Infectious Diseases

Sexually Transmitted Diseases

The U.S. Centers for Disease Control and Prevention (CDC) estimates that approximately 20 million new cases of sexually transmitted diseases (STDs) are diagnosed each year in the United States. About half occur in young people ages 15 to 24. Serious long-term consequences can result from untreated STDs, including reproductive health problems and infertility, fetal and perinatal health problems, cancer, and transmission of disease.

Women are at higher risk for long-term damage from STDs than are men. It is estimated that undiagnosed cases cause about 24,000 women to lose their fertility each year. Improving reproductive and sexual health is crucial to eliminating health disparities and reducing rates of infectious diseases and infertility, as well as supporting educational attainment, increasing career opportunities and ensuring financial stability.

Chlamydia

Chlamydia, caused by a bacterium called Chlamydia trachomatis, is one of the most frequently reported infectious diseases in the United States. If left untreated, infection can damage a woman’s reproductive organs and cause infertility. Symptoms can be mild; many experience no symptoms. It is estimated that the majority of infections go undiagnosed; less than 50 percent of sexually active women are screened annually for chlamydia.

In 2011, nearly 1.5 million cases of chlamydia were reported nationally, for a rate of 457.6 per 100,000 population. This figure was an increase of 8 percent from the 2010 rate of 423.6 per 100,000 population. This is likely due to increased screening, expanded use of more sensitive tests and more complete national reporting.

The 2012 morbidity rate for chlamydia among Pennsylvania’s black residents (1,516.9 per 100,000 population) was more than 10 times higher than the rate for whites (151.6 per 100,000). In 2012, the chlamydia rate for Hispanic residents was 429.1 per 100,000 population, more than three times the rate for whites.

Figure 5.1 Reported Cases of Chlamydia, Pennsylvania, 1994 to 2012

[Graph showing reported cases of chlamydia from 1994 to 2012.]
**Gonorrhea**

Gonorrhea, caused by Neisseria gonorrhoeae, is a common sexually transmitted infection that can grow and multiply easily in the reproductive tract, as well as the mouth, eyes and anus. If left untreated, gonorrhea can cause serious, permanent health problems. The bacteria are a common cause of pelvic inflammatory disease in women; in men, it can cause infertility.

In 2011, the U.S. saw 321,849 cases of gonorrhea reported. It was the second consecutive year in which the number of cases rose.⁹

In Pennsylvania, the rate of gonorrhea among black male residents was nearly 39 times greater than the rate among white male residents (631.20 per 100,000 population and 16.3 per 100,000 population, respectively), and the rate for Hispanic male residents (91.3 per 100,000) was about six times higher than the rate for white males. The rate for black female residents (559.5 per 100,000 population) was more than 17 times greater than the rate among white female residents (32.7 per 100,000); at the same time, the rate for Hispanic women of 97.9 per 100,000 was about three times the rate of white female residents.

![Figure 5.2 Reported Cases of Gonorrhea, Pennsylvania, 1994 to 2012](Image)

**Syphilis**

Syphilis, caused by Treponema pallidum, is transmitted through direct contact with the bacteria-laden sores. The first phase, “primary syphilis,” is typically characterized by the formation of a small, round, firm ulcer or sore at the place where the bacteria entered the body. Most often, this is on the external genitalia, vagina, anus or rectum, but it may be on the lips, in the mouth or elsewhere. Lymph nodes near the site of infection may be swollen.

“Secondary” syphilis involves a skin rash that appears weeks later, with possible additional symptoms such as a sore throat, tiredness, headache, swollen lymph nodes and more.

In absence of treatment, external symptoms will disappear eventually, but the infection will remain in the body. “Latent” syphilis, or “hidden” syphilis, can last for years.
Some with syphilis move on to “tertiary” syphilis, with damage to the heart, eyes, brain, bones, joints and more. Late syphilis can result in mental illness, blindness, deafness, neurological problems and even death.

Across the U.S., 13,970 cases of primary and secondary syphilis were reported in 2011; the morbidity rate was unchanged from the previous year, at 4.5 per 100,000 population. However, the number of infections among women has been declining, which the number among men, particularly gay and bisexual men, has increased.\(^{13}\)

The same year, 360 congenital syphilis cases were reported, at a rate of 8.5 per 100,000 live births, a seven percent decrease since the previous year. Since 2008, the national rate of congenital syphilis has decreased by nearly 20 percent.\(^{14}\)

In Pennsylvania, rates of primary and secondary syphilis were nearly 10 times higher for black male residents than white males (36.3 per 100,000 population and 3.7 per 100,000 population, respectively); compared to white males, the rate for Hispanic males was about twice as high (8.9 per 100,000 population). For black females the rate of 3.9 per 100,000 population was nearly 56 times the rate of syphilis among white females (0.07 per 100,000 population).

![Figure 5.3 Reported Cases of Primary and Secondary Syphilis, Pennsylvania, 1994 to 2012\(^{15,16,17}\)](image)

**Intervention Strategies**

The primary mission of the Pennsylvania Department of Health’s Sexually Transmitted Disease (STD) Program is prevention and intervention related to the transmission of sexually transmitted diseases. The program’s core function is the management of STD service delivery, education, training and surveillance, as well as interaction with professional health care providers and community-based organizations. Through this effort, the STD program strives to ensure that persons seeking STD related health services receive high quality, professional and client-centered care. The program also provides information, prevention and intervention services, including educational presentations, screening opportunities and diagnostic and treatment services.

Pennsylvania’s STD program provides a variety of diagnostic and treatment services, including:

- **Free and confidential STD medical services** including examination, testing and treatment for syphilis, chlamydia and gonorrhea, as well as hepatitis B vaccination, HIV testing and counseling. High-risk female patients may also receive a Pap smear.
- **Chlamydia screening for young women**, age 25 or younger at the time of their annual pelvic exam, is provided by the Infertility Prevention Project (IPP), a collaboration of the four Family Health/Planning Councils in Pennsylvania. IPP also provides for counseling, treatment, and sex partner testing and treatment.
STD surveillance, through participation in the Pennsylvania National Electronic Disease Surveillance System (PA-NEDSS). Disease reports are entered and maintained in the system, and the reporting practices of laboratories are monitored to ensure prompt and comprehensive accounting of STDs.

Collaboration with teen pregnancy efforts, led by the Pennsylvania Coalition to Prevent Teen Pregnancy. The focus of the work group is to explore and strengthen partnerships and collaborations among HIV, STD, drug and alcohol programs, Family Health Councils, and teen pregnancy prevention programs throughout the state.

Resources
Pennsylvania Department of Health, STD Program— 717-787-3981
Pennsylvania Department of Health—http://www.portal.health.state.pa.us
United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC)—http://www.cdc.gov

Endnotes


8 Philadelphia NETSS. (2013). National Electronic Telecommunications System for Surveillance (NETSS) [Data file].


12 Philadelphia NETSS. (2013). National Electronic Telecommunications System for Surveillance (NETSS) [Data file].


HIV and AIDS

Human immunodeficiency virus (HIV) attacks and weakens the immune system. Acquired immunodeficiency syndrome (AIDS) is the final stage of the HIV infection, although it may not develop for many years.

Infection Trends

In Pennsylvania, HIV and AIDS diagnoses occur disproportionately among males, blacks, Hispanics, persons 40 years and older, men who have sex with men (MSM), and injection drug users. In addition, findings from a geospatial analysis suggest that HIV and AIDS diagnoses made after December 31, 2011 and those with late diagnoses tend to occur among low income persons. The greatest reservoirs of potential sources of infection are among residents in southern Pennsylvania, as well as heterosexuals.¹

In its Healthy People 2020, the U.S. Department of Health and Human Services identifies the goal of reducing new AIDS cases among those 13 years and older from 13.8 per 100,000 population (2007 baseline data) to 12.4 per 100,000 population by 2020. In 2009, the national rate of new AIDS cases for this group was 13 per 100,000 population.²

Consistent with the national reduction, the number of new cases of AIDS in Pennsylvania has also declined. According to the Pennsylvania Department of Health’s Bureau of Health Statistics and Research, the AIDS incidence rate for age 13 and older was 11.0 reported cases per 100,000 population in 2005. By 2009, the rate decreased to 6.8 reported cases per 100,000 population, below the Healthy People 2020 national target;³ in 2010, it decreased again to 6.5 per 100,000.

As Figure 5.4 shows, the cases of AIDS in Pennsylvania have been falling since 1993 as more diagnosed persons receive treatment. By comparison, the number of persons diagnosed with HIV infection without AIDS appears relatively stable.

Figure 5.4 Reported Cases of AIDS and HIV without AIDS by Year of Diagnosis, Pennsylvania, 1980-2011⁴

![Chart showing reported cases of AIDS and HIV without AIDS by year of diagnosis, 1980-2011.](chart)

Note: HIV infection without AIDS has been reportable in Pennsylvania since October 2002.

Figure 5.5 shows cases of AIDS and HIV without AIDS from 1993 to 2011, by current vital status. Over this period, a declining trend in the diagnosis can be seen, as can the increasing trend of living with HIV infection.
Table 5.1 shows cases of HIV disease, including both AIDS and HIV infection without AIDS, from 2006 to 2011 in Pennsylvania by race and sex. More than three times as many cases of HIV have been diagnosed in males as females. For both sexes, the number of cases is highest for blacks, followed by whites and Hispanics, in that order.

