Pennsylvania Epi Notes

pennsylvania DEPARTMENT OF HEALTH

Fall 2011

Bureau of Epidemiology
Pennsylvania Department of Health

Volume 1, Issue 4

Inside this issue:

Group A Strep Outbreak	1
Lyme Disease	3
Babesiosis	4
Updated Norovirus Guidelines	6
Health Care Worker Influenza Vaccination	6
Disease Reporting	7
Employment	7

Group A Streptococcus growing on blood agar plate

Photo courtesy of CDC/Richard R. Facklam, PhD

Outbreak of Invasive Group A Streptococcus in a Long-term Care Facility—September 2010

Background

Group A *Streptococcus* (GAS) is a bacterium that is commonly found in the throat or on the skin. Most GAS infections cause mild illnesses, such as strep throat and impetigo. The bacteria can also cause serious and potentially life-threatening diseases when GAS gets into areas of the body that are normally sterile, such as the blood or lung tissue. These infections are given the name "invasive GAS disease" and include necrotizing fasciitis (occasionally described as "flesh-eating bacteria") and streptococcal toxic shock syndrome.[1] GAS is spread by direct contact with secretions from the nose or throat of infected children and adults or through contact with open areas on the skin, such as wounds and sores. Common signs and symptoms include sore throat (pharyngitis), fever and cough, as well as pain, tenderness or redness (cellulitis) surrounding a wound. GAS infection can be treated with a variety of antibiotics, and early treatment can prevent progression to severe disease. Good hand hygiene can help reduce the spread of GAS infection. Long-term care facility (nursing home) residents are at an increased risk of invasive GAS infection because of older age, crowded living conditions and the presence of underlying medical conditions, such as heart disease and diabetes.[2] For this reason, outbreaks of invasive GAS disease in long-term care facilities (LTCFs) are not uncommon.[3]

Outbreak notification and case finding

In September 2010, a county health department notified the Pennsylvania Department of Health of three recent laboratory-confirmed cases of invasive GAS in an LTCF specializing in ventilator weaning, spinal cord injury care and short-term rehabilitation. Review of Pennsylvania's reportable disease database found eight additional invasive GAS cases that had occurred since October 2009 at the same facility.

The investigation team also reviewed laboratory records from three nearby hospitals and a commercial lab and found 12 additional cases in patients of the LTCF: two with bloodstream infections and 10 with noninvasive GAS infections (respiratory, wound and eye). In total, 13 cases of invasive GAS and 10 cases of non-invasive GAS, occurring from October 2009-September 2010, were identified. Patients ranged in age from 31 to 97 years; 52 percent were male, 48 percent were black. All 13 patients with invasive GAS were hospitalized. Two deaths were associated with invasive GAS infection (case-fatality rate: 15 percent).

Case-control study

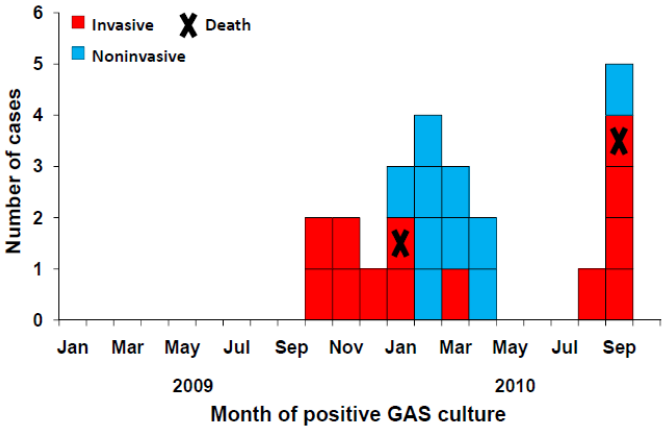
A matched case-control study comparing case-patients to uninfected LTCF residents was performed to identify risk factors for GAS infection. The medical records of three randomly chosen control residents were reviewed for each case-patient. Case-patients were significantly more likely to have two or more wounds (primarily bed sores) than control residents (Table 1).

(Group A Strep continued)

Carrier identification

Since GAS can often be spread by asymptomatic carriers, all LTCF residents and staff were screened for GAS carriage. Specimens were obtained from the throat; for residents, wounds and the skin surrounding devices such as tracheostomies, central lines and indwelling urinary catheters were also swabbed. A total of 728 specimens were collected from 436 persons. One (0.7 percent) resident and four (1.3 percent) staff (two nurses and two housekeepers) had positive GAS cultures. All five GAS carriers were decolonized with antibiotics[4]; identified staff carriers stayed home from work until receiving 48 hours of antibiotic therapy. Facility admissions were suspended from October 5 to October 18 until carriers were treated and infection prevention audits were completed.

