PREVENTING MEASLES AND PERTUSSIS IN NORTH DAKOTA

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NORTH Dakota Be Legendary.™

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MEASLES VS. PERTUSSIS

- MMR
- Ro=12-18 people
- Last ND case 2011
- Case fatality 1-2 in 1000
- No specific antiviral treatment
- PEP is vaccination w/in 72 hrs
- 10 year peaks

- DTaP/Tdap
- Ro=12-18 people
- 44 cases since November 2023
- Fatality up to 10% in young infants
- Treated/prevented with abx if caught early
- PEP is abx (no post-exposure vaccination indicated)
- 10 year peaks

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MEASLES DISEASE FACTS

- Symptoms: fever, malaise, cough, coryza, conjunctivitis, Koplik spots and maculopapular rash.
- Incubation period: 7-21 days (average 12 days from exposure to illness onset)
- Duration: Prodrome (pre-rash) lasts from 2-8 days. Rash typically lasts from 4 to 7 days. Cough can persist for 2 weeks
- Hospitalization: 20%
- Period of infectivity: 4 days before rash onset to 4 days after rash onset.
- Susceptibility: Born in 1957 or later and unvaccinated
- Mode of Spread: airborne, droplet, secretions, fomites
- Diagnosis: a) IgM (70% positive at time of rash onset, 100% by four days post rash onset); b) acute and convalescent titers; c) viral isolation; d) PCR
- Pre-exposure vaccine efficacy: 94% one dose, 99+% two doses
- Isolation and quarantine: Yes
- Post-exposure prophylaxis: 72 hour window for vaccine but limited efficacy; 5 day window for IG but limited efficacy.
- Treatment: Supportive

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CASE DEFINITION

The following case definition for case classification of measles cases, including case classifications for importation status, has been approved by the Council of State and Territorial Epidemiologists (CSTE) and was published in 2012. [29]

Case definition for case classification

Clinical description:

An acute illness characterized by:
generalized, maculopapular rash lasting ≥3 days; and temperature ≥101°F or 38.3°C; and cough, coryza, or conjunctivitis

Probable:

In the absence of a more likely diagnosis, an illness that meets the clinical description with: no epidemiologic linkage to a laboratory-confirmed measles case; and
noncontributory or no measles laboratory testing.

Confirmed:

An acute febrile rash illness with:
isolation of measles virus from a clinical specimen; or detection of measles virus-specific nucleic acid from a clinical specimen using polymerase chain reaction; or IgG seroconversion or a significant rise in measles immunoglobulin G antibody using any evaluated and validated method; or a positive serologic test for measles immunoglobulin M antibody; or direct epidemiologic linkage to a case confirmed by one of the methods above.

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PROTECT YOUR STAFF

Make sure all staff are appropriately vaccinated against measles.

Make sure staff are fit-tested for N95 masks and have them available for use in the event of a suspect measles case. (Because it is airborne, a regular surgical mask will not fully protect a person from contracting or passing along measles)

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EDUCATE PATIENTS AND IMPROVE EARLY DETECTION

Educate established patients who are delaying vaccination about the risk of non-vaccination and travel. Ask about upcoming travel plans.

Ask patients to call ahead before using walk-in clinic or emergency department services and collect basic information at the first opportunity: reason for visit, recent possible exposures (especially international travel), and vaccination status.

Use secure online portals to allow families to submit photos of rash illness to assess for characteristics.

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KNOW HOW TO DIAGNOSE MEASLES

Know when to test for measles. Please use this flow chart.

Be aware of the distinguishing features of measles rash versus other rash illnesses, as well as how this rash appears on a variety of skin tones.

Screen patients for additional explanations for rash illness (dermatological reactions to recent antibiotic use are commonly mistaken for measles, but without proper travel history and testing, may be erroneously diagnosed when measles infection is responsible for the rash.)

Use the proper test for measles: collect a PCR swab at a minimum and consider a blood test, if practical. (Both of these may also be useful in checking for other diseases that are on the differential diagnosis. People being screened for measles should also be screened for other common/seasonal respiratory diseases such as COVID-19, Influenza, Strep infection, etc.) **In general, IgM tests alone for many diseases are not able to confirm a clinical diagnosis and PCR should be collected whenever applicable.**

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LIMIT EXPOSURE TO YOUR OTHER PATIENTS AND STAFF

Have receptionists ask patients measles screening questions at intake. If patients have symptoms of measles (febrile rash) and/or recent travel abroad, **room the patient as soon as possible after check-in.**

Have staff working with suspect measles patients use N-95 masks. Other patients and individuals may use surgical masks, since N-95 masks will be of limited use without a prior fit test.