Table 5.1 Combined Cases of AIDS and HIV Without AIDS by Sex, Race/Ethnicity, and Year of Diagnosis, Pennsylvania, 2006 to 2011 with 1980 to 2011 Totals

<table>
<thead>
<tr>
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</tr>
</thead>
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<tr>
<td></td>
<td>number</td>
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<td>number</td>
<td>percent (%)</td>
<td>number</td>
<td>percent (%)</td>
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<tr>
<td>Total Male</td>
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<td>1,338</td>
<td>100</td>
<td>1,248</td>
<td>100</td>
<td>1,169</td>
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<tr>
<td>White (non-Hispanic)</td>
<td>569</td>
<td>35</td>
<td>461</td>
<td>34</td>
<td>383</td>
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<td>Black (non-Hispanic)</td>
<td>728</td>
<td>44</td>
<td>577</td>
<td>43</td>
<td>599</td>
<td>48</td>
<td>508</td>
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<tr>
<td>Hispanic</td>
<td>244</td>
<td>15</td>
<td>222</td>
<td>17</td>
<td>207</td>
<td>17</td>
<td>226</td>
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<tr>
<td>Asian/Pacific Islander</td>
<td>15</td>
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<td>20</td>
<td>1</td>
<td>12</td>
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<tr>
<td>Multiple Race</td>
<td>84</td>
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<td>58</td>
<td>4</td>
<td>47</td>
<td>4</td>
<td>41</td>
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<tr>
<td>Total Female</td>
<td>692</td>
<td>100</td>
<td>528</td>
<td>100</td>
<td>481</td>
<td>100</td>
<td>414</td>
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<tr>
<td>White (non-Hispanic)</td>
<td>374</td>
<td>25</td>
<td>314</td>
<td>59</td>
<td>267</td>
<td>56</td>
<td>226</td>
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<tr>
<td>Black (non-Hispanic)</td>
<td>172</td>
<td>25</td>
<td>114</td>
<td>22</td>
<td>98</td>
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<td>75</td>
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<td>Hispanic</td>
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<tr>
<td>Native American</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Multiple Race</td>
<td>44</td>
<td>6</td>
<td>23</td>
<td>4</td>
<td>32</td>
<td>7</td>
<td>14</td>
</tr>
</tbody>
</table>

Note: Reduced numbers may be partially due to reporting delays. Percentages may not add up to 100% due to rounding.

Table 5.2 shows cases of HIV disease in Pennsylvania by age group. The burden of HIV disease is clustered among persons 20 to 49 years old, with 20 to 29 year olds experiencing the highest year to year increases between 2006 and 2011.
Table 5.2 Combined Cases of AIDS and HIV Without AIDS by Age Group and Year of Diagnosis, Pennsylvania, 2006-2011 with 1980 to 2011 Totals

<table>
<thead>
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<tbody>
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<td></td>
<td>number</td>
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<td>number</td>
<td>percent (%)</td>
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<td>percent (%)</td>
<td>number</td>
</tr>
<tr>
<td>All ages</td>
<td>2,335</td>
<td>100</td>
<td>1,866</td>
<td>100</td>
<td>1,729</td>
<td>100</td>
<td>1,583</td>
</tr>
<tr>
<td>0 to 12</td>
<td>13</td>
<td>1</td>
<td>11</td>
<td>1</td>
<td>14</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>13 to 19</td>
<td>82</td>
<td>4</td>
<td>103</td>
<td>6</td>
<td>97</td>
<td>6</td>
<td>79</td>
</tr>
<tr>
<td>20 to 29</td>
<td>434</td>
<td>19</td>
<td>423</td>
<td>23</td>
<td>389</td>
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<td>448</td>
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<td>30 to 39</td>
<td>615</td>
<td>26</td>
<td>452</td>
<td>24</td>
<td>382</td>
<td>22</td>
<td>366</td>
</tr>
<tr>
<td>40 to 49</td>
<td>713</td>
<td>31</td>
<td>534</td>
<td>29</td>
<td>502</td>
<td>29</td>
<td>423</td>
</tr>
<tr>
<td>Over 49</td>
<td>478</td>
<td>20</td>
<td>343</td>
<td>18</td>
<td>345</td>
<td>20</td>
<td>262</td>
</tr>
</tbody>
</table>

Table 5.3 shows cases of HIV diseases in Pennsylvania by mode of transmission. According to these data, heterosexual contact was the predominant mode of transmission through 2008, but since 2009 more cases have resulted from men having sex with men than from either heterosexual contact or injecting drug use.

Table 5.3 Combined Cases of AIDS and HIV Without AIDS by Mode of Transmission and Year of Diagnosis, Pennsylvania, 2006 to 2011 and 1980 to 2011 Totals

<table>
<thead>
<tr>
<th></th>
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<td>number</td>
<td>percent (%)</td>
<td>number</td>
<td>percent (%)</td>
<td>number</td>
</tr>
<tr>
<td>All modes</td>
<td>2,335</td>
<td>100</td>
<td>1,866</td>
<td>100</td>
<td>1,729</td>
<td>100</td>
<td>1,583</td>
</tr>
<tr>
<td>Men sex w/men (MSM)</td>
<td>716</td>
<td>31</td>
<td>596</td>
<td>32</td>
<td>603</td>
<td>35</td>
<td>636</td>
</tr>
<tr>
<td>Injecting drug use (IDU)</td>
<td>461</td>
<td>20</td>
<td>285</td>
<td>14</td>
<td>215</td>
<td>12</td>
<td>164</td>
</tr>
<tr>
<td>MSM &amp; IDU</td>
<td>46</td>
<td>3</td>
<td>47</td>
<td>3</td>
<td>42</td>
<td>2</td>
<td>25</td>
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<tr>
<td>Coagulation disorder</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Heterosexual contact</td>
<td>886</td>
<td>38</td>
<td>856</td>
<td>46</td>
<td>760</td>
<td>44</td>
<td>501</td>
</tr>
<tr>
<td>Transfusion received</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Undetermined/Other**</td>
<td>16</td>
<td>1</td>
<td>12</td>
<td>1</td>
<td>17</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>All pediatric modes*</td>
<td>187</td>
<td>8</td>
<td>99</td>
<td>5</td>
<td>92</td>
<td>5</td>
<td>250</td>
</tr>
</tbody>
</table>

Note: Reduced numbers may be partially due to reporting delays. Percentages may not add up to 100% due to rounding.

**Intervention Strategies**

The primary mission of the Division of HIV/AIDS within the Pennsylvania Department of Health’s Bureau of Communicable Diseases is to ensure that a full array of HIV prevention and care services are available and accessible for people infected with HIV and AIDS, as well as those at-risk for the disease. The Division implements comprehensive HIV prevention programs to reduce morbidity, mortality and related health disparities. It also conducts activities to reduce the number of new HIV infections and to increase the proportion of HIV-infected persons who know they have HIV. The Division seeks to link Pennsylvania residents with appropriate prevention, care and treatment services. For residents with HIV/AIDS and no other means to pay for services, the program coordinates HIV/AIDS care and support services through a statewide service delivery network.

**Prevention**

The Prevention section of the Division of HIV/AIDS uses funds from the state and the U.S. Centers for Disease Control and Prevention (CDC) to implement comprehensive prevention programs to reduce morbidity, mortality and related health disparities, in accord with the National HIV/AIDS Strategy (NHAS). The following activities aim to reduce the number of new HIV infections, increase the proportion of HIV-infected persons who know they have the infection, and link them to appropriate services.

**Core activities:**

- **HIV counseling, testing, and referral**, through a network of over 145 agencies with 390 testing sites employing a variety of methods (blood, oral, rapid) in varied settings (healthcare, non-healthcare). Contractors include county and municipal health departments, community based organizations, and the Pennsylvania Expanded HIV Testing Initiative.
- **Comprehensive prevention with positives**, serves those who are identified as having HIV disease, and their partners, through linkage to care, retention/reengagement, referrals to other services, CD4 and viral load testing, and partner services for clients diagnosed both in publicly-funded testing sites and private providers.

- **Condom distribution**, free, with priority given to Department of Health-funded testing sites, STD clinics, HIV care providers and private providers serving large numbers of HIV-positive individuals.

- **Policy initiatives** to bring about changes to improve HIV prevention activities, at the health department, state or local level.

Other activities, by or in collaboration with contractors (e.g., University of Pittsburgh, HIV Prevention and Care Project: the Pennsylvania State University, College of Medicine):

- Jurisdictional HIV prevention planning
- Comprehensive HIV prevention planning
- Capacity-building activities
- Program planning, monitoring, and evaluation
- Expanded HIV testing initiative for routine HIV testing in healthcare settings
- HIV prevention demonstration project with black MSM and transgender youth: Project Silk

**Care**
The coordination and delivery of HIV/AIDS care and support services is primarily accomplished through grant agreements with seven regional grantees, including the Philadelphia Department of Public Health. These serve as a statewide service delivery network for persons with HIV or AIDS and their families, who have no other means to pay for services.

- **Provision of Ryan White Part B core medical and support services for eligible persons with HIV**, through an annual grant from the U.S. Health Resources and Services Administration (HRSA). Funding designated for core services is spent on outpatient health services, oral health care, health insurance assistance, home health care, home and community based health services, hospice services, medical case management, and substance abuse and mental health services. Funds for support services go to emergency financial assistance, food bank and home delivered meals, housing, legal costs, linguistic needs, medical transportation, outreach, psychosocial support, respite care, and treatment adherence counseling.

- **CD4+ T-cell and viral load testing**, necessary to assess disease progression and response to therapy. Free and confidential tests are available to HIV-positive persons who participate in the Special Pharmaceutical Benefits Program, or who are eligible for Ryan White Part B funding, with no other means to pay for the testing.

- **Housing Opportunities for Persons with AIDS (HOPWA) program**, through an annual grant from the U.S. Housing and Urban Development agency. Six of the seven regional grantees use this finding to provide rental assistance, short-term mortgage payments, and other housing-related services for people infected with or affected by HIV/AIDS.

- **Corrections discharge case management planning**, the result of a collaboration between the Department of Health and the Department of Corrections, assists inmates with HIV in transitioning to the community upon release from a state correctional facility. Division-funded networks are used to connect inmates who have HIV with case managers who facilitate access to medical and supportive services in their communities.

