Pennsylvania Epi Notes

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Neisseria meningitidis **bacteria**

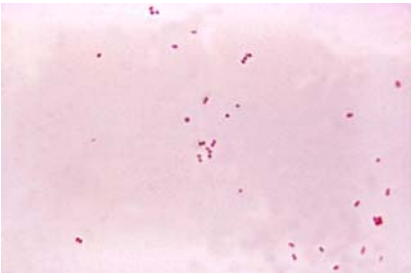

Photo courtesy of CDC/Dr. Brodsky

Cluster of Meningococcal Disease—February 2011

Invasive meningococcal disease is a serious and potentially fatal infection caused by the bacterium *Neisseria meningitidis*. Common symptoms of meningococcal disease include high fever, neck stiffness, confusion, nausea, vomiting, lethargy and a petechial or purpuric rash. *N. meningitidis* is one of the leading causes of bacterial meningitis and sepsis in the United States.[1] Usually, cases are unrelated to each other and outbreaks are infrequent. However, in February 2011, a cluster of cases was identified in Pennsylvania. Three individuals, known to each other and living in close proximity, were diagnosed with invasive meningococcal disease over a six-day period. Upon testing, it was found that all three cases were infected by the same serogroup of the bacteria.

Case 1

Case 1, a teenage male, presented to a local urgent care center on February 9, 2011 with a one-day history of fever, gastrointestinal symptoms, purpura fulminans and altered mental status. An ambulance was called, but the patient refused transport because he was uninsured. Instead, he was driven to a hospital by a friend who had accompanied him to the clinic. Physicians at the emergency department suspected meningococcal disease and began treatment. A lumbar puncture revealed gram negative diploccocci in the cerebral spinal fluid (CSF). CSF cultures were negative, but blood cultures were positive for *N. meningitidis*. The Pennsylvania Department of Health Bureau of Laboratories identified the organism as *N. meningitidis* Group B. The patient's condition deteriorated within three hours; he was intubated and flown to a tertiary care center for further treatment. Respiratory isolation was implemented at both hospitals and during transport. Case 1 spent 12 days in the neurosurgical intensive care unit and was discharged to a rehabilitation center.

The friend who had driven Case 1 to the hospital had been prescribed a three-day course of ciprofloxacin prophylaxis. However, on February 13, 2011 the friend presented to another hospital emergency department with fever, chills, back pain, weakness and an unspecified rash. Empiric intravenous treatment for meningococcal disease was promptly started. Blood cultures taken prior to antibiotic treatment were negative for bacteria. CSF obtained after the start of treatment was negative for bacteria by both gram stain and culture. Because of the lack of confirmation, he was not counted officially as a case.

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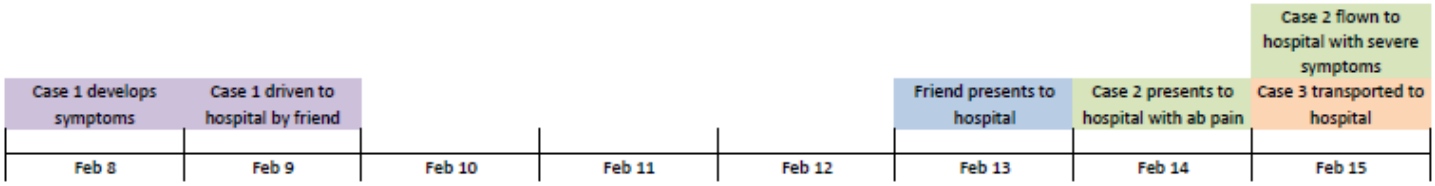
Figure 1: Timeline of Meningitis Symptom Onset



(Meningitis continued)

Case 2

Case 2, an adult male who lived in the same household with the friend and the friend's parent, presented to an emergency department on February 14, 2011 complaining of abdominal pain. He was discharged home. The following day, he developed a change in mental status, somnolence and vomiting, and an ambulance was called. He had a seizure, was intubated and flown to the tertiary care hospital. Hospital notes indicated that he had been taking ciprofloxacin for prophylaxis, although this was not confirmed. Case 2 was treated for presumptive meningococcal disease. Although CSF obtained after the initiation of treatment showed elevated protein levels and white blood cells, indicative of infection, cultures were negative. Blood cultures were also negative. However, the Bureau of Laboratories identified *N. meningitidis* Group B nucleic acid (DNA) in a sample of CSF. The patient spent nine days in the neurosurgical intensive care unit, and he was eventually discharged to home.