Figure 1: Number of residents with culture confirmed group A streptococcus (GAS), by case status and month of positive culture — Pennsylvania, 2009–2010 (n = 23)



Bacterial typing

GAS isolates from the three most recent case-patients and all five isolates from carriers were typed to assess strain relatedness. Isolates from one case-patient, one resident carrier and two nurse carriers were *emm* type 89.0, the most common *emm* type of GAS in the region; the two other case-patient isolates were *emm* type 11.0; and the two isolates from housekeeper carriers were *emm* 3.6 and *emm* 2.0.

Table 1: Final multivariable model assessing risk factors associated with group A streptococcal infection in residents of a single skilled nursing facility — Pennsylvania, 2009–2010

Characteristic/exposure	Adjusted odds ratio	95% confidence interval
Two or more wounds present	3.9	1.1–13.3
Physical therapy	1.7	0.4–6.4
Length of stay ≤ 10 months	2.5	0.7–9.7

Infection prevention assessment

Observations of infection prevention practices were performed on all clinical units beginning October 13, 2010. Interviews were conducted with administrative personnel, the full-time infection preventionist (IP) and staff; front-line staff members were observed in daily practice. An assessment of available infection prevention resources (gloves, sinks and alcohol-based hand rub dispensers) was completed. Compliance with contact precautions and hand hygiene was measured. Hand hygiene compliance was low (17 [32 percent] of 53 observed opportunities), and the facility lacked proper hand hygiene resources. Although hand rub dispensers were located in every resident room, the manufacturer had stopped producing inserts approximately one month before the evaluation. Before this time, staff reported that in-room dispensers were often empty or malfunctioning. During wound care treatments, potentially infectious materials (e.g., open, unused gauze and biohazard bags carrying discarded wound supplies) were moved from room to room. At the time of the investigation, a full-time IP, hired in August 2010, was in the process of assessing and improving infection prevention practices. Education about standard infection prevention practices, including hand hygiene, timely contact precaution implementation and correct wound care practices was provided by the full-time IP, as well as, CDC, state and county health department personnel. Hand hygiene compliance improved to 70 percent (56 of 80 observed opportunities) after staff training and placement of functioning hand rub dispensers on the wall of every resident room.

Follow-up

In December 2010, despite the increased awareness of infection prevention practices two additional invasive GAS infections were identified in the pulmonary units of the LTCF. In response, all 59 pulmonary unit residents and 112 staff who had had direct contact with the newly infected residents were re-screened. Three residents (5 percent) and four staff (3.6 percent), previously not identified, were positive and received antibiotics. Facility administration was advised to use an IP consultant to help the full-time IP identify additional opportunities to further improve prevention practices. Since December, no additional cases have been identified.

Summary

This outbreak of GAS in a nursing facility was large and prolonged. Numerous infection prevention lapses were observed. Infection was associated with having multiple wounds, which suggests that non-intact skin is an important risk factor for GAS transmission in LTCFs.[3] The long duration of the outbreak and the identification of several GAS *emm* types in case-patients and carriers suggest that there were multiple separate introductions of GAS into the facility, which were then spread by suboptimal infection prevention practices.

(Group A Strep continued)

This outbreak highlights the need for strong infection prevention programs in facilities providing complex care to vulnerable populations. LTCFs should have programs to ensure education, compliance and resources for infection prevention, with emphasis on hand hygiene, standard and transmission-based precautions, and appropriate wound care practices to prevent health care–associated outbreaks of GAS. Since asymptomatic or unrecognized GAS infection can occur among staff and residents, single cases of invasive GAS in LTCFs should be considered the potential tip of an iceberg and investigated to stem more widespread transmission. In addition, Pennsylvania's Act 52 requires that all healthcare-associated infections in LTCFs be reported to the health department.

References

[1]CDC. Group A Streptococcal disease. Frequently Asked Questions www.cdc.gov/ncidod/dbmd/diseaseinfo/groupastreptococcal_g.htm. Accessed July 25, 2011.

[2]Deutscher M, Schillie S, Gould G, et al. Investigation of a group A streptococcal outbreak among residents of a long-term acute care hospital. Clin Infect Dis 2011;52:988–994.

