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Chemoprophylaxis of Healthcare Workers Exposed to Neisseria meningitidis: Is Indiana Demonstrating Good Antimicrobial Stewardship?

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Invasive meningococcal disease is most frequently characterized by bacteremia, sepsis and meningitis, although cases may also present as pneumonia, septic arthritis and pericarditis. The most severe form the disease, meningococcemia, presents as hypotension, disseminated intravascular coagulation, and multi-organ failure and is fatal in up to 40% of all cases.¹

In the United States, it is estimated that at least 1,400 cases of meningococcal disease occur each year². During 2008, there were 27 confirmed cases reported in Indiana residents, with 3 deaths (ISDH, unpublished data, 2008).

Neisseria meningitidis is transmitted through direct contact with respiratory secretions of infected individuals. The incubation period for the infection ranges from 2 -10 days, most frequently 3-4 days³. However, the highest incidence of secondary cases occurs immediately after the onset of disease in the index patient, making it important to prophylax close contacts as soon as possible, ideally less than 24 hours after identification of the primary case.

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Recommendations for Healthcare Workers

Postexposure prophylaxis is recommended for healthcare workers who have had intensive, unprotected contact (without wearing a mask) with infected patients' oral or nasal secretions. This would include individuals performing an intubation or handling the endotracheal tube, mouth to mouth resuscitation, or performing a close examination of the oropharynx of patients. Healthcare workers may also be at increased risk for meningococcal infection if exposed to patients with a lower respiratory infection who are experiencing an active, productive cough⁴. The best way healthcare workers can protect themselves is by adherring to droplet precautions until the patient is considered no longer infectious (after 24 hours of antimicrobial therapy).

Any healthcare worker who has *not* had direct contact with the patient's respiratory droplets is considered at *low-risk* for infection and should *not* receive antimicrobial prophylaxis regardless of that individual's current health status, exposure to individuals who have suffer from chronic conditions, or are currently pregnant.

Recommended Chemoprophylaxis Regimen

The current regimen for post-exposure prophylaxis is listed in the Indiana *Communicable Disease Reporting Rule for Physicians, Hospitals and Laboratories*, 410 IAC 1-2.3, December 12, 2008. A printed copy of the rule has been distributed to local health departments and is also available online at: http://www.in.gov/isdh/files/comm_dis_rule.pdf

Recommended Chemoprophylaxis for High-Risk Close Contacts

Age	Dose	Duration	Cautions		
Rifampin					
< 1 month	5 mg/kg oral every 12 hours	2 days			
> 1 month	10 mg/kg oral every 12 hours	2 days	Not recommended for use during pregnancy		
Ceftriaxone					
< 15 years	125 mg IM	single dose			
> 15 years	250 mg IM	single dose			
Ciprofloxacin					
> 18 years	500 mg oral	single dose	Not recommended for use during pregnancy		

Epi Flashback

1889 - Secretary's Report dated August 16, 1889 reports the death of a Parke County farmer due to Glanders. Also discussed is the case of Dr. Paul Paquin, a veterinarian who became infected after "taking some virus from a glandered horse ...and not observing "his usual precaution of wearing rubber gloves." Dr. Paquin began a treatment of 20 grain doses of iodide of potassium three times a day. Further treatments of rubbing mercury and increased doses of iodide of potassium were given, later substituted with arsenic. Dr. Paquin survived the infection. According to the CDC, glanders is caused by the bacterium Burkholderia mallei and primarily infects horses. No human infections have been reported since 1945, with the exception of an occasional laboratory worker being exposed.

> Sources: State Board of Health, Indiana Report 1889

CDC Division of Foodborne, Bacterial and Mycotic Diseases

Indiana Exposure Report

From October 2008 –April 30, 2009, there were 20 reported cases of meningococcal disease in Indiana (2 suspect cases, 2 probable cases, 14 confirmed cases, and 2 cases that were reported by lab error, but were not actually cases). A total of 504 individuals received prophylaxis related to exposure from a case of meningococcal disease; this does not include the number of individuals who received prophylaxis from exposure to a case of bacterial meningitis due to another etiologic agent (approximately 62 individuals) or those who received prophylaxis due to close contact with an asymptomatic nasopharyngeal carrier. Of the estimated 566 individuals who received prophylaxis, 306 were healthcare workers.

Of the 20 reported cases, only 4 of these patients were intubated. Intubation was often performed in the field or at the admitting hospital, rather than the transferring hospital where the prophylaxis was offered. Only 1 of the 19 patients had significant lower pulmonary involvement reported in the case investigation. Two of the cases were in individuals <1 year of age. Two of the cases had confusion or combativeness reported in the progress notes in the case investigation; it is unclear whether this behavior resulted in direct exposure to the patients' respiratory droplets.