Case 3

Case 3 was the parent of Case 1's friend and lived with him and Case 2. When emergency responders arrived at the home to evaluate Case 2, they noticed that Case 3 "looked sickly" and had a rash. Case 3 was transported to the hospital for evaluation; she was awake and alert and reported only gastrointestinal symptoms. However, a lumbar puncture showed gram negative diplococci in her CSF. Treatment was initiated for presumptive meningococcal disease. Blood and CSF cultures were negative, but *N. meningitidis* Group B nucleic acid (DNA) was also detected in the CSF. She was admitted to the ICU for a 10-day hospital course and discharged home.

Prevention and Control Measures

Because of the disease's rapid onset, high case-fatality rate and adverse sequelae in survivors, a single case of meningococcal disease must elicit a rapid public health response.[2] When a case is first *suspected*, it must be immediately reported to the state or local health department. Public health professionals will work to identify close contacts of the patient and ensure that they receive prophylactic treatment, as well as determine if targeted or mass vaccination is necessary. Persons who had close contact with the index case from seven days prior to case's onset of illness to 24 hours after the case began antibiotics should receive prophylaxis, if no more than two weeks have elapsed since exposure. Close contacts include 1) household members; 2) child-care center contacts; and 3) persons directly exposed to the patient's oral secretions (e.g. by kissing, sharing eating or drinking utensils, cigarettes and drug paraphernalia, mouth-to-mouth resuscitation and endotracheal intubation or tube management). Close contacts should also be counseled to seek care immediately if they become ill. Approximately 70% of secondary cases occur within seven days of the index patient's disease onset.[2] Ongoing surveillance must be done to ensure that transmission has stopped.

Evaluation of Close Contacts

Emergency department staff assessed Case 1's friend and determined that chemoprophylaxis was necessary because of self report of shared tobacco products. The hospital also informed the urgent care center, and chemoprophylaxis was provided to all health care workers who had direct exposure to oral secretions of Case 1. At the tertiary care center, an infectious disease physician, in collaboration with the local health department, directed chemoprophylaxis of exposed hospital staff. Household contacts and close friends who attended a party with Case 1 on February 6, 2011 and reported sharing of drinks were identified and received chemoprophylaxis on February 10, 2011. As Cases 2 and 3 were identified, an expanded assessment of close contacts ensued. In total, 41 close contacts, including household members, friends and health care workers, were identified and treated. Surveillance is ongoing, but there have been no additional cases in the community to date.

Table 1: Confirmed *N. meningitidis* cases in Pennsylvania, 2006-2010

Year	# of Cases
2006	52
2007	50
2008	50
2009	47
2010	26

Mass Vaccination

Deciding to implement a mass vaccination campaign to prevent meningococcal disease requires consideration. Mass vaccination programs are expensive, require significant public health effort and may create public panic. Furthermore, current meningococcal vaccines do not protect against all serogroups of *N. meningitidis*. The organism identified in this cluster of cases was determined to be Group B, which is a serogroup not included in the current U.S. vaccines. The current vaccines protect against groups A, C, W-135 and Y. Because of this and other considerations, mass vaccination was not implemented as a control measure for this cluster.

References

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[2] Centers for Disease Control and Prevention. Manual for the surveillance of Vaccine-Preventable Diseases (4th Edition, 2008), Chapter 8: Meningococcal Disease.

[3] Zangwill KM, Schuchat AS, Riedo FX, Pinner RW, Koo DT, Reeves MW, et al. School-based clusters of meningococcal disease in the United States. JAMA 1997;277:389-95.

[4] Heymann, DL. Control of Communicable Disease Manual (19th Edition) 415-420

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(Meningitis continued)

CDC's Meningococcal Vaccination Recommendation

On January 28, 2011, the Centers for Disease Control and Prevention (CDC) announced that it was expanding the adolescent meningococcal vaccination recommendation to include a booster.

