Indiana Epidemiology Newsletter

Volume 17, Issue 5 July/August 2009

Summer: Season For Water Safety

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Most people don't think of diarrhea when they visit a swimming pool or water park, and when public pools are properly maintained and chlorinated, the risk is low. However, over the past 10 years, over 150 outbreaks of gastrointestinal illness have been reported involving community pools, large water parks, hot tubs, spas, lakes, and rivers.

Many outbreaks go unnoticed because people do not consider pool water as a possible source of illness. It may take up to several weeks for some germs to cause symptoms of illness. The longer the time period between swimming and development of illness, the less likely people are to associate their illness with swimming activity. As a result, the number of actual outbreaks is probably greater than those currently reported.

If you see fecal matter in the pool, notify the pool attendant or lifeguard. Depending on the pool policy, the lifeguard may request swimmers to leave the water. The water may be tested and the chlorine levels increased. Although this interruption can be frustrating, it is good public health practice, and may keep you and your family from getting sick.

Just because you don't see fecal matter in the pool doesn't mean the water is safe. Diarrheal contamination of a pool will most likely be invisible. The safest, most well managed pools are maintained with proper chlorine levels at ALL times. Chlorine will kill most, but not all germs, so informed and considerate swimmers play a crucial role in preventing waterborne diseases.
The following list of questions and answers from the Centers for Disease Control and Prevention (CDC) can be found at www.cdc.gov under the recreational water illness section.

<u>What are recreational water illnesses (RWIs)?</u>

RWIs are illnesses that are spread by swallowing, breathing, or having contact with contaminated water from swimming pools, spas, lakes, rivers, or oceans. Recreational water illnesses can cause a wide variety of symptoms, including gastrointestinal, skin, ear, respiratory, eye, neurologic and wound infections. The most commonly reported RWI is diarrhea. Diarrheal illnesses can be caused by germs such as *Cryptosporidium* ("crypto"), *Giardia, Shigella*, Norovirus, and *E. coli* O157:H7.

Where are RWIs found?

RWIs can be spread through use of swimming pools, hot tubs, water parks, decorative water fountains, oceans, lakes, and rivers.

Swimming Pools, Water Parks, and Spray Features

The most common illness spread through use of swimming pools is diarrhea. If swimmers are ill with diarrhea, the germs they carry can contaminate the water if they have fecal accident in the pool. On average, people have about 0.14 grams of feces on their bottoms which, when rinsed off, can contaminate recreational water. When people are ill with diarrhea, their stool can contain millions of germs. Therefore, swimming when ill with diarrhea can easily contaminate large pools or water parks. As a result, if someone swallows water that has been contaminated with feces, he/she may become sick. Many of these diarrhea-causing germs do not have to be swallowed in large amounts to cause illness. Standing water is not necessary for RWIs to spread, so even spray decks can become contaminated (the water remains in a collection tank underground) and spread illness. To ensure that most germs are killed, chlorine or other disinfectant levels and pH should be checked regularly as part of good pool operation.

Hot Tubs

Skin infections like "hot tub rash" are the most common RWIs spread through hot tubs and spas. Chlorine and other disinfectant levels evaporate more quickly because of the higher temperature of the water in the tubs. Respiratory illnesses are also associated with hot tub use if the hot tub is not well maintained. "Hot tub rash" can also be spread in pools and at the lake or beach. Because of the generally confined areas in which hot tubs are located, disinfectant levels that are too high may also cause symptoms of illness. Because of this it is important to check disinfectant levels even more regularly than in swimming pools.

Decorative Water Fountains

Not all decorative or interactive fountains are chlorinated or filtered. Therefore, when people, especially diaper-aged children, play in the water, they can contaminate the water with fecal matter, especially if sitting or standing over the fountain. Swallowing this contaminated water can then cause diarrheal illness.

Epi Flashback

1944 - An article discusses whether communities should "plan a … swimming pool as a postwar construction project." Included is a swimmer's code with the following recommendations:
"I will not swim until an hour after mealtime. I will not enter the water while I am overheated. I will not swim while alone. I will not dive into water of unknown depth. I will not take swimming lessons in deep or running water. I will not stay in the water after becoming chilled. I will not tax my strength in the water. I will learn to float."

