Indiana Epidemiology Newsletter

Indiana State Department of Health

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New Staff Member Joins ERC Surveillance Team

Pam Pontones, MA
Director, Surveillance and Investigation

Effective Monday, February 12, Karee Buffin joins the Indiana State Department of Health (ISDH) Epidemiology Resource Center (ERC) Surveillance and Investigation team as the new Vaccine-Preventable Disease Epidemiologist. She replaces Wayne Staggs, who now serves as the Invasive Infection Epidemiologist (as of November 5, 2006).

Karee joined the ISDH in June 2004 as a Public Health Investigator with the Immunization Program. She conducted investigations of vaccine-preventable diseases, promoted immunizations, and provided education regarding immunizations and the diseases they prevent in Immunization District 5, which encompasses much of east-central Indiana. Prior to joining the ISDH, Karee worked as an Immunization Program Technician and Vaccines for Children (VFC) Field Liaison for the Delaware County Health Department. Karee also has clinical laboratory and phlebotomy experience.

The ISDH Surveillance and Investigation team has undergone many changes during the last year. To ensure that your request is routed appropriately, please refer to the table below. You may contact anyone on the team by calling 317.233.7125.

Name	Title
Robert Teclaw	State Epidemiologist
Jim Howell	Veterinary Epidemiologist
Pam Pontones	Director, Surveillance and Investigation
Tom Duszynski	Director, Field Epidemiology
Donna Allen	Field Epidemiologist, District 1
Robert Allen	Field Epidemiologist, Districts 7 & 8
Steve Allen	Field Epidemiologist, District 9
Brad Beard	Field Epidemiologist, District 3
Karee Buffin	Vaccine-Preventable Disease Epidemiologist

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Name	Title
Stephanie English	Field Epidemiologist, District 6
Tina Feaster	Tuberculosis (TB) Epidemiologist
Ryan Gentry	Quality Control Epidemiologist
Karen Gordon	Field Epidemiologist, District 10
Sandy Gorsuch	Field Epidemiologist, District 5
Lynae Granzow	Enteric Epidemiologist
Antoniette Holt	Minority Health Epidemiologist
Tracy Powell	Advanced Analysis Epidemiologist
Shawn Richards	Respiratory Epidemiologist
Wayne Staggs	Invasive Infection Epidemiologist/School Health Liaison
Jean Svendsen	Chief Nurse Consultant/Bloodborne Pathogen Coordinator
Mike Wade	Syndromic Surveillance Epidemiologist
Mona Wenger	Field Epidemiologist, District 2
Mike Wilkinson	Hepatitis C Epidemiologist
Jennifer Wyatt	Field Epidemiologist, District 4

Update on the Reporting of Chronic Hepatitis C Cases

Mike Wilkinson
Hepatitis C Epidemiologist

2006 was an important year for hepatitis C reporting in Indiana. The ISDH developed a fax transmission system for submitting case reports and requested voluntary investigation of chronic hepatitis C cases (effective May 25, 2006). Data analysis of these reports is under way to identify significant risk factors of hepatitis C transmission in Indiana, which will be critical in determining how to best target prevention and funding.

The ISDH developed **The Users Guide for Hepatitis C Reporting**, which is available on the local health department SharePoint portal. This document explains the process for investigating and reporting hepatitis C cases. Additional telephone lines have been added to the fax transmission system, reducing the number of busy signals that were experienced in the beginning of this process. However, some issues still remain. The following questions and answers are provided to help resolve reporting issues.

Question: The fax confirmation says 'OK', so can I be assured that the investigation form transmitted properly?

Answer: While the fax may have transmitted, the 'OK' does not confirm that the information entered the database properly. The system scans the six-page report into the database for verification and processing. This occurs after fax transmission. The 'OK' confirmation simply means that the fax went through, not that the information entered the database properly.

Q: Can I make copies of Hepatitis C Case Investigation report (State Form 52588) and fax the investigation report copies to the ISDH?

A: The database system is very sensitive and often will not interpret photocopied letters and numbers as accurately as those that are entered online. For best results, fax only an original printout of the report. Make sure that the toner cartridge in the printer is working properly.

Q: What do I do if I cannot make contact with the case to complete the investigation report?

A: After making a reasonable attempt to contact the case, complete as much of the six-page reporting form as possible, including demographic information. Please submit all six pages, whether or not they are completed.

Q: If the ISDH requests that I follow up a lab result, do I need to resubmit a copy of the lab report?