Use a negative pressure room, if available.

Sanitize any rooms or space that a suspect or confirmed measles case has been and do not use the room for a minimum of **TWO HOURS** after its use.

Consider implementing drive-up testing or have contingency plans for testing patients outdoors or in their vehicle when weather allows.

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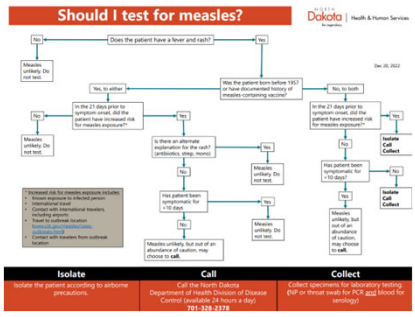

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NORTH DAKOTA STATE IMMUNIZATION LAW

23-07-17.1. Inoculation required before admission to school.

1. All students through grade 12 must meet a minimum number of required immunizations prior to school entrance.
   - These apply to public, private, and homeschooled students, as well as child care facilities.
   - According to ND Century Code, each institutional authority and district superintendent is legally responsible for excluding non-compliant students.
   - The school district and individual school employees may be liable for harm to students injured if a non-compliant student is allowed to attend school and spreads a vaccine-preventable disease to compliant students as a result of the employees' failure to comply with state immunization laws.
   - In addition, DPI can impose sanctions on schools that do not exclude non-compliant students ($1000 penalty per occurrence).

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SCHOOL VACCINATION REQUIREMENTS

	Number of Required Doses		
Vaccine Type	Kindergarten – Grade 6	Grades 7-10	Grade 11-12
DTaP/DTP/DT/Tdap/Td	5	5	5
Hepatitis B	3	3	3
IPV/OPV	4	4	4
MMR	2	2	2
Varicella (Chickenpox)	2	2	2
Meningococcal (MCV4)	0	1	2
Tdap	0	1	1

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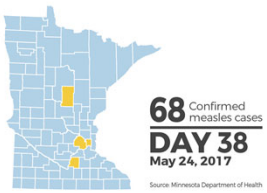
WHY SCHOOL VACCINES ARE IMPORTANT

Measles

- Each case of measles can infect up to 18 susceptible people, making it one of the most contagious diseases.
- Measles is a very serious illness. In recent outbreaks, nearly half of children have required hospitalization.
- For every 1000 measles cases, 1-2 will die.
- Over 100,000 people, mostly children, die from measles every year
- **The Herd Immunity Threshold for measles is 95%**



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MEASLES IN THE UNITED STATES

- As of March 7, 2024, a total of 45 measles cases were reported by 17 jurisdictions: Arizona, California, Florida, Georgia, Illinois, Indiana, Louisiana, Maryland, Michigan, Minnesota, Missouri, New Jersey, New York City, Ohio, Pennsylvania, Virginia, and Washington.

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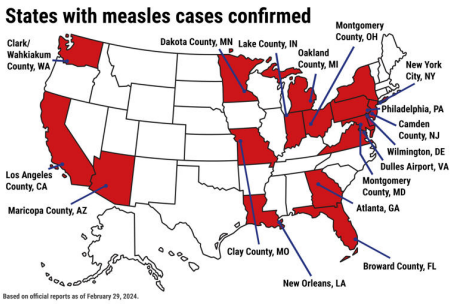

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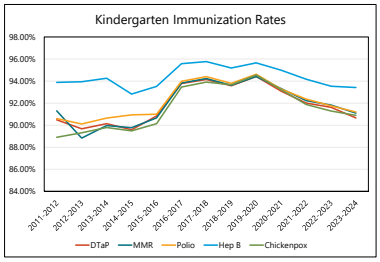
KINDERGARTEN IMMUNIZATION RATES AND TRENDS 2023-2024