- **Quality management**, to ensure that services are consistent with guidelines for improvement in the access to and quality of HIV services.

Other activities, by or in collaboration with contractors (e.g., University of Pittsburgh, HIV Prevention and Care Project: the Pennsylvania State University, College of Medicine):

- Comprehensive HIV planning
- Capacity-building activities
- Program planning, monitoring, and evaluation
- Needs assessment activities
Critical Phase Intervention Project with HIV testing sites to ensure the linkage of newly identified HIV-positive persons into care services

**Special Pharmaceutical Benefits Program (SPBP)**
The SPBP administers the AIDS Drug Assistance component of the Ryan White Pennsylvania Part B federal grant. This program serves residents with low to moderate income who are under or uninsured, and not Medicaid eligible, covering:

- **Medications for HIV and related opportunistic infections**, through a statewide network of more than 2,800 pharmacies.
- **Lab services for cardholders with no other insurance**, through any Medicaid-enrolled lab that can submit claims electronically.
- **Part B premium assistance for Medicare-eligible cardholders**.

**Resources**
Pennsylvania Department of Health, Division of HIV/AIDS—717-783-0572
Pennsylvania Department of Health—http://www.health.state.pa.us
Pennsylvania Annual HIV Surveillance Summary Report—
http://www.portal.state.pa.us/portal/server.pt?open=514&objID=557343&mode=2
Pennsylvania Integrated Epidemiologic Profile of HIV/AIDS—
http://www.portal.state.pa.us/portal/server.pt/community/hiv___aids/14241/integrated_epidemiologic_profile_of_hiv___aids_in_pa/557190
United States Department of Health and Human Services, Centers for Disease Control and Prevention, HIV/AIDS—
http://www.cdc.gov/hiv/

**Endnotes**


4 United States Department of Health and Human Services, Centers for Disease Control and Prevention. Enhanced HIV/AIDS Reporting System (eHARS) [Software application].

5 United States Department of Health and Human Services, Centers for Disease Control and Prevention. Enhanced HIV/AIDS Reporting System (eHARS) [Software application].

6 United States Department of Health and Human Services, Centers for Disease Control and Prevention. Enhanced HIV/AIDS Reporting System (eHARS) [Software application].

7 United States Department of Health and Human Services, Centers for Disease Control and Prevention. Enhanced HIV/AIDS Reporting System (eHARS) [Software application].

8 United States Department of Health and Human Services, Centers for Disease Control and Prevention. Enhanced HIV/AIDS Reporting System (eHARS) [Software application].
Tuberculosis

Tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis, a bacterium that usually attacks the lungs but can affect any part of the body, including the kidneys, spine and brain. Without proper treatment, tuberculosis can be fatal. Spread primarily by microscopic airborne droplets that become airborne when an infected person coughs, sneezes, speaks, or sings, tuberculosis generally causes symptoms such as a bad cough lasting three weeks or more, pain the chest, coughing up blood or sputum, weakness or fatigue, weight loss, lack of appetite, chills, fever, and night sweats.¹

The World Health Organization (WHO) estimates that about one-third of people worldwide are infected with tuberculosis. Nearly nine million people were sickened with the disease in 2011, and about 1.4 million died. Tuberculosis is the leading killer of persons with HIV.²

In the U.S., the Healthy People 2020 target rate for new tuberculosis cases is 1.0 per 100,000 population. This is unchanged from the Healthy People 2010 goal, which was unmet. In 2011, a total of 10,528 cases of TB were reported in the U.S., a rate of 3.4 per 100,000 population. Although higher than Healthy People goals, this was the lowest number of cases recorded since national TB reporting began in 1953.³ Pennsylvania’s rate in 2011 was even lower, at 2.0 per 100,000 population with 260 cases statewide; thus, the state is ranked 22nd of the fifty states for this health indicator.⁴

Early 2012 data suggest that the rate of TB in Pennsylvania is declining. Although 123 cases were reported during the first half of 2011, just 115 cases were reported for the same timeframe in 2012. Of those, 80 were reported as pulmonary TB (69.6 percent), 32 extra-pulmonary (spread outside the lungs; 27.8 percent), and 3 both pulmonary and extra-pulmonary TB (2.6 percent). Just two patients, less than one percent of the total reported cases, were multi-drug resistant tuberculosis (MDR-TB). Primary resistance to Isoniazid was found in 5.2 percent of cases, while resistance to at least one drug was found in 7.0 percent of reported cases.

Based on the 2012 half-year data in Pennsylvania, men and women were almost equally affected by tuberculosis, with 49.6 percent and 50.4 percent, respectively. Nearly 35 percent (40 of 115) occurred in among those 25 to 49 years old, but over half (56.5 percent; 65 of 115 cases) occurred in persons over age 50.

U.S.-born persons were affected in 46 cases in Pennsylvania during the first half of 2012. Drawing on population estimates from the U.S. Census Bureau of 11,982,617 U.S.-born persons in the state, the current case rate for U.S.-born persons in Pennsylvania is .38 per 100,000 population.

Table 5.4 Tuberculosis Rates for U.S.-born Residents, Pennsylvania, 2010 to 2012⁶

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<th>Year</th>
<th>State Target* per 100,000 population</th>
<th>State Actual Rate per 100,000 population</th>
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<tbody>
<tr>
<td>2010</td>
<td>.80</td>
<td>.80</td>
</tr>
<tr>
<td>2011</td>
<td>.90</td>
<td>.90</td>
</tr>
<tr>
<td>2012</td>
<td>.38 (to date)</td>
<td>.38 (to date)</td>
</tr>
</tbody>
</table>

Note: The goal set by the CDC is to reduce the tuberculosis rate for U.S.-born persons to less than .7 per 100,000 population by 2015.⁷

Table 5.5 Tuberculosis Testing for Persons with HIV, Pennsylvania, 2008 to 2012⁸⁹

<table>
<thead>
<tr>
<th>Year</th>
<th>No data reported</th>
<th>Negative within past year</th>
<th>Test offered</th>
<th>Test not offered</th>
<th>Positive</th>
<th>Refused</th>
<th>Test, unknown result</th>
<th>Unknown</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>0</td>
<td>247</td>
<td>342 (88.4%)</td>
<td>45 (11.6%)</td>
<td>23</td>
<td>71</td>
<td>2</td>
<td>0</td>
<td>387</td>
</tr>
<tr>
<td>2009</td>
<td>1</td>
<td>170</td>
<td>216 (91.5%)</td>
<td>19 (8.1%)</td>
<td>13</td>
<td>32</td>
<td>1</td>
<td>0</td>
<td>236</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>152</td>
<td>216 (90.8%)</td>
<td>21 (8.8%)</td>
<td>20</td>
<td>44</td>
<td>0</td>
<td>1</td>
<td>238</td>
</tr>
<tr>
<td>2011</td>
<td>0</td>
<td>183</td>
<td>231 (88.8%)</td>
<td>28 (10.8%)</td>
<td>21</td>
<td>27</td>
<td>0</td>
<td>0</td>
<td>260</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>66</td>
<td>97 (84.3%)</td>
<td>15 (13.0%)</td>
<td>10</td>
<td>9</td>
<td>12</td>
<td>3</td>
<td>115</td>
</tr>
</tbody>
</table>

* People who are immunocompromised with HIV are most impacted by TB.
Although Pennsylvania has a good overall rate of completion for tuberculosis treatment, completion within 12 months of treatment initiation continues to be a challenge.

One possible explanation is that persons managed by private physicians do not receive Directly Observed Therapy (DOT) and are not closely monitored for adherence to the self-administered treatment regimen. Although DOT is the standard of care for tuberculosis, the policy is not stressed by those outside of the public health system and referrals for DOT often are not provided to patients. Another factor which contributes to the state’s inability to meet the objective is the determination of default dates within Pennsylvania National Electronic Disease Surveillance System (PA-NEDSS), and timeliness of data entry of treatment completion dispositions.

Progress has been made on this objective as a result of ongoing education and training.

### Table 5.6 Twelve Month Treatment Completion Rate with Newly Diagnosed TB, Pennsylvania, 2010 to 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Target Established by PA* Percent (%)</th>
<th>PA Actual Percent (%)</th>
<th>Number achieved/Total)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>91.5%</td>
<td>84.69% (166/196)</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>92.0%</td>
<td>83.64% (179/214)</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>92.5%</td>
<td>Pending</td>
<td></td>
</tr>
</tbody>
</table>

*Note: 2011 data are preliminary. *The goal set by the CDC is to increase the proportion of patients with newly diagnosed TB eligible for 12 months or less of treatment that complete treatment within 12 months to 93 percent by 2015. **Numerator=Number of patients who completed treatment within 12 months; Denominator=Number of patients who started TB treatment.

### Table 5.7 Persons with Active TB Who Completed Treatment, Pennsylvania, 2008 to 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Eligible Number</th>
<th>Started on Therapy Number</th>
<th>Completed Treatment in 12 Months Number (Percent %)</th>
<th>Completed Treatment Ever Number (Percent %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>343</td>
<td>340</td>
<td>306 (90.0%)</td>
<td>314 (92.4%)</td>
</tr>
<tr>
<td>2009</td>
<td>214</td>
<td>205</td>
<td>180 (87.8%)</td>
<td>202 (98.5%)</td>
</tr>
<tr>
<td>2010</td>
<td>205</td>
<td>202</td>
<td>168 (83.2%)</td>
<td>197 (97.5%)</td>
</tr>
<tr>
<td>2011</td>
<td>218</td>
<td>218</td>
<td>115 (52.8%)*</td>
<td>141 (64.7%)</td>
</tr>
<tr>
<td>2012</td>
<td>Pending</td>
<td>Pending</td>
<td>Pending</td>
<td>Pending</td>
</tr>
</tbody>
</table>

*Note: 2011 data are preliminary.