A: The ISDH has already made copies of lab reports prior to sending them for follow-up, so you do not need to send another copy of the lab report to the ISDH.

Q: Do I need to include the First Date Positive information on the case investigation form?

A: Yes, always include First Date Positive (date blood sample collected) on the second page of the investigation report. This ensures that the case will be included in the correct calendar year's data.

For questions or further information, please contact Mike Wilkinson, 317.234.2827 or mwilkins@isdh.in.gov**. You may also reference the June 2006 edition of the *Indiana Epidemiology Newsletter* at http://www.in.gov/isdh/dataandstats/epidem/epinews_index.htm.**

Indiana First State to Submit Data to CDC's BioSense System

Mike Wade, MPH
Syndromic Surveillance Epidemiologist

Almost as dynamic as the near real-time data the system analyzes, the Indiana Public Health Emergency Surveillance System (PHESS) continues to evolve, achieving many significant milestones along the way.

The PHESS is Indiana's syndromic surveillance system. The system's purpose is to detect acts of bioterrorism, disease outbreaks, and other public health emergencies. Emergency department chief complaint data from 70 hospitals across Indiana are securely transmitted in real-time to the Regenstrief Institute at the Indiana University School of Medicine and then to the Indiana State Department of Health (ISDH) every three hours for analysis. Additionally, over-the-counter drug sales and school absenteeism data are included in the PHESS.

Most recently, the PHESS began submitting syndromic surveillance data to BioSense, the Centers for Disease Control and Prevention's (CDC) nationwide biosurveillance program. While individual health care providers and hospitals send data to BioSense, in some cases coordinated at the county level, the PHESS is the first statewide syndromic surveillance program to do so.

The purpose of the BioSense program is to conduct syndromic surveillance at the national level, analogous to the PHESS's statewide role in Indiana. Ultimately, BioSense will help identify and track significant health-related events to better protect the public's health. The CDC BioSense team is currently working with many states and counties in an effort to connect data sources, as they did with Indiana. A major strength of the BioSense model is that data from different hospitals and health facilities across the country will be processed and presented in one common format. These standardized surveillance data should facilitate communication and coordination among federal, state, and local public health officials.

OUTBREAK SPOTLIGHT....

Outbreak Spotlight is a regularly occurring feature in the Indiana Epidemiology Newsletter to illustrate the importance of various aspects of an outbreak investigation. The event described below highlights the investigation of a Salmonella outbreak that occurred during the summer of 2006.

The Summer of *Salmonella*

By Lynae Granzow, BS
Enteric Epidemiologist

Background

On July 11, 2006, the Marion County Health Department (MCHD) notified the Indiana State Department of Health (ISDH) of an increase of salmonellosis in recent weeks. Many of these initial cases resided on the south side of Marion County, bordering the Johnson County line. The Johnson County Health Department (JCHD) confirmed a similar increase in cases of salmonellosis. The ISDH Laboratories confirmed the disease agent in these cases as *Salmonella* I 4,[5],12:i:- monophasic. Pulse-field gel electrophoresis (PFGE) testing yielded identical band patterns among the cases, indicating a common source was likely.