MMR	91.11%
Polio	91.21%
DTaP	90.67%
Hepatitis B	93.42%
Chickenpox+Hx	90.90%



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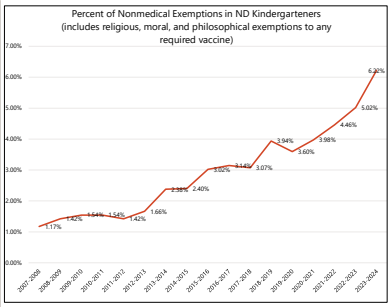
NON-MEDICAL EXEMPTIONS

These trends include the percentages of students who have exemptions to one or more of the following vaccines:

- MMR
- Polio
- DTaP
- Hepatitis B
- Chickenpox



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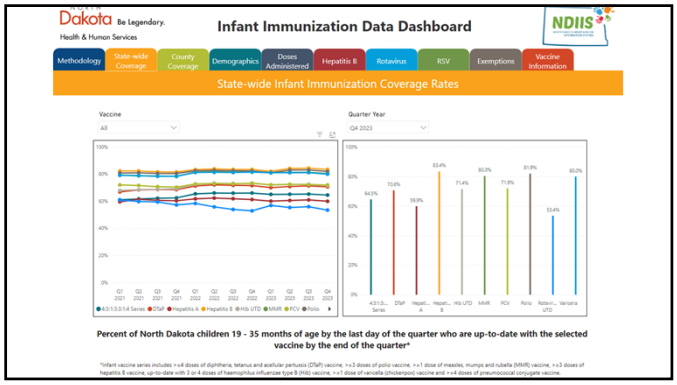

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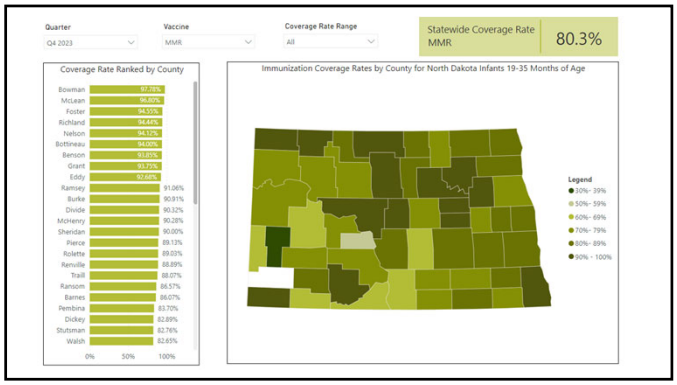

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ACTION ITEMS

- Schools and daycares:
  - Know the vaccination status of the children in your care
- Hospitals and clinics:
  - Be prepared to identify and contain measles
- Families and communities:
  - Get vaccinated! Especially before daycare, school, and travel

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SPECIAL CIRCUMSTANCES FOR MMR

- MMR is routinely given at 12 months old, with a second dose at 4-6 years old
- MMR *may* be given as early as 6-11 months, but this dose must be repeated after 12 months (for a total of three doses)
- Children under 6 months cannot receive MMR
- One dose of MMR vaccine is about 90% effective, the second dose is over 97% effective (a person may seroconvert after one dose)
- Doses need to be spaced at least 28 days apart and given at least 28 days after any other live vaccine
- The second dose may be given as early as 28 days after the first – the 4 to 6 year recommendation is for practical purposes and to fit with the US schedule+catch kids entering kindergarten

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PERTUSSIS AKA "WHOOPING COUGH"

- *Bordatella pertussis*
  - *Not to be confused with parapertussis*
- Respiratory infection
- Year round, late summer/autumn peak
- Cyclic incidence, 5-10 year peaks
- Incubation period 4-21 days (7-10 avg)

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- Early Symptoms
  - Coryza (runny nose)
  - Low-grade fever
  - Mild cough
  - Apnea in babies
- Late Symptoms
  - Paroxysms (fits) of cough
  - Inspiratory "whoop" (gasp)
  - Post-tussive emesis (coughing that causes gagging/vomiting)
  - Other sequelae of extreme coughing fits
  - Cyanosis (turning blue)