[3]Jordan HT, Richards CL, Burton DC, Thigpen MC, Van Beneden CA. Group A streptococcal disease in long-term care facilities: descriptive epidemiology and potential control measures. Clin Infect Dis 2007;45:742–52.

[4]The Prevention of Invasive Group A Streptococcal Infections Workshop Participants. Prevention of invasive group A streptococcal disease among household contacts of case patients and among postpartum and post-surgical patients: recommendations from the Centers for Disease Control and Prevention. Clin Infect Dis 2001;35:950–9.

Lyme Disease in Pennsylvania 2000-2010

Lyme disease is caused by the bacteria *Borrellia burgdorferi*. In Pennsylvania, Lyme disease is transmitted by the bite of an infected deer tick, *Ixodes scapularis*. In about 75 percent of cases, the disease begins with a distinctive rash known as erythema migrans, which has a "bull's eye" appearance. Other symptoms of acute disease include fever, fatigue, chills, headache and muscle and joint aches. Late manifestations of Lyme disease include joint swelling, cardiac conduction defects and neurological problems, such as radiculoneuropathy, facial palsies or lymphocytic meningitis. Diagnosis of Lyme disease can be challenging, but includes observation of clinical manifestations and tests of antibodies to *B. burgdorferi*.[1]

Ixodes scapularis, deer tick, on a leaf

Photo courtesy of CDC/James Gathany

Figure 1: Confirmed Lyme Disease cases by year, Pennsylvania 2000-2010

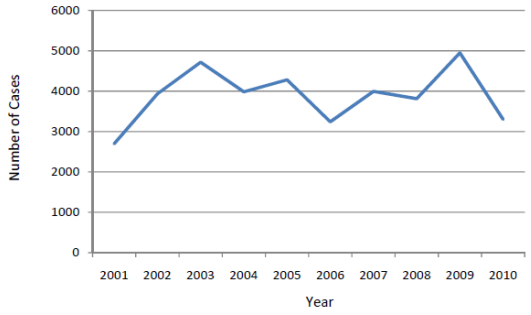
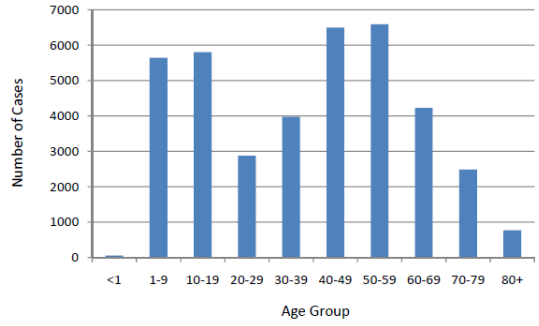


Figure 2: Confirmed Lyme Disease cases by age group, Pennsylvania 2000-2010



Although Lyme disease is reported throughout the United States, almost all cases occur in New England, the mid-Atlantic states and the upper Midwest: Pennsylvania, New Jersey, New York, Massachusetts, Connecticut, Wisconsin, Maryland, Minnesota, New Hampshire, Delaware, Maine and Virginia.[2]

In Pennsylvania, between 3,000 and 5,000 cases are confirmed each year, making it the fourth most commonly reported infectious disease in the state. Most of these cases occur in the southeastern portion of the state. Lyme disease is more commonly seen in men than in women; 50 to 59 year olds are the age group most affected by Lyme disease.

Distinctive "bull's eye" rash commonly seen in Lyme Disease infections

Photo courtesy of CDC/James Gathany

(Lyme Disease in Pennsylvania continued)