### Intervention Strategies

The Pennsylvania Department of Health’s Tuberculosis Program has overall responsibility for statewide tuberculosis control efforts, and is tasked with ensuring the provision of effective and efficient surveillance, prevention, diagnosis, and treatment services.

Along with county and municipal health departments, the TB Program provides information and assistance to residents with questions and concerns about this infectious disease. Program services include: provision of medication for the disease treatment and prevention; outpatient examination and diagnostic services; hospitalization for persons with tuberculosis who are very ill, require inpatient care, and have no source of payment; laboratory and X-ray services, if there is no source of payment; in-field DOT for persons in the process of completing recommended treatment; contact investigation and provision of preventive therapy to close contacts of infectious cases; and preventive therapy for other high-risk tuberculosis skin test reactors.
Endnotes


Hepatitis A

Caused by a virus, this disease is transmitted person to person orally, when one puts something contaminated with the stool of a hepatitis A-infected person in the mouth. Hepatitis A virus (HAV) is spread more easily through food and water in locations where there are poor sanitary conditions or where standard hand washing practices are not observed.

The virus can live outside the body for months, depending on the environment, although it is killed by adequate chlorination or high temperatures (185°F; 85°C). Casual contact such as is usual in the office, factory or school setting, typically does not spread the virus.

Most infections result from close contact with a HAV-infected household member, who may not show symptoms. Young children often show little clinical evidence of infection. Older persons are more likely to show symptoms, which tend to occur abruptly after an incubation period of about 28 days and may include fever, tiredness, loss of appetite, nausea, abdominal discomfort, dark urine and jaundice (yellowing of the skin and eyes). Symptoms usually resolve within two months, although some do remain ill for as long as six months.

HAV rarely is fatal. Once a person has had the virus and it has resolved, they will not have it again and cannot pass it to another. Diagnosis is made through a blood test, which detects specific antibodies (IgM anti-HAV). Any person who suspects they have been exposed to HAV should be tested.

According to the U.S. Centers for Disease Control and Prevention (CDC), reported cases of acute HAV declined by about 88 percent between 2000 and 2010, from 13,397 to 1,670.\(^1\) The HAV incidence rate for Pennsylvania was 0.4 per 100,000 population in 2010, lower than the national rate of 0.5 per 100,000 population. The downward trend was disrupted in 2003 by a very large, restaurant-associated outbreak in the southwestern region of the state. Approximately 600 cases occurred, and surrounding states were also affected.

In 2011, just 60 cases of acute HAV were reported in Pennsylvania, but the state has not yet reached the Healthy People 2020 target of 0.3 cases per 100,000 population.

Figure 5.6 Incidence of Acute Hepatitis A per 100,000 Population, Pennsylvania, 2000 to 2011\(^1\)
**Intervention Strategies**

To prevent the spread of hepatitis A virus, hand washing is necessary after using the bathroom or changing a diaper, as well as before preparing or consuming food.

Two commercial products are available to aid in prevention:

- **Hepatitis A immune globulin**, a preparation of harvested serum antibodies that can be given either before exposure for short-term protection against infection, or after a known exposure. It must be administered within two weeks of exposure, for maximum protection.

- **Hepatitis A vaccine**, a shot of inactivated HAV that stimulates the body's immune system to develop long-lasting antibodies against the virus. The vaccine is recommended for: all children at age one; international travelers to destinations with high HAV rates; men who have sex with men; illegal drug users (injection and other); persons with chronic liver disease such as hepatitis B or hepatitis C; persons under treatment with clotting-factor concentrates; persons who may be exposed to hepatitis A on the job, such as in a facility where HAV research occurs.

**Resources**

- Pennsylvania Department of Health—
  http://www.portal.state.pa.us/portal/server.pt/community/diseases_and_conditions/11595

- United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC)—
  http://www.cdc.gov/hepatitis/HAV/index.htm

Endnotes


Hepatitis B

By definition, hepatitis means “inflammation of the liver,” and it is most often caused by a virus. In the United States, the most common types of viral hepatitis are hepatitis A, hepatitis B, and hepatitis C. Heavy alcohol use, exposure to toxins, some medications, and certain medical conditions can also cause hepatitis.

Hepatitis B virus (HBV) attacks the liver and can cause lifelong infection, cirrhosis (scarring) of the liver, liver cancer, liver failure and death. Acute HBV is a short-term illness that occurs within the first six months of exposure to the virus. Acute infection can but does not always lead to chronic HBV, in which the virus remains in the body. Only a blood test can determine whether a person has hepatitis B disease.\(^1\)

HBV is spread through contact with bodily fluids between a person who is infected with the virus and one who is not. This can occur during activities such as birth (mother-to-baby transmission); sex with an infected partner; sharing needles, syringes or other drug-injection equipment; sharing personal items like razors or toothbrushes with an infected person; direct contact with blood or open sores of an infected person. Some cases have resulted from blood contact due to needle sticks, or use of other sharp instruments.

Hepatitis B is not spread through food or water, sharing eating utensils, breastfeeding, touching, kissing, coughing, sneezing, or casual contact.

According to the Centers for Disease Control and Prevention (CDC), approximately 350 million people worldwide are infected with hepatitis B; many are unaware of their infection status. Of those, an estimated 1.2 million persons in the United States are infected with hepatitis B. About 15 to 25 percent of persons with chronic hepatitis B develop serious liver problems, and annually, 3,000 U.S. residents die from hepatitis B-related liver disease.

From 2000 to 2010, the national number of reported cases decreased 58.3 percent, from 8,036 to 3,350.\(^2\) In Pennsylvania, the overall incidence has decreased as a result of the hepatitis B vaccine, but the prevalence of chronic HBV remains high, with 12.27 per 100,000 population in 2006 rising to 15.27 per 100,000 in 2011.

The incidence rate of acute hepatitis B was much lower in Pennsylvania in 2010, at 0.6 per 100,000 population, compared with the estimated national rate of 1.1. In 2011, the state had 1,940 newly diagnosed cases of HBV.

**Figure 5.8 Incidence of Acute Hepatitis B per 100,000 Population, Pennsylvania, 2006 to 2011**\(^3\)
**Figure 5.9 Incidence of Chronic and Unspecified Hepatitis B per 100,000 Population, Pennsylvania, 2006 to 2011**

![Incidence Chart]

**Figure 5.10 Reported Cases of Chronic Hepatitis B by County, per 100,000 Population, Pennsylvania, 2011**

![County Map]

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**Intervention Strategies**

To prevent the spread of hepatitis B, blood spills should always be cleaned with a mixture of bleach and water; even dried blood can be infectious, and HBV can survive outside the body for at least seven days. Gloves should be used, and the solution should be mixed as one part of bleach to ten parts of water.

- **Antiviral drugs** are available for the treatment of chronic HBV infection. Unfortunately, there are no medications available for acute HBV infection.

- **HBV vaccine** has been available for decades, but must be given in multiple doses to be effective. The vaccine is included as a routine component of the pediatric immunization schedule, and it is recommended for those at high risk of exposure to the virus, including occupational exposure. However, there are variances in the effectiveness of the vaccine, and this is not a substitute for reducing risky behaviors that result in exposure to infected blood or other bodily fluids.
- **Prenatal screening** is recommended for all pregnant women early in pregnancy, and repeated close to delivery for those who engage in risky behaviors. Infants who contract HBV at birth may develop a chronic infection and liver disease. Infants who test positive for the infection should receive the first dose of hepatitis B vaccine and hepatitis B immune globulin immediately. The second dose of vaccine should be administered at one to two months of age; the third should be given when the baby is six months old (but not sooner than 24 weeks of age).

- **Reduce risky behaviors** to protect health, and to prevent transmitting the virus to others. Persons with hepatitis B should stop using alcohol, see a doctor regularly and avoid any new medications (e.g., prescription, herbal, over-the-counter, other) until having talked with a doctor. Get vaccinated against hepatitis A, and do not donate blood, organs, other tissue or semen. Do not share personal items that may have microscopic traces of your blood on them, such as toothbrushes, dental appliances, nail-grooming equipment or razors. Cover any cuts or skin sores to keep from spreading the virus.

### Resources

**Pennsylvania Department of Health**—
http://www.portal.state.pa.us/portal/server.pt/community/diseases_and_conditions/11595

**United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC)**—
http://www.cdc.gov/hepatitis/b/index.htm

**United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), National Electronic Disease Surveillance System (NEDSS)**—http://www.cdc.gov/nndss/script/nedss.aspx

### Endnotes


Hepatitis C

Hepatitis, inflammation of the liver, is most often caused by a virus. Hepatitis C virus (HCV) is, according to the U.S. Centers for Disease Control and Prevention (CDC), the most common chronic blood borne infection in the United States, with nearly 3.2 million Americans chronically infected.

HCV is spread by contact with bodily fluids, especially blood, of an infected person. This can occur when sharing with an infected person such items as drug-injection equipment (e.g., needles, syringes), personal items (e.g., razors, toothbrushes). It can also result from direct contact with blood or open sores of an infected person, or exposure to blood from needle sticks or other sharp instruments. It is not spread through food or water, breastfeeding, hugging, kissing, coughing, sneezing or casual contact.

Recent studies suggest that the virus may survive on environmental surfaces at room temperature for between 16 and 96 hours. Therefore, blood spills should be cleaned using a solution of one part household bleach to ten parts water, while gloves are worn.

Although sexual contact is not a common means of HCV transmission, persons at risk for infection through injection drug use might seek care in STD treatment facilities, HIV counseling and testing facilities, correctional facilities, drug treatment centers, and other public settings where STD and HIV prevention and control services are available. Most hepatitis C infections are chronic, cause cirrhosis (scarring of the liver), and may require a liver transplant eventually.