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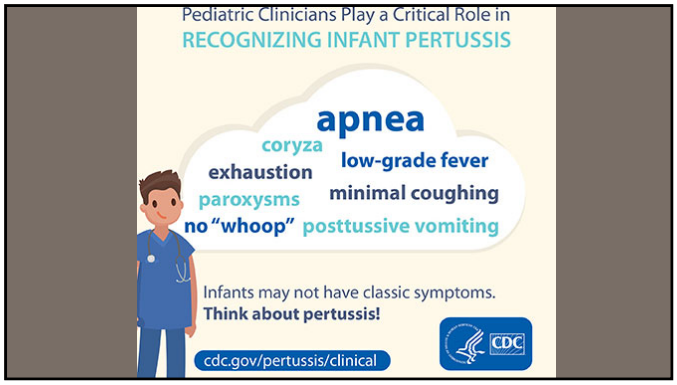

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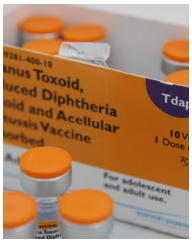
IMMUNIZATION TO PREVENT PERTUSSIS



- Previously DTP/DTwP
- Currently DTaP (primary) and Tdap (booster)
  - US changed to acellular vaccine by 1997
  - Given IM
- No single-antigen vaccine
  - All pertussis vaccines have the DT component, as well
  - Many DTaP formulations are combined with other vaccines on the pediatric schedule
- None contain thimerosal as a preservative

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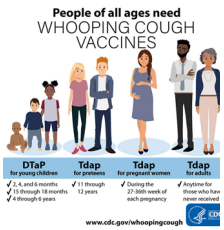
VACCINATION SCHEDULE

- DTaP
  - 2 months
  - 4 months
  - 6 months
  - 15-18 months
  - 4-6 years old
- Tdap
  - 11-12 years old
  - Catch-up for people not immunized before age 7
  - Pregnant people 27-36 week of pregnancy
  - Once in adulthood, to serve as a tetanus booster
    - Especially for those around susceptible infants for "cocooning" effect



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CASE DEFINITION (2020)

Clinical Criteria

- In the absence of a more likely diagnosis, a cough illness lasting ≥2 weeks, with at least one of the following signs or symptoms:
- Paroxysms of coughing; **OR**
- Inspiratory whoop; **OR**
- Post-tussive vomiting; **OR**
- Apnea (with or without cyanosis)

Laboratory Criteria

- *Confirmatory laboratory evidence:*
- Isolation of *B. pertussis* from a clinical specimen
- Positive Polymerase Chain Reaction (PCR) for *B. pertussis*
- **Epidemiologic Linkage**
- Contact with a laboratory-confirmed case of pertussis

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CASE DEFINITION (CONTINUED)

Case Classification

- **Probable**
- In the absence of a more likely diagnosis, illness meeting the clinical criteria
- **OR**
- Illness with cough of any duration, with
  - At least one of the following signs or symptoms:
    - Paroxysms of coughing; or
    - Inspiratory whoop; or
    - Post-tussive vomiting; or
    - Apnea (with or without cyanosis)
- **AND**
  - Contact with a laboratory confirmed case (epidemiologic linkage)
- **Confirmed**
- Acute cough illness of any duration, with
- Isolation of *B. pertussis* from a clinical specimen **OR**
- PCR positive for *B. pertussis*
- *NOTE: IgM is not diagnostic, for pertussis*

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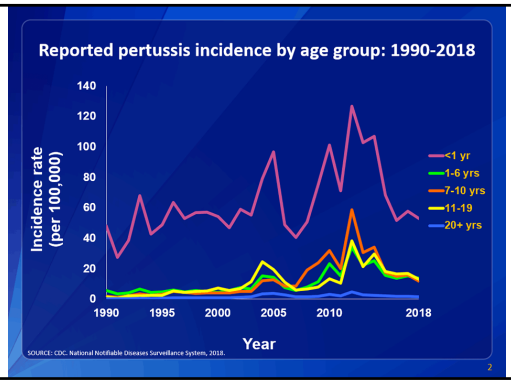

