Indiana Epidemiology Newsletter

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State Epidemiologist Bob Teclaw Pursues New Career Path

Pam Pontones, MA
Director, Surveillance and Investigation

After 13 years of service, State Epidemiologist Dr. Robert (Bob) Teclaw resigned from the ISDH to pursue an opportunity as the Director of the Human Health Services Division with the United States Department of Agriculture's (USDA) Food Safety Inspection Service (FSIS) in Washington, D.C. Bob's last day with the ISDH was February 22. Dr. Jim Howell is serving as the acting State Epidemiologist.

Bob began his career at the ISDH in 1995 as the Veterinary Epidemiologist, assigned to conduct surveillance and outbreak investigation of zoonotic diseases. His previous experience as a USDA Regional Veterinary Epidemiologist, combined with skills and knowledge he maintained as a PhD-trained epidemiologist with a Master's Degree in Public Health, served the Agency well. In 1996, the ISDH promoted Bob to the position of State Epidemiologist.

As State Epidemiologist, one of Bob's greatest challenges and shining moments occurred in 1999 when a Planned Parenthood clinic in Indianapolis received anthrax threats. Although later determined to be hoaxes, Bob spent an afternoon and evening visiting local television stations for on-site, live evening news briefs. His exceptional ability to convey educational messages to and through the media calmed a panicked city. He would repeat this service in the fall of 2001, when the U.S. fell victim to the anthrax event within the postal system.

Bob's calm, steadying, knowledgeable influence was also felt in his ability to diffuse emotionally laden and politically charged situations, such as suspected cancer clusters and environmental exposures. In 2007, two suspected environmental exposures, one at a mulch-producing plant and one at a residential subdivision, gained the attention of Indiana lawmakers. Bob's leadership and unwavering priority to analyze and interpret data helped untangle these situations to avoid drawing incorrect conclusions. During the late 1990s and 2000, Bob worked with the ISDH Environmental Epidemiology staff and the federal Agency for Toxic Substances and Disease Registry (ATSDR) to support the findings of a health assessment for a chemical site in

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Hammond. This was another high profile situation, with neighborhood concerns of child brain cancer and emissions from the plant. Bob researched and compared cancer rates with that area and surrounding areas with the rest of the state. Even though there were community interest groups urging the ISDH to state that the different types of cancer in the area were related to the chemical facility, Bob remained faithful to the data interpretation and stated that the facility could not definitively be the cause of the health concerns.

During his tenure at the ISDH, Bob served on the Agency Data Release Committee, working to ensure the integrity and proper use of data released by the ISDH. His service on the Agency Internal Review Panel (IRP) also played a significant role in 2007 when he coordinated two suspected bloodborne pathogen exposures at an eye clinic and a dental office. Both of these incidents resulted in intense legal ramifications and media exposure. Bob also provided continued support and expertise in improving data collection for racial and ethnic minority health issues. He was a key partner in implementing change to help achieve the *Healthy People 2010* goal of "Eliminating Health Disparities."

For his dedicated service to public health and his outstanding contributions to the health of Indiana citizens, Bob received the State Health Commissioner's Award on February 22. We will miss him and wish him all the best in his new position.

Ciprofloxacin-Resistant Meningococcal Strains Found in Minnesota and North Dakota

Wayne Staggs, MS
ISDH Invasive Disease Epidemiologist

A February 22, 2008, MMWR report describes the first incidence of ciprofloxacin-resistant meningococcal disease in North America. Three cases, one in 2007 and two in 2008, were identified in Minnesota and North Dakota. You may link to the MMWR report at: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5707a2.htm.

This report briefly summarizes the situation and provides recommendations for Indiana health care providers and laboratories.

Invasive meningococcal disease causes substantial morbidity and mortality with approximately 10 percent of cases being fatal. Nasopharyngeal carriage of *Neisseria meningitidis* is a precursor to disease, but most carriers do not develop disease. Household and other high risk contacts of persons with meningococcal disease have a higher risk for carriage of *N. meningitidis* and development of invasive disease and, therefore, should receive antibiotic chemoprophylaxis to eliminate carriage of *N. meningitidis* as soon as possible after exposure. Ciprofloxacin has been one of the recommended antimicrobial agents for use in chemoprophylaxis of adults.