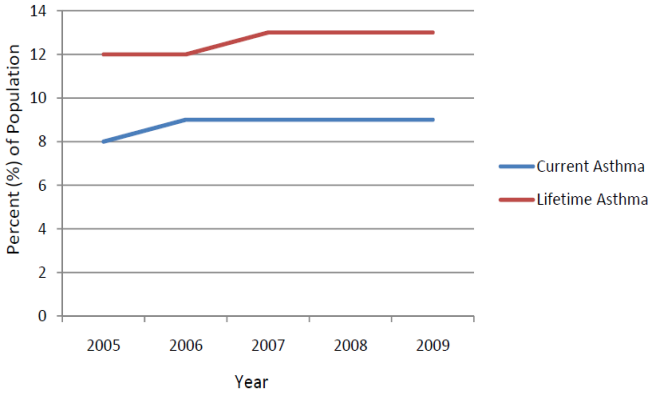
CDC now recommends vaccination for all 11 to 12 year-olds, with a booster dose at age 16. For those who receive the first dose at 13 through 15 years of age, a booster is recommended at ages 16 to 18. Persons who receive their first dose of meningococcal conjugate vaccine at or after age 16 years do not need a booster dose.[5]

College students aged 21 years or younger should have documentation of receipt of a dose of meningococcal conjugate vaccine not more than 5 years before enrollment. If the primary dose was administered before the 16th birthday, a booster dose should be administered before enrollment in college.

Asthma in Pennsylvania

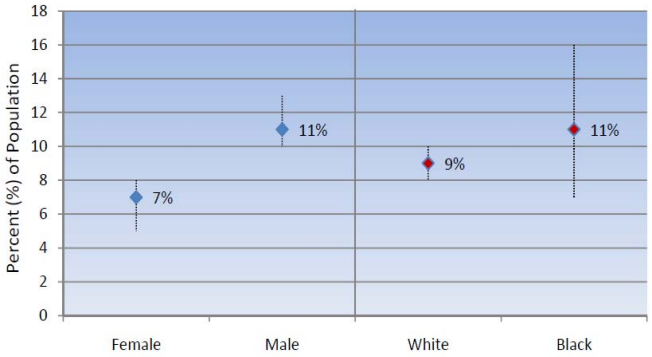
Asthma is a chronic inflammatory disease of the airways, characterized by episodes or attacks of impaired breathing.[1] Symptoms are caused by inflammation and narrowing of small airways and may include shortness of breath, coughing, wheezing and chest pain.[1] Asthma is a potentially life-threatening respiratory condition and is one of the top 10 leading chronic diseases afflicting the working population in the U.S.[1] Currently asthma affects more than 24 million Americans.[1] In the U.S., adult self-reported lifetime asthma prevalence in 2009 was 13.4 %. Current asthma prevalence among adults in the U.S. for the same year was 8.4%. Overall, 12.8% of U.S. children have been diagnosed with asthma at some point in their lives. The prevalence of asthma in the U.S. has increased dramatically with rates of asthma nearly doubling over the last few decades. Within population subgroups, asthma prevalence is highest among females, children, blacks, Hispanics, persons with family income below the poverty level[2] and those residing in the Northeast and Midwest regions of the U.S.

Figure 1: Current and Lifetime Asthma Prevalence Among Adults in Pennsylvania, 2005-2009



The estimated total cost of asthma to society, including medical expenses ($50.1 billion per year), loss of productivity resulting from missed school or work days ($3.8 billion per year) and premature death ($2.1 billion per year) was $56 billion (2009 dollars) in 2007, a $3 billion (5.7%) increase from 2002.[4] Around $5 billion nationwide could be saved with proper management of the disease and education to reduce the frequency of emergency room visits and hospitalizations. Moreover, proper asthma management can decrease "indirect" costs associated with absenteeism at work and at school; 10.5 million school days and 14.2 million work days were missed due to asthma in 2008.[2]

Figure 2: Current Asthma Prevalence Among Adults in PA 2009 with 95% Confidence Intervals



Data Source: Pennsylvania Behavioral Risk Factor Surveillance System (BRFSS)