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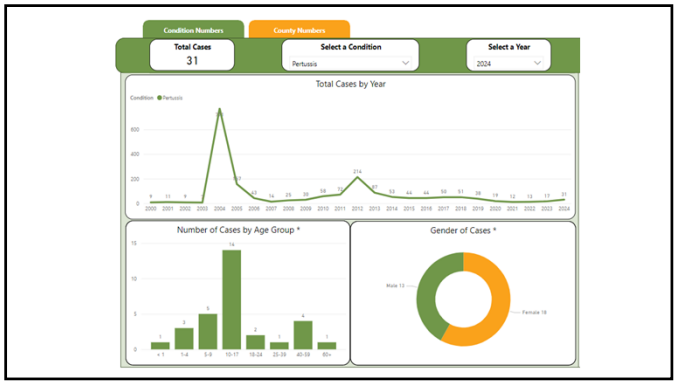
Condition Numbers
County Numbers
Total Cases
31
Select a Condition
Pertussis
Select a Year
2024
Total Cases by Year
Number of Cases by Age Group *
Gender of Cases *

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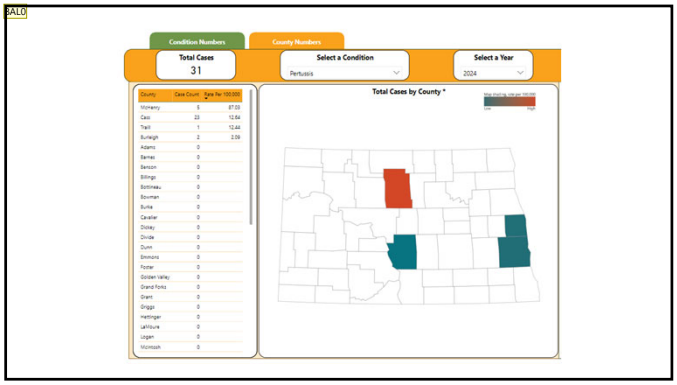
Condition Numbers
County Numbers
Total Cases
31
Select a Condition
Pertussis
Select a Year
2024
Total Cases by County *

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Pertussis Outbreak Overview -2023-2024
Last Updated: 3/11/2024
POPULATION
762,062
COUNTY
All
CASES
TOTAL CASES
43
TOTAL HOSPITALIZATIONS
2
TOTAL DEATHS
0
PERTUSSIS CASES
CASES BY AGE AND GENDER
CASE VACCINE STATUS
UNVACCINATED
10
PARTIALLY VACCINATED
7
FULLY VACCINATED
20
UNKNOWN VACCINATION STATUS
0

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Slide 32

BAL0 Can we release county when it is only one case?
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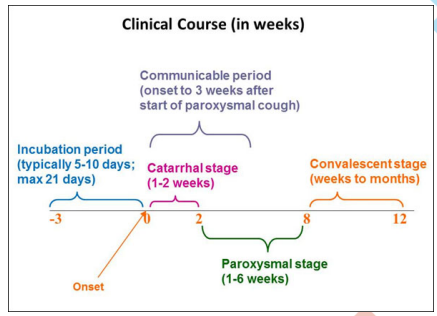

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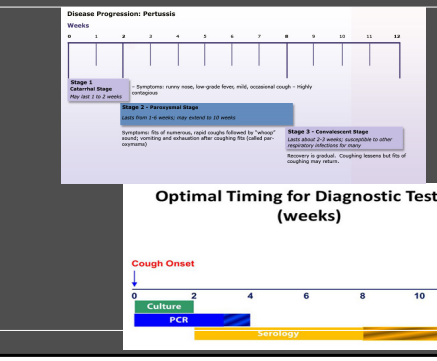

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Pertussis Treatment and Chemoprophylaxis Recommendations

Antibiotic	Infants (< 6 months of age)	Infants (≥ 6 months of age) and Children	Adults
Azithromycin*** (Zithromax®)	< 1 month: Recommended agent. 10 mg/kg/day in a single dose for 5 days 1-5 months: 10 mg/kg/day in a single dose for 5 days	10 mg/kg in a single dose on day 1 then 5 mg/kg per day on days 2-5 (Max 500mg)	500 mg in a single dose on day 1 then 250 mg per day on days 2-5
Erythromycin (E-mycin®, Eryc®, EryTab®)	< 1 month: Not preferred, associated with IHPS.* 1-5 months: 40-50 mg/kg per day in 4 divided doses for 14 days	40-50 mg/kg/day PO, in 4 divided doses for 14 days (Max 2 g/day)	2 g per day in 4 divided doses for 14 days
Clarithromycin (Biaxin®)	< 1 month: Not recommended 1-5 months: 15 mg/kg/day in 2 divided doses for 7 days	15 mg/kg/day PO in 2 divided doses for 7 days (Max 1 g/day)	1 g per day in 2 divided doses for 7 days
Trimethoprim-Sulfamethoxazole (Bactrim™, Septra®)	<2 months: Contraindicated 2-5 months: TMP 8 mg/kg/day, SMZ 40 mg/kg/day in 2 divided doses for 14 days	TMP 8 mg/kg/day, SMZ 40 mg/kg/day in 2 divided doses for 14 days	TMP 320 mg/day, SMZ 1600 mg/day in 2 divided doses for 14 days