Recommendations from the MMWR report include:

- Ciprofloxacin should not be used for chemoprophylaxis in areas where resistant strains have been identified. Currently, the only areas affected by this restriction include 34 specific counties in Minnesota and North Dakota. (These counties are listed in the MMWR Report.) Azithromycin is now included as an alternative antibiotic for chemoprophylaxis in the 34 restricted Minnesota and North Dakota counties; however, its use in Indiana is not warranted at this time.
- Ciprofloxacin may continue to be used for chemoprophylaxis of adults outside the specific counties in Minnesota and North Dakota. (See Table 1 for information on recommended chemoprophylaxis regimens for high risk contacts in Indiana.)

  To date, ciprofloxacin-resistant strains of meningococcal disease <u>have not</u> been identified in Indiana.
- In decisions regarding chemoprophylaxis of close contacts, <u>all</u> antibiotics should be used cautiously due to possible resistance resulting from widespread use. (See box for listing of high and low risk contacts of invasive meningococcal disease.)

Indiana State Department of Health Actions and Recommendations

The Indiana State Department of Health (ISDH) will monitor for ciprofloxacin-resistant organisms and chemoprophylaxis failure. To assist the ISDH in monitoring the situation, the following actions should be taken by health care providers and laboratories:

- As currently required by the Indiana Communicable Disease Reporting Rule (410 IAC 1-2.3), all invasive *Neisseria meningitidis* isolates should be submitted to the ISDH Laboratory:

  Indiana State Department of Health Laboratories
  Bacteriology Laboratory
  550 West 16th Street, Suite B
  Indianapolis, Indiana 46202

- Any laboratory routinely testing meningococcal isolates for resistance to ciprofloxacin should report ciprofloxacin-resistant organisms to the Indiana State Department of Health (Wayne Staggs at 317.234.2804)

Disease Risk for Contacts of Individuals with Invasive Meningococcal Disease*

<u>High Risk (chemoprophylaxis recommended)</u>:

- Any household contact, especially young children
- Child-care or nursery-school contact during 7 days before onset of illness
- Direct exposure to patient's oral secretions through activities such as kissing, sharing toothbrushes, eating utensils, or drinking containers
- Mouth-to-mouth resuscitation, unprotected contact during endotracheal intubation during 7 days before onset of illness
- Frequent sleeping or eating at same dwelling as patient during 7 days before onset of illness
- Passengers seated directly next to index case during airline flight lasting more than 8 hours

Low Risk (chemoprophylaxis not recommended):

- Casual contact: no history of direct exposure to index patient's oral secretions (e.g., school or work)
- Indirect contact: only contact is with high risk contact, no direct contact with index patient
- Health care professionals without direct exposure to patient's oral secretions

In outbreak or cluster:

- Chemoprophylaxis for people other than people at high risk should be administered only after consultation with public health authorities

Table 1. Recommended Chemoprophylaxis Regimens for High-Risk Contacts*

Age	Dose	Duration	Efficacy (%)	Cautions
Rifampin[1]				
<1 month	5mg/kg, orally, every 12 hours	2 Days	90-95%	
≥1 month	10 mg/kg (max. 600mg), orally, every 12 hours	2 Days	90-95%	Can interfere with efficacy of oral contraceptives and some seizure prevention and anticoagulant medications; may stain soft contact lenses
Ceftriaxone				
<15 years	125 mg, intramuscularly	Single Dose	90-95%	To decrease pain at injection site, dilute with 1% lidocaine
≥15 years	250 mg, intramuscularly	Single Dose	90-95%	
Ciprofloxacin[1]				
≥18 years	500 mg. orally	Single Dose	90-95%	Not recommended for persons <18 years of age

[1]Not recommended for use in pregnant women

*Adapted from 27th Edition of The Red Book, 2006 Report of the Committee on Infectious Diseases, American Academy of Pediatrics