Epidemiologic Investigation

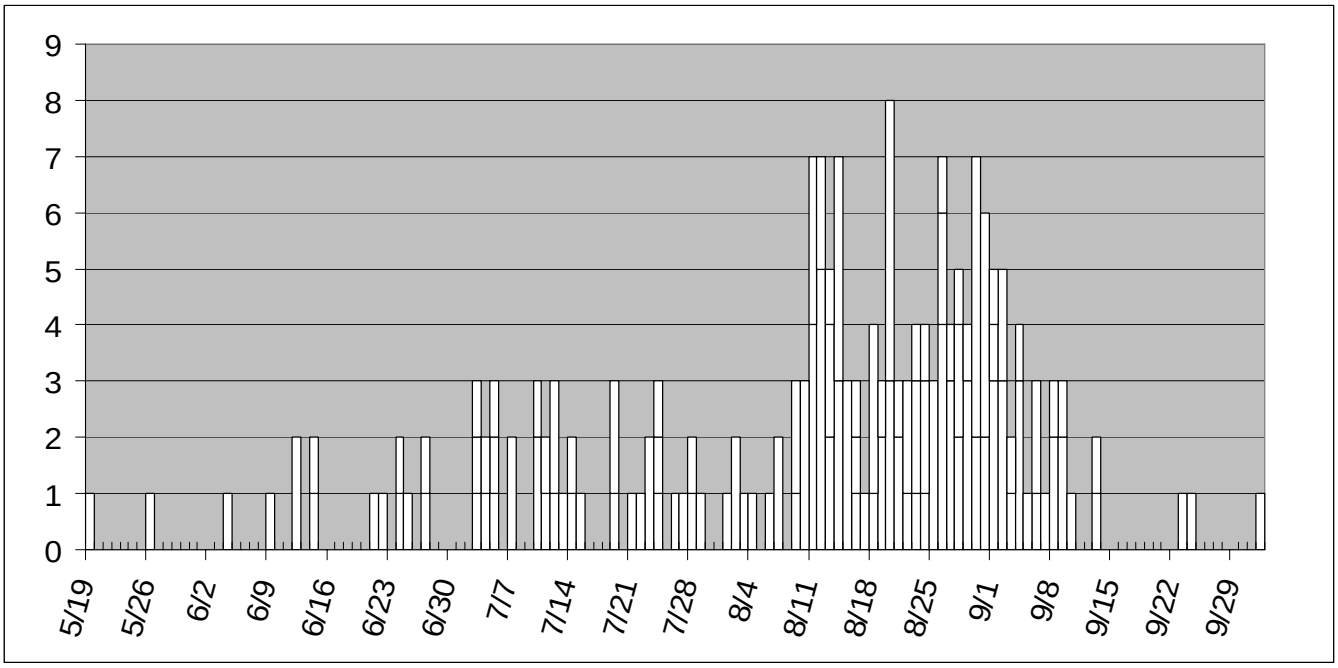
The ISDH, MCHD, and JCHD initiated a collaborative investigation of the outbreak on July 11, 2006. A case was defined as any previously healthy person who developed salmonellosis on or after May 19 (the onset date of the earliest known case) and exhibited the same PFGE band pattern. The ISDH Salmonellosis Case Investigation reporting form was used to interview all cases. During the investigation, a supplemental questionnaire provided by the CDC and the ISDH

was added to determine other specific exposures. Six cases did not respond or provided incomplete information, thus all statistical analysis was based on 193 cases.

A total of 199 cases were confirmed in the outbreak by PFGE testing at the ISDH Laboratories. The onset of the first case occurred on May 19, with the last case onset on October 2. The outbreak peaked in August (see Figure 1). The majority of cases were identified in central Indiana counties: Marion (89), Johnson (87), and Shelby (6). Fifteen cases were identified in 12 other Indiana counties. Cases were also identified in residents of New York and New Hampshire who reported recent travel to Indiana.

The mean age of the cases was 26 years, with a range of <1-83 years (see Figure 2); 57 percent of the cases were female. Symptoms reported included: diarrhea, fever, nausea, cramps, and some vomiting. Twenty-four persons (12%) were hospitalized; none died.

Figure 1: Salmonellosis Epidemiologic Curve*



*Onset date not available for two cases. Two cases were asymptomatic and dates of collection were plotted on the curve.

Cases were interviewed about foods consumed, supermarkets frequented, and restaurants patronized prior to illness. No particular food or restaurant was commonly reported among the cases. The most commonly reported exposure (76.2%) among most cases was Supermarket A. Of those who reported purchasing food items at Supermarket A, 78.9 percent bought items from the deli. Items consumed by cases from the Supermarket A deli included: prepackaged sandwiches, deli tray items, rotisserie chickens, fried deli items, and bulk deli meats and cheeses from multiple producers.

Geographic Information System (GIS) mapping showed clustering of cases around the southern Marion County and northern Johnson County border. Supermarket A is located adjacent to Interstate 65, a major interstate highway often used for commuting into Indianapolis. Among 23 cases residing in other Indiana counties, 30 percent reported eating items purchased at Supermarket A, and 17 percent reported exposures to ill contacts who had exposure to

Supermarket A prior to onset. The cases from out of state reported consuming food items purchased at Supermarket A.

The ISDH conducted a case-control study using a reverse digit-dialing system. The study included 32 cases and 32 controls. Cases included those with onset dates in July, and controls were matched by ZIP codes. The Fisher's exact test (SAS 9.1) was used to evaluate the association between illness and exposure. The following variables were analyzed: restaurants; supermarkets; gatherings; and consumption of beef, pork, chicken, turkey, fish, eggs, and fruit. Of the five supermarkets reported, a statistical significance ($\alpha = 0.05$) was found between illness and shopping at Supermarket A (OR = 21.21, $p<0.0001$), see Table 2. No statistical association with illness was found with any restaurants, attendance at gatherings, or general consumption of abovementioned foods prior to illness.