Asthma Prevalence in Pennsylvania: In 2009, adult self-reported lifetime asthma prevalence in Pennsylvania was 13.4%, or about 1.2 million adults. Current asthma prevalence among adults in 2009 was 9.1%, which is higher than prevalence nationwide, which is 8.4%.[3] Figure 2 shows current asthma prevalence in adults with selected characteristics in Pennsylvania. In Pennsylvania, according to the 2009 Behavioral Risk Factor Surveillance System (BRFSS), an estimated 15% of children had a lifetime prevalence of asthma, and 10% of children had current asthma.[3]

Asthma Hospitalization in Pennsylvania: In 2009, there were approximately 19.4 inpatient admissions with a primary discharge diagnosis of asthma for every 10,000 Pennsylvania residents.

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(Asthma continued)

Charges for Hospitalization with Asthma: From 2005 to 2009, the overall average asthma hospitalization charge per stay increased consistently every year (Table 1). Total Pennsylvania hospital charges for asthma are approximately $500 million every year. Average charges for inpatient hospitalization with asthma were 60 to 90% higher among adults compared to children. Charges were also higher for females compared to males, among blacks compared to whites and among Hispanics compared to Non-Hispanics.

Table 1: Charges for Hospitalization with Asthma by Selected Characteristics, PA 2005-2009

Selected Characteristics		2005		2006		2007		2008		2009	
		Per Stay	Per Day	Per Stay	Per Day	Per Stay	Per Day	Per Stay	Per Day	Per Stay	Per Day
Age	0-17	$10,927	$5,519	$11,863	$6,084	$13,087	$6,576	$13,636	$6,957	$15,751	$7,836
	18+	$19,296	$4,627	$21,591	$5,371	$23,596	$5,812	$24,650	$6,027	$25,549	$6,403
Sex	Female	$18,394	$4,633	$20,487	$5,377	$22,220	$5,832	$23,766	$6,078	$24,464	$6,455
	Male	$14,713	$5,056	$15,848	$5,784	$17,516	$6,211	$18,302	$6,355	$19,617	$7,133
Race	White	$14,580	$3,654	$16,116	$4,049	$17,655	$4,504	$19,431	$4,846	$20,319	$5,223
	Black	$20,969	$7,037	$22,255	$7,920	$24,143	$8,442	$25,562	$8,607	$26,286	$9,096
	Other	$20,878	$7,053	$22,106	$7,895	$23,028	$7,859	$23,265	$8,135	$23,741	$8,761
Ethnicity	Hispanic	$20,825	$7,156	$22,254	$8,366	$23,441	$8,000	$24,121	$8,464	$24,281	$8,703
	Non-Hispanic	$16,817	$4,620	$18,519	$5,337	$20,220	$5,794	$21,646	$5,996	$22,574	$6,487

Data Source: Pennsylvania Health Care Cost Containment Council (PHC4).
Notes: "Other" includes Asians, Pacific Islanders, Native Americans, Eskimos, and Unknown. Hispanic can be any race.

References

[1] National Health Statistics Reports http://www.cdc.gov/nchs/data/nhsr/nhsr032.pdf
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[3] Centers for Disease Control and Prevention http://www.cdc.gov/asthma/brfss/default.htm#09
[4] Vital Signs: Asthma Prevalence, Disease Characteristics, and Self-Management Education -- United States, 2001-2009. *MMWR*, May 6, 2011. **60 (17);547-552. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6017a4.htm**

West Nile Virus—Pennsylvania, 2000-2010

Background

West Nile virus (WNV) infection is a potentially serious disease transmitted by mosquitoes. WNV was first identified in the U.S. in 1999 in New York City. In 2000, the Pennsylvania Departments of Health, Environmental Protection and Agriculture created a collaborative WNV Control Program to monitor and manage the spread of the virus in the state.[1] The program includes surveillance and laboratory testing of mosquitoes, birds, horses and humans; as well as mosquito control efforts and public education. Pennsylvania first identified WNV in mosquitoes, horses and sentinel chickens in 2000. The first human case occurred in August, 2001. Over the years, mosquitos carrying WNV have been detected in all 67 Pennsylvania counties.