The Indiana State Department of Health frequently receives questions on the appropriate use of chemoprophylaxis for healthcare workers. Listed below are answers to the most frequently asked questions regarding the prophylaxis of health care workers:

1. What prophylaxis regimen is recommended after exposure to individuals who are identified as carriers of meningococcal bacteria?

Prophylaxis for exposure to nasopharyngeal carriers of the disease (i.e. a workplace exposure to an individual with a positive sputum culture) is not necessary or recommended. It is currently estimated that 5-10 % of the general population are asymptomatic carriers of the bacteria; however, less than 1% of all carriers will develop invasive disease¹.

Meningococci are classified into serogroups according to the immunological reactivity of the polysaccharide capsule antigen. Thirteen serogroups have been identified, but only 5 of them can cause invasive disease (A, B, C, Y, and W135). Of these five groups, only three are endemic to the United States (B, C, and Y). A positive result from a respiratory specimen does not indicate that an individual is a carrier of a pathogenic serogroup of the bacteria.

Epi Flashback

1944 – Acting State Health Commissioner Dr. Thurman Rice describes a Typhoid epidemic in northern Indiana. As of "March 15, two hundred twenty-five proved cases and there have been officially reported twelve deaths." "After a week or so of study it was hypothecated that the epidemic was due to some food produced ... in the area ... and served without being cooked." A list of products and distribution points "were determined and spotted on a map." In addition, cases were "spotted on a map" and "attention was drawn to the possibility that the source may be the Sanitary Dairy Company of Peru." Ultimately the source was identified as cheese produced by the dairy company. This "epidemic" shows the value of understanding the geographic distribution of disease.

> Source: Monthly Bulletin Indiana State Board of Health February, 1944

2. When is it most appropriate to offer prophylaxis to healthcare workers?

While it is recommended to offer prophylaxis to high-risk close contacts within 24 hours of identification of a case, it is most appropriate to offer the prophylaxis *after* the organism has been identified:

- Lab report of positive *N. meningitidis* culture from an invasive site
- Lab report of gram negative diplococci (or cocci) from an invasive site
- Clinical purpuric fulminans present (with or without culture results)
- Lab report of positive *N. meningitidis* result from validated PCR

A general rule to follow with the prophylaxis of health care workers is to offer the prophylaxis when the case is reported to the health department.

3. What dosage of ciprofloxacin, rifampin or ceftriaxone is recommended for individuals with previously diagnosed immunodeficiencies?

It is not necessary to prescribe more than the recommended regimen of antibiotic therapy, even to individuals with underlying immunodeficiencies.

4. When is mass vaccination recommended?

During an unusual outbreak/cluster (other than serogroup B), mass vaccination should be considered when the attack rate in an organization or community exceeds 10 cases per 100,000*. Mass prophylaxis with antimicrobials may be considered in outbreaks involving limited

Epi Flashback

1929 – From The Inaugural Address of President Herbert Hoover

"In public health the discoveries of science have opened a new era. Many sections of our country and many groups of our citizens suffer from disease, the eradication of which are mere matters of administration and **moderate** (emphasis added) expenditure. Public health service should be as fully organized and as universally incorporated in our governmental system as is public education. The returns arethousand-fold in economic benefits, and infinitely more in reduction of suffering and promotion of human happiness."

> Source: The Indiana State Board of Health Monthly Bulletin, March 1929

populations, and should be administered to all targeted persons at the same time. It should not be used during a community-wide outbreak⁵.

*When calculating attack rates, co-primary or secondary cases that are close contacts of cases should not be included in the case count.

References

- 1. Rosenstein NE, Perkins BA, Stephens DS, Popovic T, Hughes JM. Meningococcal disease. N Engl J Med 2001;344:1378-88.
- 2. CDC. Prevention and control of meningococcal disease. MMWR 2005;54 (No.RR-7): 1-17.
- 3. Heyman DL, editor. Control of Communicable Diseases Manual 19th ed. 2008: 415 421.
- Bolyard EA, Tablan OC, Wiliams WW, Pearson ML, Shapiro CN, Deitchman SD, et al. Guideline for infection control in health care personnel, 1998. AJIC 1998;26:289-354.
- CDC. Control and prevention of meningococcal disease and prevention of serogroup C meningococcal disease: evaluation and management of suspected outbreaks; recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 1997; 46(No.RR-5): 1-21.