History Corner: An Irish Plant Pathogen

Donna Allen, 50% Irish
ISDH Field Epidemiologist, District 1

In honor of St. Patrick's Day, March 17th, the following article describes a significant event which had an impact on the health of the Irish people. The Irish Potato Famine began in 1845 and robbed the Irish of their main sustenance for approximately five consecutive years. The cause of the potato blight was a plant pathogen, *Phytophthora infestans*. This pathogen, which is similar to a fungus, contributed to approximately 750,000 deaths. The actual number of deaths is unknown because many died unseen and were buried in shallow, unmarked mass graves. An additional two million Irish residents left their homes for Great Britain, Canada, and the United States. This famine was more destructive to human life than many modern day famines and is an example of how a single pathogen can greatly affect mortality, morbidity, and economic and social patterns of a country.

The Famine

During the 1800s, despite attempts at rebellion, Ireland was ruled by the British. Most of the land was owned by English landlords who sublet small parcels of the land to Irish tenants at high rates. (Often these tenants were people whose families had historically owned the land.) The tenants could afford the high rates because they sold or traded their crops. Before the famine, Ireland's population exceeded 8 million people. While harvests were bountiful, employment opportunities were few. In 1835, 75 percent of Irish workers lacked consistent employment.

During the 1800s, the Irish fed their growing population by planting potatoes. A farmer could grow three times as many potatoes as grain on the same plot of land. The potato provided 60 percent of the nation's food needs, and many Irish consumed 8-14 pounds of potatoes each day. They planted a potato called the "lumper". Potatoes are propagated vegetatively, so diseased potatoes used as planters sprouted diseased shoots. Moreover, the potatoes were all genetically identical to one another, so there was no genetic variation in immunity to pathogens. In 1845, the "lumpers" became susceptible to *Phytophthora infestans.* Not all of the potatoes were infected the first year, so farmers replanted the same potatoes during the next few years hoping for better results. The situation worsened as the spores spread.

The Irish relief effort soon came under the control of Charles Edward Trevelyan, Assistant Secretary of the British Treasury. The English sent Indian corn from America to aid the Irish. However, the corn had to be ground into digestible cornmeal, and there weren't enough mills available. The cornmeal itself caused problems—it was difficult to cook, hard to digest, and caused diarrhea. It also lacked vitamin C, so scurvy, a disease previously unknown to the Irish, became a problem. Cornmeal stocks were depleted after the first year, and the Irish survived by selling their livestock and all their possessions to buy food. Trevelyan believed in the popular theory of the day, "Laissez-faire (let it be)," which advocated a belief that a situation would eventually solve itself through natural processes. The British economy was also suffering at this time, and food supplies were very tight throughout Europe.

Outcomes

The Irish Potato Famine gave birth to the science of plant pathology. When the famine occurred in 1845, Louis Pasteur had not completed his work with bacteria, and the germ theory of disease had not been developed. The famine supported the idea that infectious microorganisms and plant pathogens can lead to disease. Prior to this time, it was felt that diseases and crop failures were caused by bad omens, weather, and other superstitions. People had noticed localized outbreaks of the disease early in the 1800s, but it didn't become a widespread problem until 1845.

Phytophthora infestans, although similar to fungi, is actually part of the *Protista* kingdom, which also includes slime molds and brown algae. This pathogen is usually not a problem unless the weather is cool and wet. The water is necessary for the spores to float and infect the leaves of potato plants. In wet weather, an enormous number of spores, called zoospores, are produced. During the famine, the plant foliage turned to a putrid mass in a few days, and the tubers were affected to various degrees. Under ideal weather conditions, *Phytophthora* can kill a field of potatoes in just a few days.

The conditions leading to disease during the potato famine mirror the epidemiologic triad: virulent pathogen, susceptible host, and favorable environment. One of the most important lessons learned from the famine is the need for genetic variation in crops. Lack of genetic variation in the Irish potatoes contributed to the severity of the famine. Plant populations with low genetic variation are more susceptible to changing environmental conditions and diseases. Because all of the potatoes were susceptible, the plant pathogen spread rapidly when it infected the Irish potatoes. If potatoes of different genetic varieties had been planted, it is likely there would have been varying levels of resistance, and more resistant varieties could have been planted in the following years.