The number of cases of acute hepatitis C decreased between 2000 and 2002, and remained stable from then until 2010.2 That year, there were 850 cases reported in the U.S. In Pennsylvania, the 2010 incidence rate for reported cases was 0.2 per 100,000 population3, below the Healthy People 2020 target of 0.25 cases per 100,000 population.4

Prior to 2002, national incidence rates for acute hepatitis C decreased for all age groups except 0 to 19 year olds; rates remained fairly constant from 2002 through 2010. In the U.S., 2010 rates were highest among persons aged 20 to 29 years (0.75 cases per 100,000 population) and lowest among persons ≥ 60 years of age (0.05 cases per 100,000 population).

In Pennsylvania, the age group with the highest prevalence of chronic hepatitis C is 45 to 60 years old, but a new wave of hepatitis C infections has developed in adolescents and young adults 15 to 34 years old. There were 8,452 cases diagnosed across the state in 2011. Geographical distribution of hepatitis C prevalence may be skewed by locations of state correctional facilities, where a relatively high number of hepatitis C screening tests are performed routinely.

Figure 5.11 Incidence of Acute Hepatitis C per 100,000 Population, Pennsylvania, 2006 to 2011

![Graph showing incidence of acute hepatitis C per 100,000 population in Pennsylvania from 2006 to 2011. The incidence rate decreases from 0.4 in 2006 to 0.05 in 2011.](image)
**Figure 5.12 Incidence of Past or Present Hepatitis C, 15 to 34 Age Group and All Ages, per 100,000 Population, Pennsylvania, 2006 to 2011**

![Graph showing incidence of hepatitis C from 2006 to 2011.](image)

*Incidence is calculated based on the number of cases reported to the Pennsylvania National Electronic Disease Surveillance System (PA NEDSS).*

**Figure 5.13 Reported Cases of Chronic Hepatitis C by County with Locations of State Correctional Facilities, Pennsylvania, 2011**

![Map showing reported cases of chronic hepatitis C by county and state correctional facilities.](image)

*Incidence is calculated based on the number of cases reported to the Pennsylvania National Electronic Disease Surveillance System (PA NEDSS).*

**Intervention Strategies**

Blood tests can help with the diagnosis of hepatitis C infection. Usually, the first test is a screening test that looks for HCV antibodies. If the screening is positive, the results must be confirmed with other, more specific tests. Many persons with hepatitis C infection have no symptoms, so those with risk factors should be tested.
Screening is recommended for those who are current and past injection drug users (even if use was one-time, or many years ago); recipients of blood, blood products and orders prior to 1992, or from a donor who tested positive for HCV or HIV; recipients of a blood product made before 1987 and used for clotting problems; persons who spent years on dialysis for kidney failure; those who received body piercings or tattoos with non-sterile instruments; persons with known exposure to HCV; health care workers injured by needle sticks; children born to mothers with HCV; persons having sexual contact with someone positive for HCV; persons sharing personal care items (e.g., razors, toothbrushes) with an infected person; “baby boomers” born between 1945 and 1965.

Specialized follow-up, with attention to the level of the liver enzyme Alanine Aminotransferase (ALT) in the blood. An elevated ALT indicates inflammation of the liver and need for further checking of chronic liver disease, with possible treatment. Since it is common for ALT levels to fluctuate in hepatitis C patients, with some testing with normal levels for as much as a year while liver disease persists, follow-up can need expert attention.

Combination therapy with Interferon and Ribavirin used to be the standard of care, resulting in sustained response rates of 40 to 80 percent. In 2011, the U.S. Food and Drug Administration (FDA) approved two antiviral medications, Boceprevir and Telaprevir. Added to the standard of care medications, these can increase effectiveness and shorten treatment time for HCV genotype 1.

Reduce risky behaviors to protect health, and to prevent transmitting the virus to others. Persons with hepatitis B should stop using alcohol, see a doctor regularly and avoid any new medications (e.g., prescription, herbal, over-the-counter, other) until having talked with a doctor. Get vaccinated against hepatitis A, and do not donate blood, organs, other tissue or semen. Do not share personal items that may have microscopic traces of your blood on them, such as toothbrushes, dental appliances, nail-grooming equipment or razors. Cover any cuts or skin sores to keep from spreading the virus.

Resources

Pennsylvania Department of Health—
http://www.portal.state.pa.us/portal/server.pt/community/diseases_and_conditions/11595

United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC)—
http://www.cdc.gov/hepatitis/C/index.htm

United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), National Electronic Disease Surveillance System (NEDSS)—http://www.cdc.gov/nndss/script/nedss.aspx

Endnotes


Hospital-Related Healthcare Associated Infections

Healthcare associated infections are those that are not present when a person is admitted to the hospital, and occur as a consequence or complication of the care they receive while hospitalized.

Act 52 (2007) requires hospitals in Pennsylvania to report healthcare associated infections (HAIs) to the Pennsylvania Department of Health through the National Healthcare Safety Network (NHSN) of the U.S. Centers for Disease Control and Prevention (CDC), and to annually report progress in reducing the occurrence of HAIs in Pennsylvania hospitals. HAIs are proven to increase health care costs, and are preventable. The CDC estimates that one in 20 hospitalized patients will acquire an HAI.

Common types of HAI reported to NHSN are: bone and joint infections; bloodstream infections with or without a central line; central nervous system infections; cardiovascular system infections; eye, ear, nose and throat infections; gastrointestinal infections; lower respiratory tract infections; pneumonia with or without a ventilator; reproductive tract infections; skin and soft tissue infections; surgical site infections; systemic infections; urinary tract infections with or without a catheter.

Table 5.8 shows a steady decline in incidence of HAIs. Figure 5.14 shows HAIs for a three-year period, with the category clearly marked.

Table 5.8 Healthcare Associated Infections, Pennsylvania, 2009 to 2011

<table>
<thead>
<tr>
<th></th>
<th>HAI</th>
<th>Hospital Patient Days</th>
<th>HAI rate (per 1,000 patient days)</th>
<th>Percent change in rate from previous year</th>
<th>Percent change in rate from baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>25,914</td>
<td>10,929,596</td>
<td>2.37</td>
<td>No data</td>
<td>No data</td>
</tr>
<tr>
<td>2010</td>
<td>23,601</td>
<td>10,289,079</td>
<td>2.29</td>
<td>-3.4</td>
<td>-3.4</td>
</tr>
<tr>
<td>2011</td>
<td>22,713</td>
<td>10,212,208</td>
<td>2.22</td>
<td>-3.1</td>
<td>-6.3</td>
</tr>
</tbody>
</table>

Note: A “patient day” represents one day of hospitalization per patient. If a person is hospitalized for ten days, that represents ten patient days. Similarly, ten patients hospitalized for one day represents ten patient days.

Figure 5.14 Healthcare Associated Infections by Category, Pennsylvania, 2009 to 2011

- Surgical Site Infections
- Urinary Tract Infections
- Gastrointestinal Infections
- Bloodstream Infection
- Pneumonia
- Other
Table 5.9 shows that the incidence rate of healthcare associated infections increased among hospitalized patients, by age group. Figure 5.15 shows that, considered by infection type, the incidence of HAI generally increases with age group; the exception is those related to bloodstream infection. In general, the highest incidence is for surgical site infections in middle-aged individuals, aged 45 to 64 years old.

### Table 5.9 Healthcare Associated Infections per 100,000 Population by Age Group, Pennsylvania, 2009 and 2010

<table>
<thead>
<tr>
<th>Age Group</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 4</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>5 to 17</td>
<td>5.8</td>
<td>6.0</td>
</tr>
<tr>
<td>18 to 44</td>
<td>7.0</td>
<td>6.7</td>
</tr>
<tr>
<td>45 to 64</td>
<td>14.3</td>
<td>13.4</td>
</tr>
<tr>
<td>65 to 84</td>
<td>16.6</td>
<td>15.6</td>
</tr>
<tr>
<td>85+</td>
<td>12.8</td>
<td>11.6</td>
</tr>
</tbody>
</table>

### Figure 5.15 Healthcare Associated Infections by Type and Age Group, Pennsylvania, 2010

![Bar chart showing incidence rates of infections per 1,000 patients by type and age group for Pennsylvania in 2010.](chart)

Figure 5.16 shows that white non-Hispanic patients were more likely to have a healthcare associated infection than black non-Hispanic or Hispanic patients.
Note: The numbers of HAIs for patients of other race and ethnicities (e.g., Asian/Pacific Islander, Native American) were too small to generate useful rates.

Table 5.10 shows that patients who had an HAI had significantly higher mortality, longer length of hospitalization and were more likely to be readmitted to the hospital than patients who did not experience an HAI while hospitalized. It is important to note that patients who contracted an HAI were likely to have underlying health conditions and comorbidities that may explain these differences; in other words, they were often sicker than fellow patients who did not contract an HAI. As a result, the following differences cannot be entirely attributed to the occurrence of HAI.