Mosquito on a human finger

Photo courtesy of CDC/James Gathany

Table 1: West Nile Virus Morbidity and Mortality in Pennsylvania, 2000-2010

Year	Human Cases	Deaths	Case Fatality Rates (%)
2000	0	0	0
2001	3	0	0
2002	62	0	0
2003	237	9	3.8
2004	15	2	13.3
2005	25	2	8.0
2006	9	2	22.2
2007	10	0	0
2008	14	1	7.1
2009	0	0	0
2010	28	0	0
	403	**16**	**3.97**

Clinical Manifestations

Approximately 80% of persons infected with WNV will be asymptomatic. Most of the rest will develop non-neuroinvasive disease, which includes fever, headache and sometimes rash. However, approximately one in 150 infected persons will develop serious neurologic illness, such as encephalitis, aseptic meningitis or acute flaccid paralysis. WNV can be deadly; the elderly are particularly at risk. The virus is most commonly diagnosed by laboratory testing of WNV antibodies in serum. There are no antiviral medications that have been proven to be effective against WNV disease, and there is no human vaccine available.

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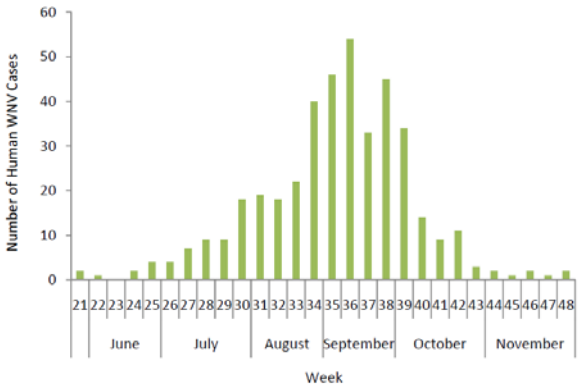
Symptomatic WNV infection is a reportable disease in Pennsylvania.[2] To date, there have been 403 human WNV cases, including 16 deaths, reported in Pennsylvania (Table 1). By far the most active year for human cases was 2003, with 237 cases. However, 2010, with 28 cases, has been the worst year since that time. Cases peak in early September, although they may occur at any time from late spring to late fall (Figure 1). WNV has disproportionately affected the elderly, with those ≥70 years of age particularly susceptible to neuroinvasive disease (Figure 2). (Most reported cases are neuroinvasive, since non-neuroinvasive cases are less likely to be diagnosed and reported.) Although WNV cases can occur anywhere in Pennsylvania, counties with the highest incidence rates are clustered in the southcentral and northwestern parts of the state (Figure 3).

Figure 1: Week of Symptom Onset Date, Pennsylvania 2000-2010



Prevention of WNV Infection

Since there is no effective vaccine or treatment for WNV infection, personal protection measures and environmental control strategies are critical prevention activities. The Pennsylvania WNV Control Program recommends[3] that persons use mosquito repellant containing DEET and wear shoes, socks, long pants and a long-sleeved shirt when outdoors, especially at dusk or dawn when mosquitoes are most active. Electromagnetic and ultrasound devices are not effective in preventing mosquito bites. Around the home, install tight fitting window screens. Mosquitoes breed in standing water, so removing sources of standing water on your property will protect your family and your neighbors too. Clean out clogged gutters, remove discarded tires and don't let stagnant water collect in pots, wheelbarrows, bird baths, wading pools or other containers. Clean and chlorinate swimming pools and cover when not in use. For standing water that cannot be eliminated, use larvicide tablets.