Sections of Ireland's population were entirely dependent upon the potato. Ireland at this time had only 70 miles of railroad track, so efficient food distribution was not possible. Fish remained out of reach in waters that were too deep, and starving fishermen had sold their nets and boats to buy food. In addition, the Irish had ancient cultural taboos against eating certain foods. For example, seals were thought to be reincarnated relatives. When food became available, the Irish had no money to purchase it. Without money, residents were unable to pay rent, and many became homeless. *Phytophthora* infections have occurred in the northeastern United States and in other countries. However, because of a much more diversified diet, the effects have not been nearly as devastating as those resulting from the Irish Potato Famine.

The Irish Potato Famine demonstrates how a pathogen can devastate a nation. Most deaths were due to associated diseases, not from hunger. The famine led to severe poverty and homelessness, which led to unsanitary and crowded conditions. Diseases such as cholera, dysentery, scurvy, typhus and lice infestations were common. Typhus was called the "Black Fever," because it blackened the skin and was carried by body lice from town to town by beggars and the homeless. Many doctors, nuns, and others who attended to the sick in lice-infested dwellings also became ill. Masses of bodies were buried without coffins just a few inches below the soil.

Those who traveled to other countries did not fare much better. They traveled in crowded conditions that were perfect for disease transmission. Hundreds of men, women, and children were crowded together with no ventilation and no sanitary facilities. Another problem was the lack of potable

drinking water. Water was stored in old, unwashed wooden casks that had previously stored wine, vinegar, or chemicals, which leached and contaminated the water. The trip to Quebec, Canada, took from 40 days to 3 months, depending on the weather. Shiploads of feverish Irish overwhelmed local medical facilities.

In Boston, during this same time, there was neither enforcement of sanitary regulations nor building or fire safety codes in place. A single-family three-story house was divided room by room into housing for 100 Irish. On average, adult Irish lived six years after stepping off the boat onto American soil. Cholera was the predominant disease, and infant mortality rates were high.

The Irish Potato Famine teaches several lessons. It supported the fact that disease is a biological activity and not a mysterious event brought on by superstitions. Many lessons in plant pathology were learned, from introducing a foreign plant into a new environment (corn) to the importance of producing genetically variable products (potatoes). The famine also demonstrated the consequences of relying on one crop to feed the majority of people as well as the social, public health, and economic consequences that can occur as the result of starvation.

References:

1. Tom Volks's Fungus of the Month for March 2001
2. The Great Famine: Gone But Not Forgotten by Sean Henahan
3. http://evolution.berkley.edu Monoculture and the Irish Potato Famine: cases of missing genetic variation
4. www.digitalhistory.uh.edu/history/online/irish_potato_famine.cfm
5. www.apsnet.org The Irish Potato Famine and Birth of Plant Pathology by Gail Schuman

Descriptive Epi

Descriptive Epi is a new feature in the Indiana Epidemiology Newsletter to highlight epidemiologists and those practicing epidemiology in Indiana. If you are aware of anyone deserving recognition, please contact the Epi newsletter staff at epinewsletter@isdh.IN.gov .

Name: Michael Wade

Position: Syndromic Surveillance Epidemiologist – leads the Public Health Emergency Surveillance System (PHESS)

Education: BS, MS – University of Florida; MPH – Indiana University in Indianapolis

How did you get started in public health?

My career path in health started when I volunteered with an ambulance service. After that, it was crystal clear that helping those in need was "It" for me.

What is the most rewarding part of your job?

Knowing that we are working to meet an important mission—protecting the public's health.

What is a typical day like for you?

My days vary, which is what makes my job enjoyable. I analyze a lot of syndromic data looking for unexpected elevations. I also get to work with a great team, continually working to refine and improve the PHESS. My work also allows me to interact with hospitals, local health departments, researchers, and academic institutions.

What is your ideal vacation?

Spending a week with my wife at the beach with a couple of good books—and eating at least one fresh grouper/Reuben sandwich!

Favorite hobby?