Source: Monthly Bulletin, Indiana State Board of Health July 1944

Lakes, Rivers, and Oceans

Lakes, rivers, and oceans can become contaminated with germs from sewage, animal waste, water runoff following rainfall, fecal accidents, and germs rinsed off the bottoms of swimmers. It is important to avoid swallowing the water because natural recreational water is not disinfected. Avoid swimming after rainfalls or in areas identified as unsafe by health departments. Contact your state or local health department for results of water testing in your area or go to EPA's beach site or their National Health Protection Survey of Beaches.

Why doesn't chlorine kill some of these RWI germs?

Chlorine in swimming pools does kill many of the germs that may make people sick, but it can take time. Chlorine in properly disinfected pools kills most germs that can

cause RWIs in less than an hour. Chlorine takes longer to kill some germs such as *Cryptosporidium*, which can survive for days in even a properly disinfected pool. This means that without your help, illness can spread even in well-maintained pools.

Healthy swimming behaviors are needed to protect you and your family from RWIs and will help stop transmission of illness in recreational water settings.

Who is most likely to get an RWI?

Children, pregnant women, and people with weakened immune systems (such as those with HIV, those who have received an organ transplant, or those receiving certain types of chemotherapy) can suffer from more severe illness if infected. People with compromised immune systems should be aware that recreational water might be contaminated with human or animal waste that contains *Cryptosporidium*, which can be life threatening in persons with weakened immune systems. People with a compromised immune system should consult their health care provider before participating in behaviors that place them at risk for illness.

REFERENCES:

http://www.cdc.gov/healthyswimming/
http://www.cdc.gov/healthyswimming/fact_sheets.htm
http://www.epa.gov/waterscience/beaches/aboutsurvey.html
http://www.epa.gov/OST/beaches
http://www.cdc.gov/healthyswimming/6_pleas.htm
http://www.cdc.gov/healthyswimming/pdf/pool_user_tips.pdf
http://www.cdc.gov/healthyswimming/pdf/test_strip_instructions.pdf
htpp://www.cdc.gov/healthyswimming/pdf/spa_user_tips.pdf
http://www.healthyswimming.org

Clostridium difficile Resource Manual

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The Indiana State Department of Health (ISDH) Surveillance and Investigation Division (SID) has recently posted resource material related to *Clostridium difficile* (*C. difficile*) on its Web site. This web resource manual can be accessed at http://www.in.gov/isdh/files/CDI_ResourceManual.pdf. The SID hopes this web manual will be helpful in reducing the risk of infection and providing healthcare personnel and the public with the most up-to-date information on *C. difficile* infection (CDI).

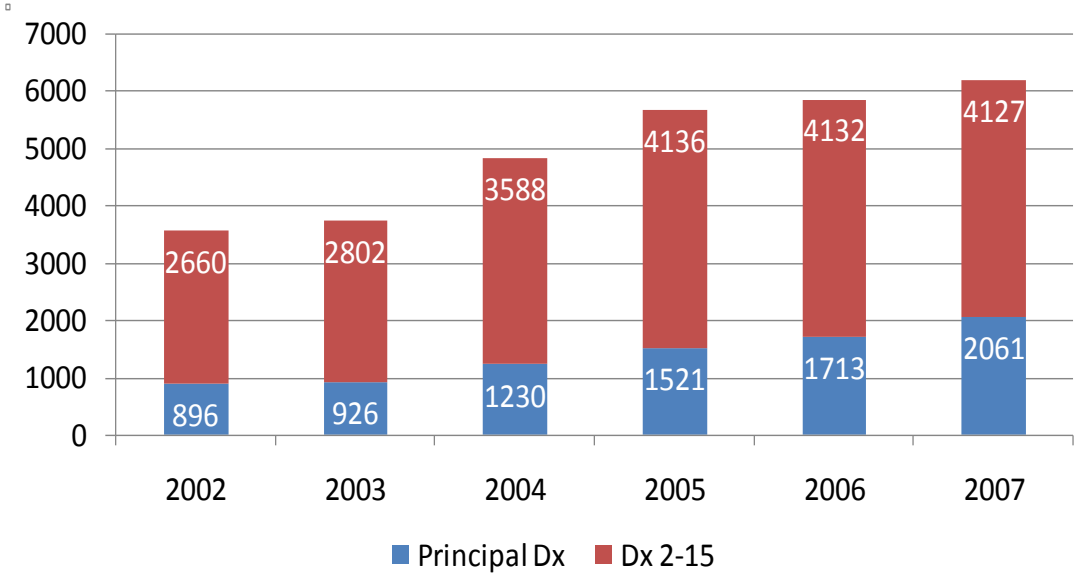
The manual is separated into five categories with various resources from the ISDH, the Centers for Disease Control and Prevention (CDC) and other expert groups. Each of the five categories listed below has several links to information related to the topic. The five categories are:

- General Information about *Clostridium difficile*
- *Clostridium difficile* Information for Those Who Work in Healthcare Settings
- Antibiotic Facts and Resources
- Hand washing Facts and Resources
- Journal Articles and Slide Presentations on CDI

C. difficile is a gram-positive, anaerobic, spore forming bacillus. Symptoms of CDI include watery diarrhea, fever, loss of appetite, nausea, and abdominal pain/tenderness. *C. difficile* is the most common cause of infectious diarrhea in hospitalized patients and causes an average of $3,600 in excess medical costs per case and an average of 3.6 extra hospital days. Antibiotic use is the primary risk factor for CDI because it disrupts normal bowel flora and allows *C. difficile* overgrowth. Most people who develop CDI are elderly, had a recent history of antibiotic use, and/or had been recently hospitalized. But in recent years, an increase has been seen in the number of people with CDI who have no recent history of antibiotic use or hospitalization. This is considered to be community acquired CDI.

Although CDI is not a reportable condition in Indiana, ISDH staff members have been able to analyze hospital discharge and vital records death data as an indicator of trends in the occurrence of infection in the severely ill and/or hospitalized cases. The remainder of this report provides a brief summary of that data.
Discharge data was analyzed from 117 critical Access and short-term stay hospitals (acute care hospitals) for the period 2002-2007. Figure 1 shows that patients *discharged* with CDI listed as first (primary) or any diagnosis increased 74% from 2002 (3556 cases) to 2007 (6188 cases). The increase in *primary diagnosis*, from 896 cases in 2002 to 2061 cases in 2007 represents a 130% increase.

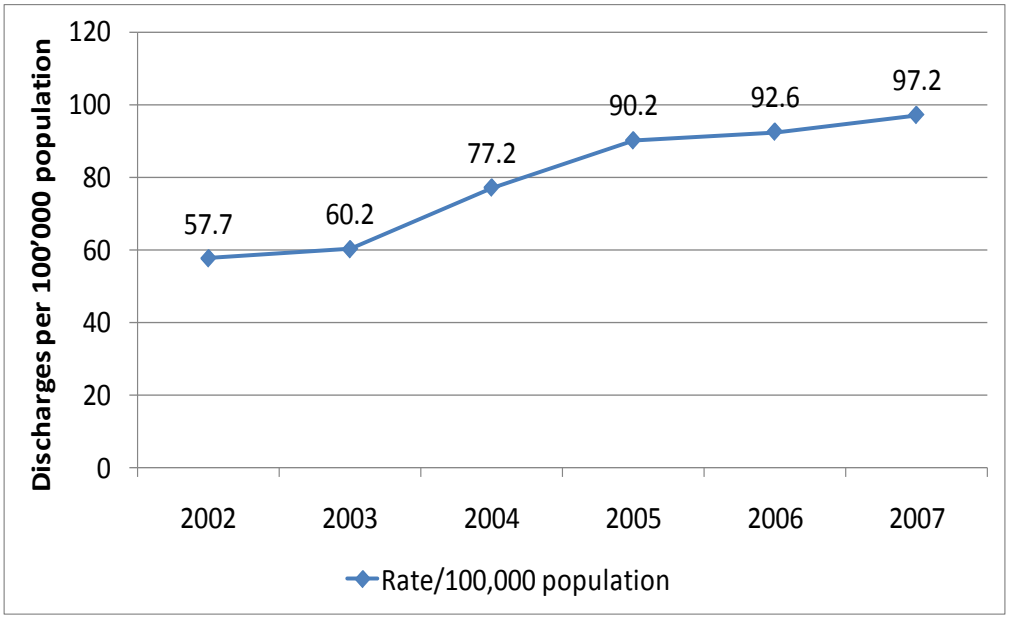
Figure 1. *Clostridium difficile* Cases
Critical Access and Short-Term Stay Hospitals
Indiana, 2002-2007