Figure 2: Number of WNV Cases by Age, Pennsylvania 2000-2010

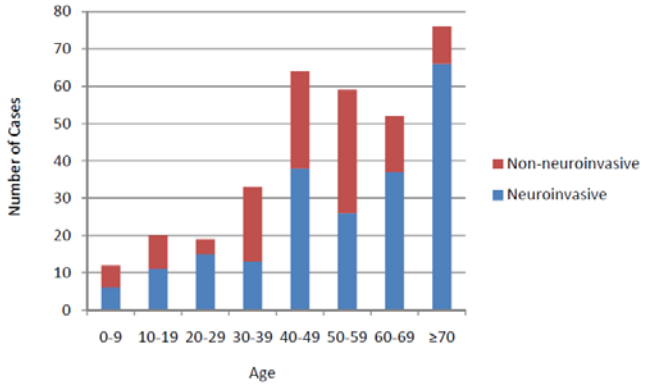
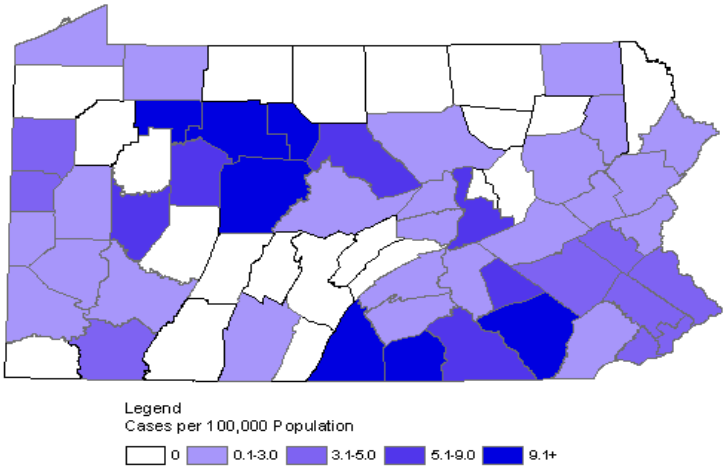


Figure 3: Incidence of WNV by County, Pennsylvania 2000-2010



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[1] http://www.westnile.state.pa.us/index.html
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[3] http://www.westnile.state.pa.us/action.htm

Salmonella in Turtles

Background

Reptiles (including turtles, snakes and lizards) commonly carry *Salmonella* bacteria in their intestines and shed the bacteria in their feces. While infection with *Salmonella* can be a serious disease in humans, the bacteria are part of the natural intestinal contents of turtles and other reptiles and do not make the animals sick. However, if a person accidentally gets the bacteria into their own mouth, illness can result. The bacteria might be easily transmitted while holding or cleaning up after a reptile, or the bacteria might contaminate the home environment (floors and other surfaces), where a small child could pick up the bacteria indirectly. Among reptiles, turtles in particular may be seen by parents as a non-threatening small pet for young children. However, young children are particularly vulnerable to *Salmonella* infection.

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(Salmonella in Turtles continued)

Since 1975, with the passing of the Public Health Services Act (Title 21 CFR 1240.62) by the Food and Drug Administration (FDA), the sale or distribution of turtles with a shell or carapace of less than four inches has been banned. The Centers for Disease Control and Prevention (CDC), estimates that this ban has prevented an estimated 100,000 cases of salmonellosis each year in children. Despite these efforts, however, the sale of illegal turtles continue to be a national problem. Illegal turtles (<four inches) are often purchased from local street vendors, small variety shops, flea markets or over the internet.

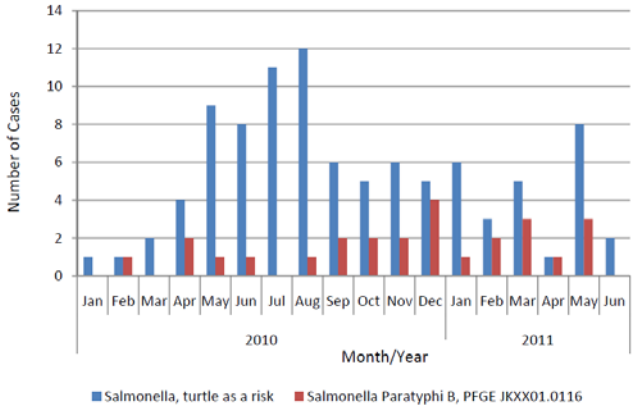
Turtle from a Pennsylvania *Salmonella* outbreak which carried *Salmonella* serotype Paratyphi B that was a match by PFGE to human cases in the household