SMZ = sulfamethoxazole, should not be given to pregnant women near term, nursing mothers, or infants < 2 months of age
TMP = trimethoprim, should not be given to pregnant women near term, nursing mothers, or infants < 2 months of age

Source: Centers for Disease Control and Prevention. Recommended Antimicrobial Agents for Treatment and Postexposure Prophylaxis of Pertussis. MMWR 2005;54 (No. RR-14):10.

*Infantile hypertrophic pyloric stenosis.

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CASE INVESTIGATION – WHAT DOES HHS DO?

- Confirm that the known or suspected case meets the pertussis case definition or is highly suspected.
  - Obtain basic clinical information available at the time of the interview; follow-up to assess cough duration for case classification is not needed.
- For infant cases <4 months of age or cases requiring hospitalization, more detailed information on the clinical course, hospitalization, and mother's Tdap vaccination history and case's DTaP vaccination history should be obtained.
- Ensure that the case has been recommended to receive antibiotic treatment if it is <21 days since cough onset

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IDENTIFY HIGH-RISK CONTACTS

- High-risk contacts definition: those at highest risk of severe dz or of transmitting to others who are at risk for severe disease, including:
  - Infants (under 12mo), especially <4mo and those w/o hx of DTaP
  - Pregnant women in third trimester
  - People who care for or live with infants
  - All who attend or work at childcare setting w/ infants or pregnant woman in 3rd trimester

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LOWER RISK CONTACTS

- Non-pregnant staff and students at childcare facility/school setting
- PEP is not necessarily needed, but contacts should be advised to monitor for symptoms for 21 days and seek care asap if early symptoms (cold-like) develop

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EXPOSED HEALTHCARE WORKERS

- If unmasked exposure occurred:
  - Contact may be offered PEP
  - Contact may self-monitor for symptoms for 21 days
- Guidance should consider the patient population served by HCW (PEP and exclusion are preferred if working with high-risk patients.)
- HAI/ICN should be notified/consulted

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WHO NEEDS PEP?

- All HH contacts
- Infants under 12 months old
- People with pre-existing health conditions
- People who are in contact with high-risk people
  - Especially those who work in a NICU, prenatal care, child care
- Potentially more individuals, in the event of an outbreak

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OTHER CONSIDERATIONS FOR PEP

- PEP for all HH contacts is recommended by CDC and AAP
- If exposure is ongoing (in the event of an outbreak, for instance) multiple courses of abx are not needed
- PEP has limited value when 21 days has passed

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EXCLUSION (ISOLATION OF CASE)

- Cases should be excluded until they've been on abx for 5 days or until 21 days after their cough began

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OUTBREAKS/LETTERS

Setting	Criteria Needed for Letter
Child Care	1 case: chemoprophylaxis should be recommended for the smallest setting possible (i.e. if children are in separate rooms)
Elementary School by classroom	1 case
Middle School by grade	At least 2 cases
High School by grade	At least 2 cases
Group Activities with fewer than 20 participants	1 case
Group Activities with more than 20 participants	At least 2 cases or prolonged contact in an enclosed space.
Sports Activities	If activity involves close, prolonged contact in an enclosed space or if sharing of water bottles is common.

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POST-TEST

- Post-test
  - Nurses interested in continuing education credit, visit Successfully complete the five-question post-test to receive your certificate: https://ndhealth.co1.qualtrics.com/jfe/form/SV_51p23PYHh24Lm2W
  - Credit for this session will not expire until April 9, 2024.
- This presentation will be posted to our website: www.hhs.nd.gov/immunizations

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QUESTIONS?

Thank you!

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