* Source: Indiana Hospital Discharge Data Set

The rate of patients (per 100,000 population) discharged with first or any diagnosis increased 68% from 57.7 in 2002 to 97.2 in 2007 (Figure 2).

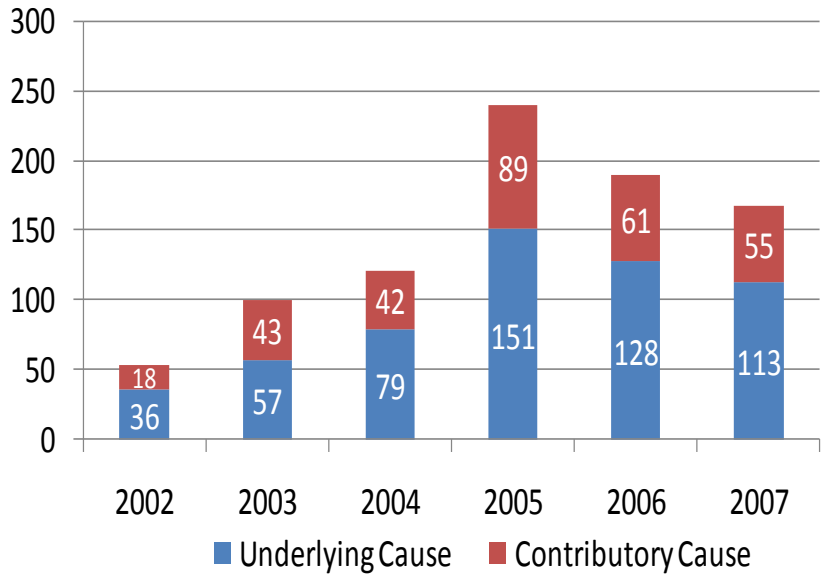
Figure 2. *Clostridium difficile* Infections in Patients Discharged from Critical Access and Short-Term Stay Hospitals
Indiana, 2002-2007



Source: Indiana Hospital Discharge Data Set and U.S. census data.

Deaths due to an underlying or contributory cause trended significantly upward from 54 in 2002 to 240 in 2005, an increase of 344% (Figure 3). Deaths dropped in the next two years to 189 in 2006, and again to 168 in 2007.

Figure 3. *Clostridium difficile* Deaths
Indiana, 2002-2006



Source: Indiana State Dept. of Health Vital Records, Death Certificates

Even though CDI most commonly affects persons in acute care hospitals, it has been increasingly recognized among residents in long-term care facilities and persons who have not recently been in a health care facility (community acquired). The ISDH will continue to monitor CDI incidence and provide assistance where needed in outbreak or cluster situations. The ISDH will also continually evaluate the need for additional reporting of CDI based on national and state data, as well as the changing epidemiology of CDI.

Gardening and Produce Safety

Tips on avoiding consumption of animal feces

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We are frequently reminded of the importance of eating our fruits and vegetable for a well balanced diet, and many Americans are taking this advice by eating more fresh produce. Many people are meeting this need by growing produce in their own gardens.

A common practice for many gardeners is the use of animal manure as a fertilizer to improve the soil quality with nutrients and organic matter. Although this is a natural way to improve the quality of the soil for growing produce, it could have some food safety risks.