Figure 3: Confirmed Lyme Disease cases by sex, Pennsylvania 2000-2010

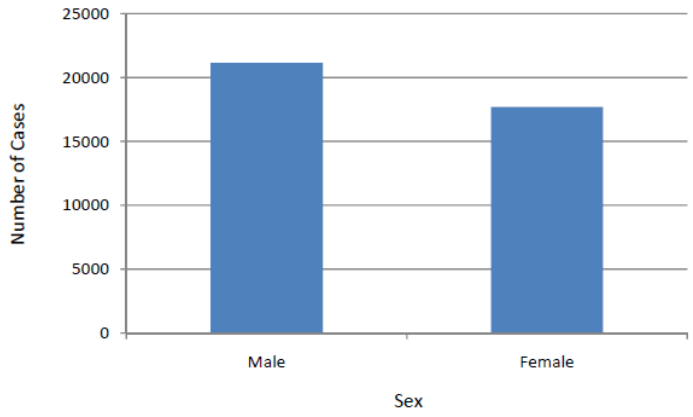
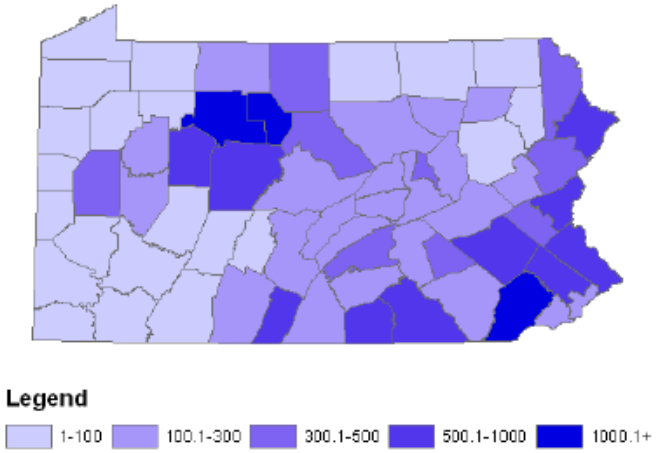


Figure 4: Confirmed Lyme Disease incidence rates per 100,000 people by county, Pennsylvania 2000-2010



References
[1] www.cdc.gov/lyme
[2] www.cdc.gov/lyme/stats/index.html

Babesiosis

Babesiosis is a tick-borne zoonotic disease that is caused by the protozoa *Babesia*.[1] This parasite lives inside red blood cells during part of its life cycle. Although several *Babesia* species have been found in animals, the most common human pathogen in the United States is *B. microti*.[2]

Ixodes scapularis

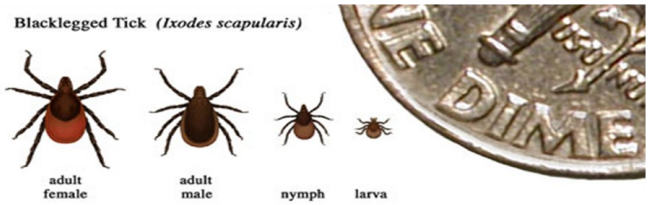


Figure courtesy of CDC

Transmission

The life cycle of *Babesia* species involves both invertebrate and vertebrate hosts.[1] Rodents, particularly the white-footed mouse, are the usual vertebrate hosts, while the *Ixodes scapularis* tick, commonly called the deer tick or blacklegged tick (see picture) is the invertebrate host. Tick bites can transmit the parasite to humans. *Babesia* transmission to humans can also occur through blood transfusions and transplant procedures.[3] There are no tests currently licensed to screen the blood supply for *Babesia*. In rare cases, perinatal transmission has also been documented.[4]

Clinical Findings

Most persons infected with *Babesia* are asymptomatic, but mild to life-threatening illness may develop. The incubation period of babesiosis generally is several weeks to several months for both tick-borne and transfusion-associated disease.[5] Illness is characterized by nonspecific flu-like symptoms (such as fever, chills and myalgia) and hemolytic anemia. In addition, hepatomegaly, splenomegaly or jaundice may be present. Complications can include multiorgan failure, disseminated intravascular coagulation and death. Severe disease and complications are more likely to occur in elderly, asplenic or immunocompromised patients. Co-infection with Lyme disease or human granulocytic ehrlichiosis, diseases that are also transmitted by deer ticks, may occur.[6]

Diagnosis

Babesiosis should be considered in persons with a compatible clinical picture who live in, or have traveled to, endemic areas or received a blood transfusion within the previous nine weeks. Since symptoms are non-specific, microscopic identification of *Babesia* organisms on blood smear is necessary to confirm the diagnosis. It can be difficult to distinguish between infection with *Babesia* and malaria; thus, smears should be reviewed by a reference lab. Serological testing of patients suspected of having babesiosis can also be helpful, especially if there is a low blood level of parasites. PCR testing is increasingly available, but should remain an adjunct to microscopy.[6,7]

(Babesiosis continued)

Treatment

Symptomatic patients should be treated for at least 7 to 10 days with a combination of either: 1) atovaquone and azithromycin or 2) clindamycin and quinine. Other supportive care measures (antipyretics, dialysis, mechanical ventilation, blood transfusions and vasopressors) may be needed, especially in patients with severe disease.[6,7]