Table 5.10 Outcomes of Patients with and without Healthcare Associated Infection, Pennsylvania, 2010

<table>
<thead>
<tr>
<th>Infection type</th>
<th>Patients (Number)</th>
<th>Mortality (Percent %)</th>
<th>Mean length of stay (Days)</th>
<th>Readmitted within 30 days (Percent %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All hospitalized patients</td>
<td>1,880,189</td>
<td>1.8%</td>
<td>5.2</td>
<td>16.6%</td>
</tr>
<tr>
<td>Patients without Infection</td>
<td>1,858,870</td>
<td>1.7%</td>
<td>5.0</td>
<td>16.3%</td>
</tr>
<tr>
<td>Patients with Specific Infection</td>
<td>21,319</td>
<td>9.1%</td>
<td>21.9</td>
<td>41.9%</td>
</tr>
<tr>
<td>Urinary Tract</td>
<td>4,696</td>
<td>5.5%</td>
<td>19.6</td>
<td>27.6%</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>2,110</td>
<td>24.7%</td>
<td>24.3</td>
<td>30.4%</td>
</tr>
<tr>
<td>Bloodstream</td>
<td>2,016</td>
<td>19.3%</td>
<td>32.7</td>
<td>37.8%</td>
</tr>
<tr>
<td>Surgical Site</td>
<td>5,711</td>
<td>1.3%</td>
<td>10.0</td>
<td>61.9%</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>3,489</td>
<td>9.4%</td>
<td>20.1</td>
<td>37.9%</td>
</tr>
<tr>
<td>Other categories</td>
<td>1,874</td>
<td>7.3%</td>
<td>27.7</td>
<td>35.0%</td>
</tr>
<tr>
<td>Multiple Infections</td>
<td>1,423</td>
<td>16.4%</td>
<td>54.5</td>
<td>39.0%</td>
</tr>
</tbody>
</table>

The following three categories of HAIs are used to benchmark progress in Pennsylvania hospitals. While significant progress has been made in reducing incidence of catheter-associated urinary tract infections (CAUTIs) and central line-associated bloodstream infections (CLABSIs), the trend for surgical site infections (SSIs) has not been as favorable. Of
note, because of the required 12-month follow-up period to identify an infection after certain surgical procedures, data for SSIs tend to lag data for other conditions.

Table 5.11 Catheter-Associated Urinary Tract Infections in Hospitals, Pennsylvania, 2008 to 2011

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate per 1,000 catheter days</th>
<th>Decline from previous year (Percent %)</th>
<th>Number of infections prevented (compared to previous year)</th>
<th>Total number of infections prevented</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008*</td>
<td>2.29</td>
<td>Data unknown</td>
<td>Data unknown</td>
<td>Data unknown</td>
</tr>
<tr>
<td>2009</td>
<td>1.97</td>
<td>14.6%</td>
<td>634</td>
<td>634</td>
</tr>
<tr>
<td>2010</td>
<td>1.71</td>
<td>13.2%</td>
<td>488</td>
<td>1,094</td>
</tr>
<tr>
<td>2011</td>
<td>1.55</td>
<td>9.4%</td>
<td>295</td>
<td>1,351</td>
</tr>
</tbody>
</table>

Note: 2008 data is for July through December (half year).

As shown in Table 5.12, in 2010, Pennsylvania reported a rate of 0.93 per 1,000 central line days, representing a 24.4 percent decline in CLABSIs from the previous year. In 2011, the overall rate declined further, to 0.89 CLABSIs per 1,000 central line days, a 4.3 percent decline. Overall, this was a 27.6 percent decrease since the baseline year, 2009.

Table 5.12 Central Line-Associated Bloodstream Infections in Hospitals, Pennsylvania, 2008 to 2011

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate per 1,000 catheter days</th>
<th>Decline from previous year (Percent %)</th>
<th>Number of infections prevented (compared to previous year)</th>
<th>Total number of infections prevented</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008*</td>
<td>1.59</td>
<td>Data unknown</td>
<td>Data unknown</td>
<td>Data unknown</td>
</tr>
<tr>
<td>2009</td>
<td>1.23</td>
<td>22.6%</td>
<td>630</td>
<td>630</td>
</tr>
<tr>
<td>2010</td>
<td>0.93</td>
<td>24.4%</td>
<td>526</td>
<td>1,149</td>
</tr>
<tr>
<td>2011</td>
<td>0.89</td>
<td>4.3%</td>
<td>69</td>
<td>1,210</td>
</tr>
</tbody>
</table>

Note: 2008 data is for July through December (half year).

Table 5.13 Selected Surgical Site Infections in Hospitals, Pennsylvania, 2008 to 2011

<table>
<thead>
<tr>
<th>Procedure</th>
<th>2008 Rate (per 100 procedures)</th>
<th>2009 Rate (per 100 procedures)</th>
<th>Change in number of infections 2008 to 2009</th>
<th>2010 Rate (per 100 infections)</th>
<th>Change in number of infections 2009 to 2010</th>
<th>Total change in number of infections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac surgery</td>
<td>1.03</td>
<td>1.18</td>
<td>+10</td>
<td>1.18</td>
<td>0</td>
<td>+6</td>
</tr>
<tr>
<td>Coronary bypass: Two incision sites</td>
<td>2.41</td>
<td>2.48</td>
<td>+8</td>
<td>2.02</td>
<td>-48</td>
<td>-40</td>
</tr>
<tr>
<td>Coronary bypass: Single incision site</td>
<td>2.03</td>
<td>1.31</td>
<td>-15</td>
<td>1.34</td>
<td>0</td>
<td>-10</td>
</tr>
<tr>
<td>Hip replacement</td>
<td>1.38</td>
<td>1.39</td>
<td>+2</td>
<td>1.48</td>
<td>+22</td>
<td>+22</td>
</tr>
<tr>
<td>Knee replacement</td>
<td>0.92</td>
<td>0.93</td>
<td>+5</td>
<td>0.88</td>
<td>-18</td>
<td>-18</td>
</tr>
<tr>
<td>Abdominal hysterectomy</td>
<td>1.70</td>
<td>1.59</td>
<td>-15</td>
<td>1.57</td>
<td>-18</td>
<td>-18</td>
</tr>
<tr>
<td>Total</td>
<td>1.36</td>
<td>1.35</td>
<td>+12</td>
<td>1.27</td>
<td>-77</td>
<td>-88</td>
</tr>
</tbody>
</table>

Note: 2008 data is for July through December (half year).

Antimicrobial resistance is a major concern in healthcare settings. The microorganism that has been the subject of most concern is methicillin-resistant Staphylococcus aureus (MRSA). Figure 5.17 shows MRSA trends in Pennsylvania hospitals, demonstrating that the proportion of HAIs due to MRSA has remained stable over the time period. The only kind of infection for which MRSA seems to be declining is surgical site infection.
Figure 5.17 MRSA by Infection Type in Hospitals, Pennsylvania, 2008 to 2011

<table>
<thead>
<tr>
<th>Infection Type</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical Site</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bloodstream</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumonia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin &amp; Soft Tissue</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Respiratory</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: 2008 data is for July through December (half year).

Resources


Pennsylvania Patient Safety Authority—http://patientsafetyauthority.org


Endnotes


West Nile Virus

West Nile virus (WNV) is a mosquito-borne illness characterized by fever, headache, muscle aches, skin rash and sometimes encephalitis or meningitis.\(^1\) Prior to the mid-1990s, WNV occurred only sporadically and was considered a generally minor risk for humans. Since then, it has spread globally; the first U.S. case was identified in New York City in 1999. Since 2004, a North American continent-wide epidemic flares up each summer and continues into the fall, as infected mosquitoes spread the virus from birds to horses, other animals, and humans. In Pennsylvania WNV cases tend to occur primarily in the mid-summer or early fall, although “mosquito season” is usually April to October.\(^2\)

Approximately 20 in 3,000 people (0.66 percent) of persons who are infected with WNV will develop neuroinvasive disease, and about one in those 20 will die from it. Associated symptoms include blindness, disorientation, coma, convulsions, headache, high fever, muscle weakness, neck stiffness, numbness, paralysis, stupor, tremors and death. These symptoms may last for several weeks; the neurological effects may become permanent.

About 80 percent of people with WNV show no symptoms. Up to 20 percent of persons with WNV experience symptoms including fever, head and body aches, nausea, vomiting, swollen lymph nodes, or skin rash on the chest, stomach and back. Usually, symptoms develop between three and 14 days after the infecting mosquito’s bite, and can last from a few days to several weeks. Persons over age 50 are more likely to develop serious symptoms if they do get sick with WNV.

All 50 states reported WNV infections in people, birds or mosquitoes in 2012. A total of 5,674 cases of WNV disease in people, including 286 deaths, were reported to the U.S. Centers for Disease Control and Prevention (CDC). Of these, 2,873 (51 percent) were classified as neuroinvasive disease (e.g., meningitis, encephalitis), and the remaining 2,801 (49 percent) were classified as non-neuroinvasive disease. Sixty of the cases (1.06 percent) occurred in Pennsylvania.\(^3\)

Table 5.14 West Nile Virus, Human Cases, Pennsylvania, 2001 to 2012\(^i\)

<table>
<thead>
<tr>
<th></th>
<th>Human cases</th>
<th>Percent (%)</th>
<th>Mean age</th>
<th>Deaths</th>
<th>First case</th>
<th>Last case</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>2001</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>56.3</td>
<td>60</td>
<td>49</td>
</tr>
<tr>
<td>2002</td>
<td>62</td>
<td>25</td>
<td>37</td>
<td>40.3</td>
<td>63</td>
<td>61</td>
</tr>
<tr>
<td>2003</td>
<td>237</td>
<td>115</td>
<td>122</td>
<td>48.5</td>
<td>48.6</td>
<td>50.9</td>
</tr>
<tr>
<td>2004</td>
<td>15</td>
<td>8</td>
<td>7</td>
<td>53.3</td>
<td>56.5</td>
<td>56.5</td>
</tr>
<tr>
<td>2005</td>
<td>25</td>
<td>11</td>
<td>14</td>
<td>44.0</td>
<td>62.1</td>
<td>66.3</td>
</tr>
<tr>
<td>2006</td>
<td>9</td>
<td>5</td>
<td>4</td>
<td>55.6</td>
<td>49.1</td>
<td>56</td>
</tr>
<tr>
<td>2007</td>
<td>10</td>
<td>5</td>
<td>5</td>
<td>50.0</td>
<td>49.5</td>
<td>58</td>
</tr>
<tr>
<td>2008</td>
<td>14</td>
<td>6</td>
<td>8</td>
<td>42.9</td>
<td>64.9</td>
<td>67</td>
</tr>
<tr>
<td>2009</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00%</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2010</td>
<td>28</td>
<td>15</td>
<td>13</td>
<td>54.0</td>
<td>56.8</td>
<td>61.5</td>
</tr>
<tr>
<td>2011</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>50.0</td>
<td>59.8</td>
<td>59</td>
</tr>
<tr>
<td>2012</td>
<td>60</td>
<td>34</td>
<td>26</td>
<td>56.7</td>
<td>59.5</td>
<td>63.6</td>
</tr>
</tbody>
</table>