Both ill and healthy appearing animals can harbor enteric pathogens in their intestinal tracts and shed these pathogens through their feces which can remain in the environment for a long period of time. It is known that many pathogens can be transferred from animal manures to humans. *Salmonella, Listeria,* and *E.coli* O157:H7, as well as parasites, such as roundworms and tapeworms, have all been linked to applications of manure to gardens. With the increase in public awareness of the potential for disease, it has caused concern for gardeners and consumers and some now question the safety of using manures in the garden.

Contamination of produce can occur at any time from the point of planting through the food preparation process. The best way to manage your home garden is to be aware of the potential risks and to establish common sense practices that will lessen the chance of contamination.

Reducing the risks of contaminating produce when gardening with manure:

- Wait 120 days from the time of applying fresh manure to the time of harvest or apply non-composted fresh manure only in the fall of the preceding harvest year
- Make sure your garden is located in an area that is not affected by surface runoff from manure storage
- Apply only properly composted manure to your garden
- Never apply fresh manure after the garden is planted
- Manure should not come into contact with ready to eat produce during the growing season
- Use sterilized manure that is that is available commercially
- Keep domestic and wild animals out of the garden

Epi Flashback

1929 – Publication of new rules for the state includes "Rule 66 – Tularemia and Undulant Fever Added to the List of Reportable Diseases." Physicians "attending a person sick with the disease known as Tularemia or Undulant Fever" must "report such cases to the Health Officer having jurisdiction." Tularemia, also known as "rabbit fever," is a disease caused by the bacterium *Francisella tularensis*. Undulant fever (now referred to as Brucellosis) is an infectious disease caused by the bacteria of the genus *Brucella*.

Source: Monthly Bulletin, Indiana State Board of Health July 1929

Minimizing the risks after harvesting:

- Proper hand washing is important in all stages from the harvest through storage and preparation
- When harvesting make sure containers, gloves and equipment are clean
- Always thoroughly wash produce in running water rather than batch washing in a basin
- Throw away the outer leaves of leafy vegetables such as lettuce and cabbage before washing
- Scrub produce with firm skins or hard rinds with a vegetable brush under cool running water
- Always wash produce even if you are not eating the rind or skin because when cut it could contaminate the edible surface
- The risk is greatest for root crops like radishes and carrots and leafy vegetables such as lettuce and spinach, in which the edible part of the plant touches the soil.
- Cook foods properly to further reduce risk.

Most individuals can recover from foodborne illness without complications or need for medical care, but the very young and old and those with compromised immune systems are at greater risk for severe complication or death.

References

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Rangarajan, Anusuya, Elizabeth Bihn, Robert Gravani, Donna Scott, and Marvin Pritts. "Food Safety Begins on the Farm, A Grower's Guide." Cooperative State Research, Education, and Extension Service and USDA (2003).

Suslow, Trevor, and Linda Harris. "Key Points of Control and Management for Microbial Food Safety: Edible Landscape Plants and Home Garden Produce." University of California, Division of Agriculture and Natural Resources Pub (2003).

Epi Flashback

1883 – A report on swine plague or hog cholera describes what is known about the disease, the expense of loss to swine owners, and typical behavior of infected animals. "Inoculation with a modified virus…have proven at least partially successful." However, until inoculation is perfected, the article suggests prevention by use of carbolic acid, since "all animals treated with this remedy…derived perfect immunity." "A system of vigorous pruning is indispensable." Remove or destroy the sick…then give the rest carbolic acid treatment and the will live."

Source: Second Annual Report of the State Board of Health of Indiana for the Fiscal Year Ending October 31, 1883

Mass Vaccination Campaign in Response to Meningococcal Meningitis: The Kosciusko County Experience

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On January 29, 2009, the Kosciusko County Health Department (KCHD), was notified of a student suspected of having *Neisseria meningitides*. The KCHD, in collaboration with the Indiana State Department of Health (ISDH) and the school corporation conducted an investigation. All close contacts of the student were identified, and public health officials provided assistance obtaining appropriate prophylaxis by the end of the day.

