response—individual providers and public health

Evaluation: Outbreak Response

- Control measures implemented
- Number of cases with onset prior to report of index case compared to those after investigation and response initiated
- Percentage of cases with culture or PCR confirmation

Texas Vaccination Levels

	Coverage Levels	
Age/DTP Doses	Texas	U.S.
3 months/DTP1	84%	87%
5 months/DTP2	72%	77%
7 months/DTP3	62%	66%
13 months/DTP3	84%	89%
19-35 months/DTP4	73%	82%

We all have the same goal…
Protecting the most vulnerable among us,
our little Texans.