Environmental Assessment

Supermarket A opened to the public on April 19, 2006. A final pre-opening inspection of the facility was conducted on April 13, 2006. The JCHD conducted a routine inspection on June 16, 2006, and no critical violations were found.

On July 21, 2006, the JCHD inspected Supermarket A at the ISDH's request based on the suspicion of an outbreak of salmonellosis. The deli and produce departments were checked for possible sources of contamination, and none was found at that time. No critical violations were noted. On July 31, 2006, representatives from the JCHD and the ISDH met with supermarket management to discuss epidemiologic data indicating the establishment as a possible source of the outbreak. Supermarket management provided a list of deli and bakery associates, their corresponding hire dates, sick days, and schedules on August 4, 2006.

On August 10, 2006, a team of representatives from the JCHD and the ISDH met with supermarket employees to discuss the outbreak. All deli and bakery workers were interviewed to assess gastrointestinal symptoms, work hours, exposures to food and uncooked meat while working, risk factors for salmonellosis, and any other information they were willing to provide about their work environment. Twenty-two of 23 employees responded to the interview. While not used for analysis, these data provided a guide for the environmental assessment and further investigation.

Due to the ongoing nature of the outbreak, deli and bakery associates were requested to provide three serial stool specimens at least 72 hours apart for *Salmonella* testing to identify anyone asymptomatically infected. Two employees tested positive (see Laboratory Results) and were immediately restricted from all food-handling duties. The investigation revealed that one of these individuals had a pet snake. Since reptiles are known to harbor *Salmonella*, the snake was tested to determine if it could be a source of the outbreak. The snake tested negative for the outbreak strain of *Salmonella*.

During mid to late August, Supermarket A provided training in food preparation, the foodborne illness protocol, and the sick leave policy. On August 24, 2006, when the second positive employee was identified, Supermarket A voluntarily removed all bakery and deli employees from food-handling duties and thoroughly cleaned both departments. Employees returned to their previous duties once all three stool samples tested negative. Supermarket A also thoroughly cleaned and disinfected these two departments using staff and a third-party vendor on August 24, August 25, and August 30, September 6, and September 13. On August 31, Silliker Laboratories collected and tested 55 environmental samples from the deli and bakery for Supermarket A. A

knife block tested positive for the outbreak strain and was removed from the deli/bakery area on September 3 (see Laboratory Results). Silliker Laboratories collected another 111 samples from September to October; all samples were negative.

Supermarket A conducted additional cleanings of the deli and bakery departments on September 6 and September 13. Due to the identification of additional case, the JCHD and the ISDH Food Protection Program (FPP) collected food and environmental samples at Supermarket A on September 14 to identify any possible residual environmental contamination. All food and environmental samples tested at the ISDH Laboratories were negative for *Salmonella*. On September 14-15, the ISDH FPP conducted 24-hour surveillance of the Supermarket A deli and bakery employees regarding food-handling procedures. The ISDH FPP observed potential cross-contamination sources, including soiled aprons and seasoning packets in contact with the packaged raw chickens. These are considered critical violations.

Laboratory Results

The ISDH Laboratory identified 199 confirmed cases of *Salmonella* I 4,[5],12:i:- monophasic associated with this outbreak through culture and two-enzyme PFGE matching.

All food and environmental samples collected by the JCHD and the ISDH tested negative for *Salmonella*. In addition, food samples provided by patrons also tested negative. A knife block tested positive for *Salmonella* I 4,[5],12:i:- monophasic according to Silliker Laboratories. This serotype result was verified by ISDH Laboratories and matched the two-enzyme (Xba I and Bln I) PFGE outbreak pattern.

On August 23, 2006, a total of 32 isolates was sent to the CDC Epidemic Investigations and Surveillance laboratory for multi-locus variable-number tandem-repeat analysis (MLVA). All isolates were indistinguishable by MLVA, and the pattern was unique to the MLVA database (N of I 4,[5],12:i:- database = 450).

Conclusions

This investigation confirmed an outbreak of salmonellosis involving residents from 15 Indiana counties and 2 other states. A total of 199 cases were identified over a four-month period that were culture positive and matched a 2-enzyme PFGE pattern. A unique MLVA pattern was confirmed in all isolates submitted to the CDC. Therefore, a common source was extremely likely.