The affected school happened to be closed due to adverse weather conditions on January 30, 2009. Immediately, students from the school began to utilize electronic means of communication (e.g., texting, My Space, Facebook, e-mail) to spread the information the family had openly shared. The rapid means of information sharing created a wave of public concern that overwhelmed the KCHD and depleted its meningococcal vaccine supply. Using the opportunity of increased awareness and the desire to provide meningococcal immunizations, the KCHD, the school corporation, community nurse volunteers, and the ISDH collaborated and quickly responded to the vaccine demand.

Nurses from the KCHD and the school corporation organized mass immunization clinics at four schools in the affected school system. Vaccine was obtained through the ISDH and neighboring counties. School officials distributed parent consent forms and vaccine information statements to students. Students were required to submit a signed parental consent form before the vaccine was administered during the clinics.

On February 5, 2009, meningococcal immunization clinics were held at three schools. Each of these schools had three nurses to administer the vaccine, and 628 children were vaccinated. On February 12, 2009, an additional clinic was held. Nine nurses were on site and 482 more students were immunized within 65 minutes.

The affected school system has 3500 students. At the end of the mass immunization campaign, 1,110 students received the meningococcal vaccine. This experience shows that a school-based mass immunization clinic can quickly achieve high immunization coverage. Coordination and communication between key emergency preparedness partners were exercised and relationships strengthened to allow for more effective future response. Media attention was managed and a positive public perception was maintained. The mass immunization clinics were allowed to be utilized as an emergency preparedness drill for evaluation of a point of dispensing site (POD).

Recommendations:

The general population uses electronic methods to share information quickly, but not necessarily accurately. Establishing the media as a public health partner early in a disease investigation can assist in minimizing concern in a community. If a message is distributed in collaboration with the media and public health, the community becomes not only accurately informed of the medical situation, but becomes knowledgeable of the health information needed for disease prevention.

Recently, the ISDH, along with representatives from the Indiana Department of Education (IDOE) and the Indiana Association of School Nurses (IASN), published potential revisions for Indiana schools immunization requirements. These revisions are based on current immunization recommendations by the Centers for Disease Control and Prevention (CDC) and the Advisory

Committee of Immunization Practices (ACIP). These revisions are located at the following website:

https://chirp.in.gov/chirp_files/docs/School%20Immunization%20Requirements%202009%20letter_lhb_dma052209_%20_2_.pdf)

The ISDH also anticipates that one meningococcal vaccine (MCV4) will be required for all students entering 6th – 12th grades for the **2010–2011** school year. School district administrative staff and nursing staff are reminded that IC 20-30-5-18 requires schools to send information to ALL students, parents, and guardians about meningitis and the meningococcal vaccine. Updated information is currently available on the CHIRP and IDOE Web sites.

Additional information:

1) http://www.cdc.gov/meningitis/index.html
2) http://www.cdc.gov/meningitis/about/faq.html
3) http://www.nlm.nih.gov/medlineplus/ency/article/000608.htm
4) Meningococcal Disease Quick Facts
5) http;//www.immunize.org/catg.d/p2021.htm
6) http://www.cdc.gov/vaccines/pubs/vis/downloads/vis-mening.pdf

Professional Partnerships: Achieving Public Health Mission and Objectives

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Effective public health systems enhance their ability to meet the objective of preventing, controlling, and mitigating diseases (the epidemiologic mission) through the development of collaborations built with effective communication. This undertaking has special significance for the ten public health essential services, the cornerstone for the professional work force in assuring the public's health.

Good communication forms the foundation for success from initial networking to professional partnership development. The Institute of Medicine's publication, *The Future of the Public's Health in the 21st Century* (2003), stated that communication among public health partners is of the utmost importance to assure the public's health and lists among its recommendations that, "all partners within the public health system should place special emphasis on communication as a critical core competency on public health service".

The ISDH Field Epidemiologist, in concert with the ISDH Epidemiology Resource Center (ERC), assists and supports local health departments and other professional partners in development and implementation of strategies to prevent and mitigate disease occurrences and outbreaks.

Initial stage networking reveals that local public health professionals demonstrate passion in their work, an interest to network with other professionals, and a willingness to actively collaborate with their associates. Efforts to support these public health experts holds promise for realizing the epidemiologic mission.