Photo courtesy of PA Dept of Health/Larry Sundberg

Salmonella, Paratyphi B, and turtles in Pennsylvania

- Since January of 2010, 25 cases of *Salmonella* serotype Paratyphi B were reported in residents of Pennsylvania. The *Salmonella* isolates all shared an identical genetic pattern (PFGE XbaI pattern JKXX01.0116). Fifteen of these illnesses occurred in children aged 9 years or less.
- These cases were located in the Southcentral and Southeastern regions of Pennsylvania in the following counties: Dauphin, York, Cumberland, Berks, Lehigh, Montgomery and Philadelphia.
- When interviewed, 15 (60%) of the 25 case-patients or their parents mentioned having exposure to turtles less than four inches in size. The type of turtle most frequently mentioned was the subspecies of pond turtles often called "red eared sliders." These turtles are most frequently sold illegally as pets.
- While the original source of these turtles has not been discovered, typically they were purchased from street vendors in urban settings or at small variety shops.
- Turtle-associated *Salmonella* infections frequently occur in PA and often follow a typical pattern of infection, with peaks in the summer months of the year.

Figure 1: Salmonella, Turtles as a Risk Factor vs. Salmonella Paratyphi B, Jan 1, 2010 - Jun 9, 2011, Pennsylvania



Prevention and advice for consumers

- Don't buy small turtles for pets or as gifts.
- If your family is expecting a child, remove any pet turtle (as well as other reptiles and amphibians) from the home before the infant arrives.
- Keep turtles out of the homes with children under 5 years old, the elderly or people with weakened immune systems.
- Do not allow turtles to roam freely through the house, especially in food preparation areas.
- Do not clean turtle tanks or other supplies in the kitchen sink. Clean turtle tanks and equipment in an area not used for food preparation or where children play, and be sure to clean and disinfect the area afterwards.
- Always wash your hands thoroughly with soap and water after touching any turtles, their housing or any other item (for example, turtle food) that comes in contact with a turtle or its housing.
- Be aware that *Salmonella* infection can be caused by contact with turtles in petting zoos, parks, child day care facilities or other locations.
- Watch for symptoms of *Salmonella* infection, such as diarrhea, stomach pain, nausea, vomiting, fever and headache. Call your doctor if you suspect that you or a member of your family may have *Salmonella*.

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Cases of Select Notifiable Diseases in Pennsylvania (as of 7/2/2011)*

Disease	2011 †	2010	2009	2008	2007
	Total cases reported for previous 5 years				
Chlamydia	25379	47,518	43,068	42,233	42,469
Gonorrhea	6321	12,883	10,138	11,071	12,706
Campylobacter	791	1,624	1,542	1,554	1,359
Salmonella	693	1,809	1,701	1,721	1,866
Pertussis (whooping cough)	248	763	468	368	257
Giardia	322	786	837	873	751
Cryptosporidiosis	219	485	465	326	939
Varicella (chicken pox)	148	373	461	853	1,821
Legionella	93	324	383	408	308
Shigella	52	634	1,201	248	171

* Confirmed cases only
† Case counts for 2011 are provisional and subject to change.

Disease Reporting

Health care practitioners, health care facilities, and clinical laboratories are required to report certain diseases to the Pennsylvania Department of Health. In addition to the diseases on the list, all disease outbreaks and/or unusual occurrences of disease are reportable within the commonwealth. In most cases, reporting must be done electronically via Pennsylvania's version of the National Electronic Disease Surveillance System (PA-NEDSS). To request a PA-NEDSS account, health care providers may email PA-NEDSS@state.pa.us; please include your contact information and the name and address of the facility for which you will be reporting.

Employment Opportunities

The Pennsylvania Department of Health is currently accepting applications for the following positions:

- Epidemiologist
- Epidemiology Research Associate
- Public Health Physician

To apply, click on the links above or visit the Pennsylvania State Civil Service Commission website and click on Job Seekers.

Complete a civil service application for employment for each test announcement for which you are interested. The Commission will send you the results of your examination or rating. If you meet the minimum requirements and pass the test, your name is placed on the list of eligible candidates (eligible list) for that job title according to your score. Positions in the merit system are filled from this pool of eligible candidates. When a job vacancy occurs, the hiring agency requests an eligible list from which to interview for that job title. If you are ranked high enough on the eligible list, you will be contacted for a job interview.

See How to Get a Civil Service Job for more information.

Pennsylvania Epi Notes

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