March 2009 I-NEDSS Update







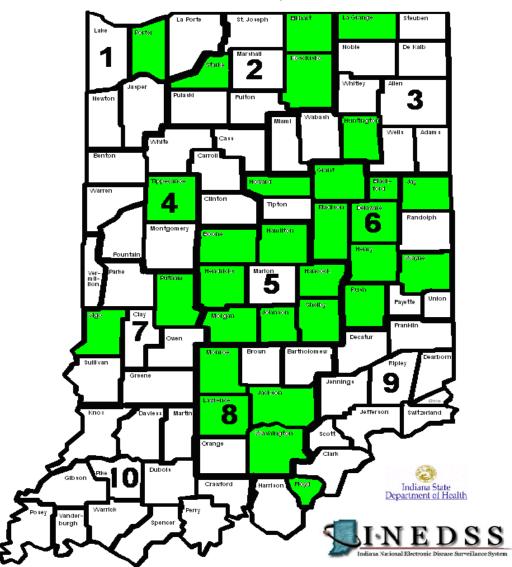
Les Brumbaugh IT Project Manager I-NEDSS, PHIN

The Indiana National Electronic Disease Surveillance System (I-NEDSS) is a web-based application that promotes the collection, integration, and sharing of reportable disease data at federal, state, and local levels. The purpose of I-NEDSS is to automate the current paper-based process for reporting of lab reports, communicable disease reports (CDR), and case investigations.

I-NEDSS is, above all else, a tool to support and enhance the reporting process outlined in the Communicable Disease Reporting Rule, IAC 410

(http://www.in.gov/legislative/iac/T04100/A00010.PDF). Benefits of I-NEDSS include an increase of speed, accuracy, and accountability in reportable disease surveillance efforts by having the reporting and investigation forms accessed, completed, and submitted electronically.

The I-NEDSS Project Team has been busy in the first quarter of 2009. Trainings were conducted in Bloomington and the first district level I-NEDSS training, for District 6, in Muncie. Thirty local health departments received training and are now utilizing I-NEDSS. These counties are identified on the map below.



I-NEDSS PARTICIPATING COUNTY HEALTH DEPTS MARCH 6, 2009

Feedback from the trainings has been positive. The I-NEDSS Project Team continues to make improvements based on feedback and suggestions. I-NEDSS Release version 3.4.1 was put into production in February of this year, with I-NEDSS Release version 3.4.2 scheduled for early April.

Also scheduled in April are trainings for District 3 (April 22) and District 2 (April 30). Classes for these training sessions are currently full. Other training sessions are being planned for later this year. See the complete District Training Schedule below.

I-NEDSS Production Release and District Training Schedule

02/09	I-NEDSS Production Release v3.4.1
03/4	District 6 Training @ Ball Memorial Hospital, Muncie Blackford, Delaware, Fayette, Grant, Henry, Howard, Jay, Madison, Randolph, Rush, Tipton, Union, Wayne
04/9	I-NEDSS Production Release v3.4.2
04/22	District 3 Training @ Parkview Hospital, Ft. Wayne Adams, Allen, De Kalb, Huntington, La Grange, Miami, Steuben, Noble, Wabash, Wells, Whitley,
04/30	District 2 Training @ Memorial Hospital, South Bend Elkhart, Fulton, Kosciusko, Marshall, Pulaski, St. Joseph, Starke
Week of 05/25	I-NEDSS Production Release v3.4.3
06/15	District 1 Training – @ Methodist Hospital Southlake Campus, Merriville East Chicago HD, Gary HD, Jasper, Lake, La Porte, Newton, Porter
06/22	District 4 Training – @ Tippecanoe County Office Building, Lafayette Benton, Cass, Carroll, Clinton, Fountain, Montgomery, Tippecanoe, Warren, White
Week of 07/10	I-NEDSS Production Release v3.4.4
Week of 07/27	District 7 Training – TBD Clay, Greene, Owen, Parke, Putnam, Sullivan, Vermillion, Vigo
Week of 08/03	District 8 Training – TBD Bartholomew, Brown, Jackson, Lawrence, Monroe, Orange, Washington
Week of 09/04	I-NEDSS Production Release v3.4.5
Week of 09/21	District 10 Training – TBD Crawford, Daviess, Dubois, Gibson, Knox, Martin, Pike, Perry, Posey, Spencer, Vanderburgh, Warrick
Week of 09/28	District 9 Training – TBD Clark, Dearborn, Floyd, Harrison, Jefferson, Jennings, Ohio, Ripley, Scott, Switzerland
Week of 10/30	I-NEDSS Production Release v3.4.6
Week of 11/16	District 5 Training – Indiana State Department of Health, Indianapolis Boone, Hamilton, Hancock, Hendricks, Johnson, Marion, Morgan, Shelby

Keep in the Loop!!!