Epidemiology and Reporting Considerations

Babesiosis is currently considered endemic in two states (New York and New Jersey) that border Pennsylvania, as well as in Massachusetts, Rhode Island, Connecticut, Wisconsin and Minnesota. The parasite's range appears to be expanding. Babesiosis was made a nationally notifiable illness in 2011.[8] Current Pennsylvania regulations do not require laboratories or providers to report babesiosis; however, reports submitted voluntarily are investigated. Of the 21 cases of babesiosis reported in Pennsylvania for 2005 to 2010, 19 (90 percent) resided in the eastern one-third of the commonwealth. One case was infected through transfusion. Five (24 percent) reported having traveled to an endemic state. Regulatory changes making babesiosis reportable in Pennsylvania have been proposed. Until then, voluntary reporting of cases of babesiosis is encouraged. It is especially important to report any transfusion-associated disease, so appropriate follow-up of additional recipients can take place.

References

[1] Homer, M.J., et al. (2000). Babesiosis. *Clinical Microbiology Reviews*, 13(3), 451-469. Retrieved from www.ncbi.nlm.nih.gov/pmc/articles/PMC88943/pdf/cm000451.pdf

[2] Centers for Disease Control and Prevention (2009). Parasites and Health, Babesiosis. Retrieved from dpd.cdc.gov/dpdx/HTML/Babesiosis.htm

[3] Herwaldt BL et al. Transfusion-associated babesiosis in the United States: A description of cases. *Ann Intern Med* 2011 Sep 5; [e-pub ahead of print]. (www.annals.org/content/early/2011/09/02/0003-4819-155-8-201110180-00362.full)

[4] Centers for Disease Control and Prevention (2010). Babesiosis, Frequently Asked Questions. Retrieved from www.cdc.gov/parasites/babesiosis/gen_info/index.html

[5] Heymann, D.L. (Ed.). (2008). Babesiosis. In *Control of Communicable Diseases Manual* (pp. 69-72). Washington, DC: American Public Health Association.

[6] Wormser, G.P., et al. (2006). The Clinical Assessment, Treatment, and Prevention of Lyme Disease, Human Granulocytic Anaplasmosis, and Babesiosis: Clinical Practice Guidelines by the Infectious Diseases Society of America. *CID, 43,* 1089-1134. Retrieved from cid.oxfordjournals.org/content/43/9/1089.full

[7] Centers for Disease Control and Prevention (2010). Babesiosis, Resources for Health Professionals. Retrieved from www.cdc.gov/parasites/babesiosis/health_professionals/index.html

[8] Centers for Disease Control and Prevention (2011). Babesiosis, 2011 Case Definition. Retrieved from www.cdc.gov/osels/ph_surveillance/nndss/casedef/babesiosis_current.htm

Tick Bite Prevention

- Minimize exposed skin by wearing socks, long pants tucked into socks, and a long-sleeved shirt.
- Apply repellents following product instructions.
  - Products containing DEET can be applied to skin and clothing.
  - Products containing permethrin can be applied to clothing and boots, not skin.
- Walk on cleared trails, in the center of the trail.
- After enjoying the outdoors, perform a tick check of the entire body and remove any that are found.
  - Remove ticks using fine-tipped tweezers by grabbing the mouth parts close to the skin and gently pulling the tick straight out.

See www.cdc.gov/ticks/avoid/on_people.html for more information.

Updated Norovirus Guidelines

Norovirus (formerly known as Norwalk virus) is a common cause of nausea, vomiting and diarrhea. The Centers for Disease Control and Prevention (CDC) has recently published updated norovirus outbreak management and disease prevention guidelines. These recommendations are intended for public health professionals to guide efficient use of resources for effective prevention and control of norovirus disease. The guidelines underscore that hand hygiene is likely the single most important method to prevent infection and control transmission.