Illness was statistically associated with consumption of foods purchased at Supermarket A. The likely mode of transmission was environmental contamination, possibly from raw rotisserie chicken preparation within the deli. A knife block used to house multi-purpose knives tested positive for the *Salmonella* I 4,[5],12:i:- outbreak strain and, once removed on September 3, the outbreak ceased shortly after. The cases following the removal of the knife block can be explained by purchase and consumption dates of the deli items. Knives were used throughout the deli and bakery. The likely mode of transmission was contaminated knives being used to open packages of ready-to-eat foods, exposing a small surface area of the package or specific portions of food to contamination. This hypothesis explains why no deli food samples tested positive for *Salmonella* and how only some persons who were exposed to the deli items became ill.

Salmonellosis is characterized by diarrhea, fever, abdominal cramps, nausea, headache, and sometimes vomiting. Approximately 40,000 cases of salmonellosis are reported annually in the United States, and approximately 600 persons die each year due to acute complications.[3] Persons become ill within 6-72 hours after exposure, usually within 18-36 hours. Infections usually resolve within 5-7 days. Complications such as dehydration or septicemia can occur, requiring antibiotic therapy or hospitalization. Young children, the elderly, and immunocompromised persons are more likely to have severe complications.[3] *Salmonella* bacteria are shed in the stool of infected cases for several days to several weeks.[1] Rarely, persons can shed the bacteria for months or years after convalescence.

Salmonellosis is most often transmitted by the fecal-oral route. *Salmonella* is commonly found in the intestines of animals including poultry, cattle, swine, fish, and reptiles. Foods of animal origin, such as meats, poultry, eggs, and dairy, or externally contaminated produce, are common sources of *Salmonella*. Most of these infections can be avoided by properly storing, cleaning, or cooking food before consumption. Person-to-person transmission can also occur, as can infection from contaminated fomites.[1]

Salmonella I 4,[5],12:i:- monophasic is an emerging serotype in Indiana and nationwide. This serotype has been isolated from cattle, horses, poultry, domestic animals/environment, pigs, and reptiles.[2] The leading hypothesis is that exposure to poultry is the most common human risk factor for *Salmonella* I 4,[5],12:i:- monophasic. In Indiana, from 2003 through 2006 (*through November), respective sequential totals for this serotype are 7, 20, 34, and 234 (including outbreak cases). The PFGE pattern was unique during the outbreak period on the national PulseNet database. The more discriminatory MLVA testing indicated that the pattern was unique among 450 isolates of the same serotype, and that there was no genetic variability among the 32 samples analyzed. These tests confirmed that cases were exposed to a common source.

This *Salmonella* source was isolated to Supermarket A. This was supported by the fact that no other outbreaks or cases of the same serotype or PFGE pattern were identified in other states or locations in Indiana or the U.S. unless they were linked to Supermarket A. This outbreak was not related to a particular food item within the distribution chain. A contaminated food item would have resulted in numerous cases along the distribution line from the manufacturer or producer. Also, the outbreak lasted over four months, which would make it very unlikely that a consistently contaminated food item would be the exposure.

Two asymptomatic deli employees tested positive for the outbreak strain; however, given no date of illness onset, it is unclear whether these employees were a source of the outbreak or part of it. These two employees were removed from food-handling duties immediately after their positive *Salmonella* results. They were allowed to return to work only after completing antibiotic therapy and at least 48 hours later having two negative successive stool samples. However, all employees were removed from food-handling duties at Supermarket A on August 24 and were not allowed to return to work until completing three successive negative stool samples. There was no change in the epidemiologic curve of cases when the employees were removed from food handling.

Some cases did not report exposure to Supermarket A but reported exposure to ill contacts, daycare settings, and gatherings involving foods of unknown origin. Several familial clusters resulted from eating deli items purchased at Supermarket A, and many of these involved secondary cases. Of note, the last three cases reported did not report exposure to Supermarket A. Recall and interviewer bias may have played a significant role in unknown exposures.

The Indiana State Department of Health extends its deepest appreciation to the Johnson and Marion County Health Departments, the Centers for Disease Control and Prevention, and all other local and state health departments involved in this outbreak. The awareness, surveillance, and long hours of investigation provided by these agencies generated data-driven evidence in the outbreak. The active cooperation and concern of the Supermarket A corporate office led to cooperative prevention measures and the cessation of the outbreak.

More information about salmonellosis and prevention measures can be found at www.isdh.in.gov/isdh.