Running, though I recently developed some low back pain that has me walking these days, but I'll take what I can get. Hiking/Bird watching—great time I can share with my wife. And there are never enough books to read….!

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

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

HIV/STD Quarterly Reports (1998-June 2006)	Indiana Mortality Report (1999, 2000, 2001, 2002, 2003, 2004, 2005)
Indiana Cancer Incidence Report (1990, 1995, 1996, 1997, 1998)	Indiana Infant Mortality Report (1999, 2002, 1990-2003)
Indiana Cancer Mortality Report (1990-1994, 1992-1996)	Indiana Natality Report (1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005)
Combined Cancer Mortality and Incidence in Indiana Report (1999, 2000, 2001, 2002, 2003, 2004)	Indiana Induced Termination of Pregnancy Report (1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005)
Indiana Health Behavior Risk Factors (1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006)	Indiana Marriage Report (1995, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004)
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, 5/2007, 12/2007)	Indiana Infectious Disease Report (1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005)
Indiana Hospital Consumer Guide (1996)	Indiana Maternal & Child Health Outcomes & Performance Measures (1990-1999, 1991-2000, 1992-2001, 1993-2002, 1994-2003, 1995-2004)
Public Hospital Discharge Data (1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006)	Assessment of Statewide Health Needs – 2007

HIV Disease Summary

Information as of February 29, 2008 **(based on 2000 population of 6,080,485)**

HIV - without AIDS to date:

391	New HIV cases from March 2007 thru February 29, 2008	12-month incidence	6.79 cases/100,000
3,867	Total HIV-positive, alive and without AIDS on February 29, 2008	Point prevalence	67.23 cases/100,000

AIDS cases to date:

361	New AIDS cases from March 2007 thru February 29, 2008	12-month incidence	6.28 cases/100,000
4,142	Total AIDS cases, alive on February 29, 2008	Point prevalence	72.01 cases/100,000
8,539	Total AIDS cases, cumulative (alive and dead) on February 29, 2008		

REPORTED CASES of selected notifiable diseases

Disease	Cases Reported in February *MMWR* Weeks 5-9		Cumulative Cases Reported January – February *MMWR* Weeks 1-9	
	2007	2008	2007	2008
Aseptic Meningitis	20	13	20	27
Campylobacteriosis	38	32	38	41
Chlamydia	2,086	1,572	3,779	2,975
Cryptococcus	1	2	1	3
Cryptosporidiosis	7	6	7	12
E. coli, shiga toxin-producing	1	1	1	3
Haemophilus influenzae, invasive	5	7	5	9
Hemolytic Uremic Syndrome (HUS)	0	0	0	0
Hepatitis A	0	2	0	3
Hepatitis B	2	3	2	3
Histoplasmosis	8	4	8	5
Influenza Deaths (all ages)	Not Reportable	4	Not Reportable	4
Gonorrhea	776	671	1,505	1,302
Legionellosis	4	3	4	3
Listeriosis	2	0	2	0
Lyme Disease	1	0	1	0
Measles	0	0	0	0
Meningococcal, invasive	6	1	6	2
Mumps	0	0	0	0
Pertussis	1	2	1	3
Rocky Mountain Spotted Fever	0	0	0	0
Salmonellosis	51	20	51	36
Shigellosis	8	69	8	137

REPORTED CASES of selected notifiable diseases (cont.)

Disease	Cases Reported in February *MMWR* Weeks 5-9		Cumulative Cases Reported January – February *MMWR* Weeks 1-9	
	2007	2008	2007	2008
Group A Streptococcus, invasive	2	4	2	7
Group B Streptococcus, Newborn	35	29	33	39
Group B, Streptococcus, invasive	87	76	88	145
Streptococcus pneumoniae (invasive, all ages)	27	17	27	32
Streptococcus pneumoniae (invasive, drug resistant)	4	4	6	6
Streptococcus pneumoniae (invasive, <5 years of age)	4	10	6	15
Syphilis (Primary and Secondary)	17	10	25	10
Tuberculosis	0	1	0	2
Yersiniosis	0	0	0	0
Animal Rabies	2	4	2	7

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

Indiana State Department of Health
Surveillance and Investigation
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

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