\(^i\) Information from CDC. The data in the table is the number of WNV cases reported to the Pennsylvania Department of Health from 2001 to 2012. The data includes the number of cases, the percentage of cases by gender, the mean age of cases, and the number of deaths. The first and last case dates are also included.
### Table 5.15 West Nile Virus, Animal Cases, Pennsylvania, 2001 to 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Mosquito Pools</th>
<th>Dead Birds</th>
<th>Horses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number tested</td>
<td>Number WNV-positive</td>
<td>Percent (%) WNV-positive</td>
</tr>
<tr>
<td>2001</td>
<td>2,274</td>
<td>42</td>
<td>1.8%</td>
</tr>
<tr>
<td>2002</td>
<td>5,951</td>
<td>51</td>
<td>0.9%</td>
</tr>
<tr>
<td>2003</td>
<td>15,464</td>
<td>674</td>
<td>4.3%</td>
</tr>
<tr>
<td>2004</td>
<td>14,138</td>
<td>954</td>
<td>6.7%</td>
</tr>
<tr>
<td>2005</td>
<td>11,856</td>
<td>163</td>
<td>1.4%</td>
</tr>
<tr>
<td>2006</td>
<td>13,258</td>
<td>276</td>
<td>2.1%</td>
</tr>
<tr>
<td>2007</td>
<td>15,464</td>
<td>234</td>
<td>1.5%</td>
</tr>
<tr>
<td>2008</td>
<td>15,790</td>
<td>223</td>
<td>1.4%</td>
</tr>
<tr>
<td>2009</td>
<td>15,881</td>
<td>518</td>
<td>3.2%</td>
</tr>
<tr>
<td>2010</td>
<td>15,143</td>
<td>279</td>
<td>1.8%</td>
</tr>
<tr>
<td>2011</td>
<td>15,188</td>
<td>1,057</td>
<td>6.9%</td>
</tr>
<tr>
<td>2012</td>
<td>15,607</td>
<td>1,262</td>
<td>8.1%</td>
</tr>
</tbody>
</table>

*Note: Equine WNV vaccination became available in 2005.

### Figure 5.18 West Nile Virus, Human Cases, Pennsylvania, 2000 to 2012

Figure 5.19 illustrates the success of the West Nile Prevention and Control Program by comparing WNV incidence rates per 1,000,000 population for Pennsylvania and the U.S.
**Intervention Strategies**

The Pennsylvania West Nile Virus Prevention and Control Program (WNV Program) interagency team works each mosquito season to minimize WNV disease morbidity and mortality, and the financial impact that WNV disease outbreaks would have on Pennsylvania agriculture, fishing, hunting and tourism. The Pennsylvania Department of Health serves as lead agency, and has worked with the state’s Department of Environmental Protection and Department of Agriculture to successfully implement a coordinated and comprehensive twelve-year strategy to prevent and control the seasonal public health impact of WNV in Pennsylvania. The WNV Program involves county governments, local health jurisdictions, conservation districts, emergency services and the Penn State Cooperative Extension Service.

The Pennsylvania Department of Health WNV Program also strives to educate the public about how to prevent infection, in absence of a human vaccine for the WNV virus.

- **Mosquito bite avoidance** is the best approach, when spending time outside working or playing. Children and adults should wear mosquito repellent routinely when outdoors during April through October, especially during dusk and dawn, when many mosquito species actively feed. The repellent should contain DEET and be applied in accord with the manufacturer’s directions. Also, maintain good screens on home windows and doors.

- **Standing water elimination** strategies should be taken, since mosquitoes will lay eggs in any standing water that may remain for more than four days. Routine emptying of outside containers or drilling drainage holes in the bottom, turning over wading pools and wheelbarrows when not in use, preventing water in bird baths and ornamental ponds from stagnating, cleaning and chlorinating pools, removing standing water from pool covers, landscaping to eliminate areas of standing water that routinely collect, and removing discarded tires from property. Any standing water that cannot be removed should be treated with Bacillus thuringiensis israelensis (Bti) or Bacillus sphaericus (Bsp) tablets, available at lawn and garden stores, which will kill any mosquito larva without making the water unsafe for people, pets, plants, etc.

- **Statewide prevention and control network** engages in trapping and testing mosquitoes and monitoring reports of infected horses and people, as well as collecting sentinel chickens and dead birds for testing.
Resources
Pennsylvania Department of Environmental Protection—http://www.westnile.state.pa.us
Pennsylvania Department of Health—
http://www.portal.state.pa.us/portal/server.pt/community/diseases_and_conditions/11595
United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC)—http://www.cdc.gov/ncidod/dvbid/westnile/

Endnotes


Lyme Disease

Lyme disease (LD) is a tick-borne disease caused by infection with the spirochete Borrelia burgdorferi. LD is transmitted to humans through the bite of an infected tick; in Pennsylvania, this is typically the black-legged (or deer) tick. The number of cases of LD reported in the United States has increased about 25-fold since reporting began in 1982. It is localized mostly in the northeastern, mid-Atlantic, and upper Midwest regions, as well as northwestern California. Over 96 percent of all cases are reported by just 13 states. Thousands of LD cases are reported annually in Pennsylvania; the highest number of cases in the southeastern part of the state.

Lyme disease is an inflammatory illness afflicting multiple organs in several stages. In its early stages, the disease is cured readily with oral antibiotics. It typically presents with a characteristic “bull’s eye” rash, Erythema Migrans (EM), accompanied by nonspecific symptoms, such as fever, malaise, fatigue, headache, muscle aches and joint pain. About 85 percent or more of Lyme disease patients have EM, but some have no recognized illness and others have only nonspecific symptoms of viral illness (e.g., fever, headache, fatigue, muscle aches). Onset can occur between three and 30 days from exposure. Left untreated, it may progress to late-stage arthritic or nervous system complications requiring more intensive therapy.

In 2011, Pennsylvania reported 4,739 confirmed and 623 additional probable cases of Lyme disease, more than any other state. Nationwide that year, there were a total of 33,097 confirmed and probable cases of Lyme disease. Although Pennsylvania had the highest number of cases of Lyme disease, it did not have the highest incidence rate (cases per 100,000 population). Seven states had overall incidence rates of confirmed cases worse than Pennsylvania’s rate of 37.2 per 100,000 population. Nationally, Washington, D.C. has the highest incidence, followed by Delaware, Vermont, New Hampshire, Maine, Connecticut, Wisconsin, New Jersey and Pennsylvania.

Although more cases of Lyme disease occur in southeastern Pennsylvania than any other region of the state, when adjusted for population, rates are elevated throughout the east, and there is a “hotspot” in a section of the northwestern portion of the state. See Figure 5.20 for details.

Figure 5.20 Incidence Rates of Lyme Disease by County, Pennsylvania, 2007 to 2011

[Map showing incidence rates of Lyme disease by county in Pennsylvania, 2007-2011]
Since 2008, increases in Lyme disease have been most pronounced in the north central, northwestern and southwestern regions. Additional studies are ongoing to determine if this increase in the western part of the state is a true increase or artifactual.

**Figure 5.21 Incidence Rates of Lyme Disease by Region, Pennsylvania, 1980 to 2011**

**Figure 5.22 Confirmed and Probable Cases of Lyme Disease by Month, Pennsylvania, 2010**
**Intervention Strategies**

The Pennsylvania Department of Health seeks to educate residents in strategies for avoiding Lyme disease infection. Individual risk varies widely, dependent on the density of vector ticks in the environment (varies by place, season), the prevalence of B. burgdorferi infection in vector ticks, and the extent of person-tick contact (related to the type, frequency and duration of activities in a tick-infested environment). Persons who work or live in residential areas surrounded by woods or overgrown bush infected by vector ticks are at risk of getting LD. Also, those who participate in recreation activities away from home (e.g., hiking, camping, fishing and hunting) and those who engage in outdoor occupations (e.g., landscaping, brush clearing, forestry, wildlife management, and parks management) in tick habitat may be at risk of Lyme disease.

Strategies for reducing risk of Lyme disease include:

- **Avoidance of tick habitats**, whenever possible. Walking in the center of the trails can help avoid overhanging brush. At home, creating a tick-safe zone around homes, parks and recreational areas should be a priority. Ticks that transmit LD thrive in humid wooded areas and die quickly in sunny dry areas. Steps that help: removing leaf litter and clearing tall grasses and brush around homes and edges of lawns; placing wood chips or gravel between lawns and wooded areas to reduce tick migration to recreational areas; mowing the lawn and clearing brush and leaf litter frequently; keeping the ground under bird feeders clean; stacking firewood neatly and in dry areas; keeping playground equipment, decks and patios away from yard edges and trees. Also, avoid drawing deer to your property and construct physical barriers. Bait boxes that treat wild rodents with a tick-killing insecticide have been shown to reduce ticks around homes by more than 50 percent, when used properly.

- **Applying insect repellent**, particularly containing 10 to 30 percent of DEET, following the manufacturer’s instructions. Wearing protective clothing is also advised: light-colored fabrics, so ticks can be spotted more easily; pant legs tucked into socks and boots, with tape applied where they meet; shirts tucked into pants; hat, long-sleeved shirt, long-sleeved pants.