References

1. American Public Health Association. (2004). Control of Communicable Diseases Manual 18th ed. United Book Press, Inc., Baltimore, MD.
2. Centers for Disease Control and Prevention. *Salmonella Annual Summary, 2004.* Table 7: Non-clinical *salmonella* isolates from nonhuman sources.
3. Centers for Disease Control and Prevention. *Salmonellosis: General Information.* Retrieved October 31, 2006, from www.cdc.gov/ncidod/dbmd/diseaseinfo/salmonellosis_g.htm

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/programs/immunization.htm.**

ISDH Data Reports Available

The ISDH Epidemiology Resource Center has the following data reports and the Indiana Epidemiology Newsletter available on the ISDH Web Page:

http://www.IN.gov/isdh/dataandstats/data_and_statistics.htm

HIV/STD Quarterly Reports (1998-June 06)	Indiana Mortality Report (1999, 2000, 2001, 2002, 2003, 2004)
Indiana Cancer Incidence Report (1990, 95, 96, 97, 98)	Indiana Infant Mortality Report (1999, 2002, 2003, 2004)
Indiana Cancer Mortality Report (1990-94, 1992-96)	Indiana Natality Report (1998, 99, 2000, 2001, 2002, 2003, 2004)
Combined Cancer Mortality and Incidence in Indiana Report (1999, 2000, 2001, 2002)	Indiana Induced Termination of Pregnancy Report (1998, 99, 2000, 2001, 2002, 2003, 2004)
Indiana Health Behavior Risk Factors (1999, 2000, 2001, 2002, 2003, 2004, 2005)	Indiana Marriage Report (1995, 97, 98, 99, 2000, 2001, 2002)
Indiana Health Behavior Risk Factors (BRFSS) Newsletter (9/2003, 10/2003, 6/2004, 9/2004, 4/2005, 7/2005, 12/2005, 1/2006, 8/2006, 10/2006)	Indiana Infectious Disease Report (1997, 98, 99, 2000, 2001, 2002, 2003, 2004, 2005)
Indiana Hospital Consumer Guide (1996)	Indiana Maternal & Child Health Outcomes & Performance Measures (1990-99, 1991-2000, 1992-2001, 1993-2002, 1994-2003)
Public Hospital Discharge Data (1999, 2000, 2001, 2002, 2003, 2004, 2005)	

HIV Disease Summary

Information as of December 28, 2006 (based on 2000 population of 6,080,485)

HIV - without AIDS to date:

386	New HIV cases from January 2006 thru December 2006	12-month incidence	6.71 cases/100,000
3,687	Total HIV-positive, alive and without AIDS on December 31, 2006	Point prevalence	64.10 cases/100,000

AIDS cases to date:

339	New AIDS cases from January 2006 thru December 2006	12-month incidence	5.89 cases/100,000
3,920	Total AIDS cases, alive on December 31, 2006	Point prevalence	68.15 cases/100,000
8,126	Total AIDS cases, cumulative (alive and dead)		

REPORTED CASES of selected notifiable diseases

Disease	Cases Reported in December *MMWR* Weeks 49-52		Cumulative Cases Reported January – December* *MMWR* Weeks 1-52	
	2005	2006	2005	2006
Campylobacteriosis	54	43	473	564
Chlamydia	1,588	1,440	20,007	19,747
E. coli O157:H7	9	9	80	90
Hepatitis A	4	9	23	40
Hepatitis B	17	13	58	66
Invasive Drug Resistant *S. pneumoniae* (DRSP)	21	28	197	182
Invasive pneumococcal (less than 5 years of age)	8	11	74	71
Gonorrhea	629	574	8,080	8,643
Legionellosis	2	3	33	43
Lyme Disease	3	0	34	21
Measles	0	0	33	1
Meningococcal, invasive	1	1	19	24
Mumps	0	0	1	10
Pertussis	84	41	396	257
Rocky Mountain Spotted Fever	0	0	1	7
Salmonellosis	91	77	686	886
Shigellosis	20	17	195	174
Syphilis (Primary and Secondary)	5	3	62	91
Tuberculosis	21	16	146	126
Animal Rabies	1 (bat)	0	12 (bats)	11 (bats)

***Note: Case totals for 2006 are preliminary and will change, as cases with onsets in 2006 which are still being investigated are completed and returned to the ISDH.**

For information on reporting of communicable diseases in Indiana, call the *Epidemiology Resource Center* at 317.233.7125.

Indiana State Department of Health

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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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