Facilitating movement from networking, to partnerships, to collaborations is integral to the role of the Field Epidemiologist as liaison between local public health professionals and the ERC. Kouzes and Posner (*Leadership the Challenge*, 2002) further describe that fostering collaborations enables others to act, builds confidence and trust, and facilitates positive interdependence. These components are crucial for healthy camaraderie, functional performance, and positive outcomes.

The 10 Public Health Essential Services are core to all activities performed in the public health realm. Successful collaborative efforts are directly interwoven into the fabric of at least several public health essential services, including:

ES 1) Monitor health status to identify health problems
ES 2) Diagnose and investigate health problems
ES 3) Inform, educate and empower people
ES 4) Mobilize partnerships to identify and solve health problems

Local and state public health professionals have taken the lead in efforts to assure the public's health regarding communicable diseases. These efforts are enhanced and flourish because of the collaborative leveraging of their mutual expertise to prevent, mitigate, and control disease.

Training Room

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
    - Pandemic Influenza
- General Recommendations on Immunization
    - Timing and Spacing
    - Indiana Immunization Requirements
    - 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)	Indiana Marriage Report (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 July 31, 2009 **based on 2000 population of 6,080,485)**

HIV - without AIDS to date:

318	New HIV cases August 2008 thru July 31, 2009	12-month incidence	5.53 cases/100,000
3,877	Total HIV-positive, alive and without AIDS on July 31, 2009	Point prevalence	67.40 cases/100,000

AIDS cases to date:

363	New AIDS cases from August 2008 thru July 31, 2009	12-month incidence	6.31 cases/100,000
4,375	Total AIDS cases, alive on July 31, 2009	Point prevalence	76.06 cases/100,000
9,051	Total AIDS cases, cumulative (alive and dead) on July 31, 2009		

REPORTED CASES of selected notifiable diseases

Disease	Cases Reported in June - July *MMWR* Weeks 22-30		Cases Reported in January – July *MMWR* Weeks 1-30	
	2008	2009	2008	2009
Campylobacteriosis	198	53	344	218
Chlamydia	3,473	2,589	12,512	13,201
Cryptococcus	5	0	15	12
Cryptosporidiosis	40	13	95	112
E. coli, shiga toxin-producing	31	5	41	14
Giardiasis	Not Reportable	7	Not Reportable	75
Haemophilus influenzae, invasive	13	5	52	44
Hemolytic Uremic Syndrome (HUS)	1	0	1	0
Hepatitis A	2	4	12	13
Hepatitis B	13	4	23	40
Hepatitis C Acute	0	1	0	5
Histoplasmosis	15	9	48	68
Influenza Deaths (all ages)	2	1	15	4
Gonorrhea	1,445	1,196	5,000	4,374
Legionellosis	21	3	32	18
Listeriosis	1	4	3	5
Lyme Disease	18	4	19	10
Measles	0	0	0	0
Meningococcal, invasive	4	3	17	20
Mumps	0	0	0	1
Pertussis	8	15	28	126
Rocky Mountain Spotted Fever	2	0	2	2
Salmonellosis	188	42	317	180
Shigellosis	121	2	445	33

REPORTED CASES of selected notifiable diseases

Disease	Cases Reported in June - July *MMWR* Weeks 22-30		Cases Reported in January – July *MMWR* Weeks 1-30	
	2008	2009	2008	2009
Severe *Staphylococcous aureus* in Previously Healthy Person	Not Reportable	1	Not Reportable	9
Group A Streptococcus, invasive	22	11	94	116
Group B, Streptococcus, Invasive (All ages)	61	29	163	134
Streptococcus pneumoniae (invasive, all ages)	94	22	561	217
Streptococcus pneumoniae (invasive, drug resistant)	27	9	157	141
Streptococcus pneumoniae (invasive, <5 years of age)	7	2	40	38
Syphilis (Primary and Secondary)	17	16	79	84
Tuberculosis	25	19	73	65
Vibriosis	Not Reportable	0	Not Reportable	0
Varicella	Not Reportable	1	Not Reportable	197
Yersiniosis	0	0	5	6
Animal Rabies	2	3	3	3

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

Indiana State Department of Health
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.