Training will be given in contiguous districts, so if a local health department cannot participate in local district training, there will be opportunities to participate in training in neighboring districts. Please contact the I-NEDSS Helpdesk as early as possible if you need to attend a training that is not in your district.

I-NEDSS Updates are given in a variety of places:

- LHD Resource Website (https://myshare.in.gov/isdh/lhdresource/default.aspx)
- LHD-ISDH Conference Call (2nd Friday of every month)
- *Indiana Epidemiology Newsletter* (http://www.in.gov/isdh/17458.htm)
- Indiana Health Alert Network (IHAN)
- Direct communication via the ISDH Field Epidemiologists
- Other outlets as identified

For more information, or if you have specific questions, you can reach the I-NEDSS Project Team at any time by contacting our helpdesk via email: I-NEDSS@isdh.in.gov

The I-NEDSS Project had several successes during 2008. With your participation, we will make major improvements in disease reporting and surveillance for Indiana in 2009.

Frequently Asked Questions: Varicella Special Edition

Kristin Ryker, MPH Vaccine Preventable Disease Epidemiologist

Q: Why is varicella now a reportable disease in Indiana?

A: Now that two doses of varicella vaccine are part of the routine immunization schedule, the epidemiology of varicella will change. This is our first opportunity to identify the burden of disease and track changes over time. Over the next few years, as coverage with two doses of varicella vaccine increases, the number of cases and, thus, the number of case investigations, will decrease. It is expected that transmission of varicella will someday be interrupted.

Q: Which cases of varicella are reportable?

A: All cases of primary varicella disease (chicken pox) are reportable. According to the Centers for Disease Control and Prevention, reportable cases can be those diagnosed by a health care provider or those identified by a parent/guardian.

Q: Are schools required to report cases of varicella?

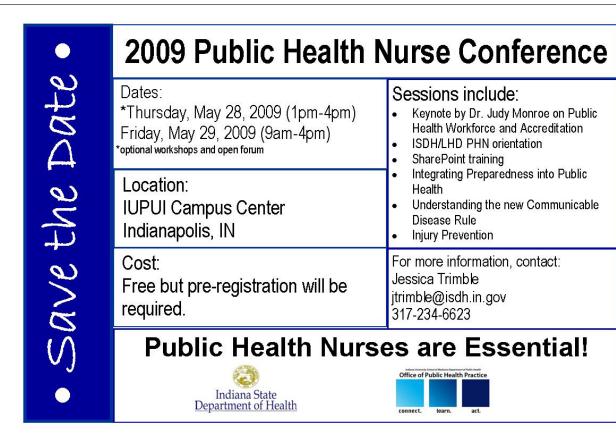
A: While schools are not legally required to report cases of any reportable communicable diseases, if the school has not already been contacted by health department staff, it is recommended that schools contact the local health department. Schools often are the best eyes and ears for health concerns in a community.

Q: How should cases of varicella be reported?

A: Cases of primary varicella (chicken pox) should be reported to the local health department using I-NEDSS the Confidential Report of Communicable Diseases form (State Form 43823) available at http://www.in.gov/isdh/files/43823.pdf.



Training Room



The conference will be held at the IUPUI Campus Center on Thursday, May 28th and Friday, May 29th, 2009. You will find the latest agenda attached to this e-mail.

Please contact Jessica Trimble if you have any questions about the conference or registration.

We look forward to seeing you in May!

INDIANA STATE DEPARTMENT OF HEALTH IMMUNIZATION PROGRAM PRESENTS:

Immunizations from A to Z

Immunization Health Educators offer this FREE, one-day educational course that includes:

- Principles of Vaccination
- Childhood and Adolescent Vaccine-Preventable Diseases
- Adult Immunizations
 - o Pandemic Influenza
- General Recommendations on Immunization
 - o Timing and Spacing
 - o Indiana Immunization Requirements
 - o Administration Recommendations
 - Contraindications and Precautions to Vaccination
- Safe and Effective Vaccine Administration
- Vaccine Storage and Handling
- Vaccine Misconceptions
- Reliable Resources

This course is designed for all immunization providers and staff. Training manual, materials, and certificate of attendance are provided to all attendees. Please see the Training Calendar for presentations throughout Indiana. Registration is required. To attend, schedule/host a course in your area or for more information, please reference http://www.in.gov/isdh/17193.htm.