Key Points for Investigation and Response to Norovirus Outbreaks

- Initiate investigations promptly, including collection of clinical and epidemiologic information, to help identify predominant mode of transmission and possible source.
- Promote GOOD hand hygiene, including frequent washing with soap and running water for a minimum of 20 seconds. If available, alcohol-based hand sanitizers (≥70 percent ethanol) can be used as an adjunct between proper hand washings but should not be considered a substitute for soap and water.
- Exclude ill staff in certain positions (e.g., food, child care and patient-care workers) until 48 to 72 hours after symptom resolution. In closed or institutional settings (e.g., long term care facilities, hospitals and cruise ships), isolate ill residents, patients and passengers until 24 to 48 hours after symptom resolution. In licensed food establishments, approval from the local regulatory authority might be necessary before reinstating an employee following a required exclusion.
- Reinforce effective preventive controls and employee practices (e.g., elimination of bare-hand contact with ready-to-eat foods and proper cleaning and sanitizing of equipment and surfaces).
- After initial cleaning to remove soiling, disinfect potentially contaminated environmental surfaces using a chlorine bleach solution with a concentration of 1,000-5,000 ppm (1:50-1:10 dilution of household bleach [5.25 percent]) or other Environmental Protection Agency (EPA) approved disinfectants. (See www.epa.gov/oppad001/list_g_norovirus.pdf.) In health care settings, cleaning products and disinfectants should be EPA registered and have label claims for use in health care settings; personnel performing environmental services should adhere to the manufacturer's instructions for dilution, application and contact time.
- Collect stool specimens from at least five persons during the acute phase of illness (≤72 hours from onset).
- Report all outbreaks of acute gastroenteritis to the local health department or the Pennsylvania Department of Health.

Health Care Worker Influenza Vaccination

There is well-documented evidence of the importance and benefits of vaccinating health care personnel (HCP) against influenza. Despite longstanding recommendations and the implementation of intensive voluntary vaccination campaigns, influenza immunization rates are still unacceptably low. The average 2010-2011 seasonal influenza vaccination rate was 63.5 percent among HCP in the United States,[1] far below the Healthy People 2010 goal of 90 percent. In contrast, the vaccination rate was 98.1 percent among HCP who had an employer requirement for vaccination. No other policy or campaign to promote HCP influenza vaccination has consistently achieved equivalent success.

Therefore, the Pennsylvania Department of Health, in collaboration with the Hospital and Health System Association of Pennsylvania (HAP), the Pennsylvania Immunization Coalition (PAIC), the Center for Vaccine Ethics and Policy (CVEP) at the University of Pennsylvania, and the Pennsylvania Patient Safety Authority (PSA) is continuing to promote evidence-based universal influenza vaccination initiatives for HCP and is encouraging health care institutions to make vaccination a condition of employment.

Seven hospitals were recently recognized at the HAP Patient Safety Symposium for achieving HCP vaccination rates above 90 percent through mandatory vaccination programs. Institutions achieving HCP vaccination rates of 90 percent or better are encouraged to contact the Department of Health. For additional information, including a toolkit to assist administrators in achieving the goal of universal HCW influenza vaccination, visit www.haponline.org/quality/resources/flu-campaign and pahcwfluvax.org. Questions regarding this problem should be directed to Dr. Jeff Miller or Owen Simwale at 717-787-3350.

References

[1]Centers for Disease Control and Prevention. (2011). Influenza Vaccination Coverage Among Health-Care Personnel — United States, 2010 – 11 Influenza Season. *Morbidity and Mortality Weekly Report*, 60(32), 1073-1077.

Cases of Select Notifiable Diseases in Pennsylvania (as of 10/1/2011)*

Disease	2011 †	2010	2009	2008	2007
	Total cases reported for previous 5 years				
Chlamydia	38330	47,518	43,068	42,233	42,469
Gonorrhea	9991	12,883	10,138	11,071	12,706
Campylobacter	1400	1,624	1,542	1,554	1,359
Salmonella	1435	1,809	1,701	1,721	1,866
Pertussis (whooping cough)	377	763	468	368	257
Giardia	579	786	837	873	751
Cryptosporidiosis	380	485	465	326	939
Varicella (chicken pox)	210	373	461	853	1,821
Legionella	294	324	383	408	308
Shigella	88	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@pa.gov; 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

Editors:
Leah Lind, MPH
Chandra Marriott, MPH

Contributors:
Allison Longenberger, PhD, MPT
Aimee Palumbo, MPH, CIC
Elizabeth Hunt, RN, MPH
Judi Sedivy, BSN, MPH
Owen Simwale, MPH

Bureau of Epidemiology
Pennsylvania Department of Health

Health & Welfare Building, Room 933
625 Forster Street
Harrisburg, PA 17108
Phone: 717-787-3350

This newsletter is published quarterly at

www.health.state.pa.us/epinotes.

To subscribe electronically, send an email request to

epinotes@pa.gov.