ISDH Data Reports Available

The following data reports and the *Indiana Epidemiology Newsletter* are available on the ISDH Web Page:

http://www.IN.gov/isdh/

HIV/STD Spotlight Reports (June 2007, December 2007, June 2008, January 2009)	Indiana Mortality Report (1999-2006)
Indiana Cancer Report: Incidence; Mortality; Facts & Figures	Indiana Infant Mortality Report (1999, 2002, 1990-2003)
Indiana Health Behavior Risk Factors (1999-2006)	Indiana Natality Report (1998-2006)
Indiana Health Behavior Risk Factors (BRFSS) Newsletter (2003-2008)	Indiana Induced Termination of Pregnancy Report (1998-2005)
Indiana Hospital Consumer Guide (1996)	<u>Indiana Marriage Report</u> (1995, 1997, & 2000-2004)
Public Hospital Discharge Data (1999-2006)	Indiana Infectious Disease Report (1997-2006)
Assessment of Statewide Health Needs – 2007	Indiana Maternal & Child Health Outcomes & Performance Measures (1989-1998, 1990-1999, 1991-2000, 1992-2001, 1993-2002, 1994-2003, 1995-2004, 1996-2005)

HIV Disease Summary

Information as	of January 31	2009 based on	2000 population	of 6.080.485)
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HIV - without AIDS to date:

304	New HIV cases April 2008 thru March 31, 2009	12-month incidence	5.28 cases/100,000			
3,862	Total HIV-positive, alive and without AIDS on March 31, 2009	Point prevalence	67.14 cases/100,000			
AIDS ca	AIDS cases to date:					
405	New AIDS cases from April 2008 thru March 31, 2009	12-month incidence	7.04 cases/100,000			
4,282	Total AIDS cases, alive on March 31, 2009	Point prevalen	ce 74.44 cases/100,000			
8,948	Total AIDS cases, cumulative (alive and dead) on March 31, 2009					

REPORTED CASES of selected notifiable diseases

Disease	Cases Reported in February MMWR Weeks 5-8		Cases Reported in January – February MMWR Weeks 1-8	
	2008	2009	2008	2009
Campylobacteriosis	31	27	40	54
Chlamydia	1,499	1,650	3,258	3,259
Cryptococcus	3	0	4	0
Cryptosporidiosis	6	11	11	22
E. coli, shiga toxin-producing	0	1	2	2
Giardiasis	Not Reportable	6	Not Reportable	15
Haemophilus influenzae, invasive	7	5	9	10
Hemolytic Uremic Syndrome (HUS)	0	0	0	0
Hepatitis A	1	1	2	3
Hepatitis B	3	6	3	11
Hepatitis C Acute	0	0	0	3
Histoplasmosis	8	9	10	12
Influenza Deaths (all ages)	4	0	4	0
Gonorrhea	595	575	1,325	1,128
Legionellosis	3	3	3	6
Listeriosis	0	0	0	0
Lyme Disease	0	1	0	1
Measles	0	0	0	0
Meningococcal, invasive	1	5	2	6
Mumps	0	0	0	0
Pertussis	2	0	3	0
Rocky Mountain Spotted Fever	0	0	0	0
Salmonellosis	18	14	30	34
Shigellosis	68	8	136	15

REPORTED CASES of selected notifiable diseases

Disease	Cases Reported in February MMWR Weeks 5-8		Cases Reported in January – February <i>MMWR</i> Weeks 1-8	
	2008	2009	2008	2009
Severe Staphylococcous aureus in Previously Healthy Person	Not Reportable	2	Not Reportable	4
Group A Streptococcus, invasive	16	17	23	33
Group B Streptococcus, Newborn	1	0	3	1
Group B, Streptococcus, invasive	23	17	37	39
Streptococcus pneumoniae (invasive, all ages)	75	35	144	56
Streptococcus pneumoniae (invasive, drug resistant)	18	21	33	28
Streptococcus pneumoniae (invasive, <5 years of age)	2	1	9	1
Syphilis (Primary and Secondary)	11	18	18	26
Tuberculosis	10	4	20	12
Vibriosis	Not Reportable	0	Not Reportable	0
Varicella	Not Reportable	8	Nor Reportable	16
Yersiniosis	1	0	2	3
Animal Rabies	0	0	0	0

For information on reporting of communicable diseases in Indiana, call the *Surveillance and Investigation Division* at 317.233.7125.



Epidemiology Resource Center 2 North Meridian Street, 5-K Indianapolis, IN 46204 317/233-7125

Cover photo of Cryo-EM reconstruction of a norovirus capsid courtesy of Dr. B.V.V. Prasad, Baylor College of Medicine, Houston, TX 77030 The *Indiana Epidemiology Newsletter* is published monthly by the Indiana State Department of Health to provide epidemiologic information to Indiana health care professionals, public health officials, and communities.

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