- **Regularly checking for and removing attached ticks**. The CDC provides guidance for proper tick removal: http://www.cdc.gov/ticks/removing_a_tick.html.

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**Resources**

Pennsylvania Department of Health—
http://wwwportal.state.pa.us/portal/server.pt/community/diseases_and_conditions/11595

United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC)—
http://www.cdc.gov/lyme/

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**Endnotes**


Rabies

Rabies is a viral disease affecting the nervous system, usually transmitted to a human via the saliva of an infected animal that bites. Rabies continues to be a significant public health problem in Pennsylvania. Annually since 2000, about 400 to 500 animals typically are reported to have rabies each year; Pennsylvania ranks in the top five states for most animal rabies reports.

By contrast, human cases of rabies are rare in Pennsylvania. The last diagnosed case was in 1984.

The incubation period for rabies in humans is typically three to eight weeks, but it can be anywhere between one week and nine years; even if time has passed, medical attention for a potential rabies exposure is necessary. Initial symptoms include irritability, fatigue, headache, fever, and pain or itching at the exposure site. Late symptoms include paralysis, spasms of the throat muscles, seizures, delirium, and death. If late symptoms appear, rabies is almost always fatal.

In 2010, PA reported 394 animal rabies cases, or 6.4 percent of all cases in the United States. About half of animal cases are raccoons, followed by skunks, cats, bats, and foxes. Cases are reported more often in the warmer summer months and in early fall.

Figure 5.23 Reported Cases of Animal Rabies, Pennsylvania, 2007 to 2011

Figure 5.24 Animal Rabies Cases by Month, Pennsylvania 2007 to 2011
**Intervention Strategies**

The Pennsylvania Department of Health aims to educate the public on rabies prevention strategies and prevent the spread of the disease to humans.

- **Medical care for exposure**is necessary. Washing the wound thoroughly, immediately, with plenty of soap and warm water helps reduce the risk of infection, but human rabies vaccine may be warranted. This series of four shots is administered in the arm (or thigh, for small children) on days 0, 3, 7, and 14 after seeing the health care provider. The vaccine is highly effective in preventing the disease if given post-exposure and pre-symptom.

- **Observation for exposed animals** is often sufficient. If acting normally, dogs, cats and ferrets may be observed for ten days following a bite. If it is healthy after 10 days, it was not exposed to rabies through the saliva at the time of the bite. Raccoons, foxes and skunks should be humanely killed, with the head sent to the appropriate lab for testing. If an animal must be shot to prevent its escape, care should be taken not to damage the brain, which is needed for analysis. A veterinarian and local health authorities should be involved in decision-making for other animals.
- **Responsible pet practices** can help reduce the risk. All animals should be restrained and leashed in public; stray dogs should be impounded; all dogs and cats should be registered, licensed and vaccinated; mass vaccination clinics should be established and supported; wild animals should not be handled or kept as pets.

**Resources**

Pennsylvania Department of Health—
http://www.portal.state.pa.us/portal/server.pt/community/diseases_and_conditions/11595

United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC)—
http://www.cdc.gov/rabies/

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**Endnotes**


Legionellosis

Legionellosis is a respiratory illness caused by Legionella bacteria. The disease came to be known as “Legionnaire’s disease” after a 1976 outbreak of the previously unrecognized disease among attendees of an American Legion convention in Philadelphia. It is generally associated with water, such as creeks and ponds, hot and cold water taps, hot water tanks, water used in air conditioning cooling towers and evaporative condensers, hot tubs, ornamental fountains, and soil at excavation sites. It appears to spread through the air from a soil or water source, and not via person-to-person transmission. Most cases occur as single, isolated events, and the highest incidence is in the summer and early fall.

Symptoms of legionellosis include cough, shortness of breath, fever, muscle aches, headaches and occasionally diarrhea. There are two distinct forms of legionellosis. The more severe form of infection can include pneumonia. Pontiac fever, a milder illness, does not include pneumonia. Symptoms usually begin two to 14 days after exposure to the bacteria. Patients are frequently hospitalized, although most cases of legionellosis can be treated successfully with antibiotics. It can be difficult to diagnose legionellosis because the symptoms are similar to those caused by influenza and other types of bacterial pneumonia, and it may not be suspected by the health care provider initially.

Legionellosis is more common in persons over the age of 50, particularly middle-aged or older men who smoke, have chronic lung disease, or drink alcohol heavily. Males contract the disease nearly two and a half times more often than females. People with underlying illnesses or lowered immune system resistance to disease are at higher risk.

In the United States, fewer than 4,500 cases of legionellosis are reported each year, although estimates suggest that 8,000 to 18,000 hospitalizations occur annually as a result of the illness. Underdiagnosing and underreporting are suspected. Incidence rates of legionellosis are highest in the northeastern area of the country, and Pennsylvania generally has one of the highest annual incidence rates, by state. Over the past five years, there have been nine legionellosis outbreaks in the state.

In Pennsylvania, between 300 and 500 cases of legionellosis typically are reported each year, although 2011 data topped this with 502 diagnosed cases. This figure was higher than any of the previous four years, and cases occurred in 56 of the state’s 67 counties. Approximately 80 percent of the cases were in persons over age 50.

*This number reflects all cases reported to the PA DOH, including those cases reported by federal facilities.

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**Figure 5.27 Reported Cases of Legionellosis, Pennsylvania, 2007 to 2011**

[Graph showing reported cases of legionellosis from 2007 to 2011]
**Intervention Strategies**

There is no vaccine to prevent legionellosis. They key to preventing the disease is proper maintenance and disinfection of water sources in which Legionella tend to grow, including drinking water systems, hot tubs, decorative fountains and cooling towers. Persons at increased risk of exposure may choose to avoid high risk exposures, such as using or being near a hot tub.

**Resources**

Pennsylvania Department of Health—
http://www.portal.state.pa.us/portal/server.pt/community/diseases_and_conditions/11595

United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC). *Legionella*—
http://www.cdc.gov/legionella/index.html

Endnotes


Salmonellosis

Salmonellosis is an infection caused by Salmonella bacteria that generally affect the intestinal tract, and occasionally the bloodstream and other organs. It is one of the more common causes of bacterial gastroenteritis (diarrhea and/or vomiting). Each year, approximately 42,000 laboratory-confirmed cases are reported to the U.S. Centers for Disease Control and Prevention (CDC), about 2,000 in Pennsylvania. This is only a small fraction of the 1.2 million cases estimated to occur each year across the U.S.

On average, about 15 cases of laboratory-confirmed Salmonella infections per 100,000 population were reported between 2006 and 2008. In 2010, Pennsylvania’s Salmonella incidence rate was 14.9 per 100,000 population, higher than the Healthy People 2020 goal of 11.4 cases per 100,000 population. Since many milder cases are not diagnosed or reported, the actual number of infections may be twenty-nine or more times greater. Most cases occur in the summer months; they can be single cases, clusters, or outbreaks.

Salmonella is diagnosed more often in infants and children. The rate of diagnosed infections in children younger than five years old is higher than the total rate in all other age groups. Young children, the elderly and immunocompromised persons are more likely than other groups to experience severe cases of salmonellosis. Approximately 400 persons die each year in the United States from acute Salmonellosis.

There are over 2,000 identified serotypes of Salmonella. The most common serotypes in the U.S. are Enteritidis and Typhimurium. In Pennsylvania, for 2011 there were a total of 108 Salmonella serotypes reported. The top ten most commonly reported serotypes of Salmonellosis cases are listed below.

Table 5.16 Top Ten Most Commonly Reported Serotypes of Salmonella, Pennsylvania, 2011

<table>
<thead>
<tr>
<th>Serotype</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enteritidis</td>
<td>461</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>203</td>
</tr>
<tr>
<td>Montevideo</td>
<td>135</td>
</tr>
<tr>
<td>Typhimurium Var. O:5 Negative (Copenhagen)</td>
<td>89</td>
</tr>
<tr>
<td>Newport</td>
<td>67</td>
</tr>
<tr>
<td>I 4,5,12: I-</td>
<td>46</td>
</tr>
<tr>
<td>Javiana</td>
<td>40</td>
</tr>
<tr>
<td>Paratyphi B Var. D-Tartrate +</td>
<td>36</td>
</tr>
<tr>
<td>Saint-Paul</td>
<td>31</td>
</tr>
<tr>
<td>All other serotypes</td>
<td>489</td>
</tr>
</tbody>
</table>

Figure 5.30 Confirmed and Probable Cases of Salmonella by Month, Pennsylvania, 2011
Intervention Strategies

The Pennsylvania Department of Health has the goal of educating Pennsylvania residents about Salmonella bacteria, how to prevent illness, and how to recognize the symptoms, to reduce the risk of morbidity and mortality from Salmonellosis.

Note that persons who have developed Salmonellosis may experience mild or severe (and even bloody) diarrhea, fever, and occasional vomiting 12 to 72 hours after infection. They may have an infection without symptoms. They may have a strain that causes a urinary tract infection. Or they may have a severe case, in which the infection spreads internally beyond the intestines to the bloodstream or other sites, and cause death unless the ill person is treated promptly with antibiotics. Bloodstream infections can be particularly serious for the very young or elderly. Diagnosis is made by collecting stool specimens and culturing the organism.

- **Proper hand washing** can reduce the risk. Most cases of Salmonellosis occur as a result of eating or drinking contaminated food or water, by contact with an infected person or animal, or through contact with a contaminated environmental source. Salmonella live in the intestinal tracts of humans and other animals, including birds. Washing hands with soap and water after using the bathroom and before any food prep can help.

- **Proper meat and poultry handling** in the kitchen is perhaps the best strategy. Treating raw poultry, beef and pork as if it is contaminated by containing it in plastic bags at the market to prevent blood from dripping on other foods; refrigerating the foods promptly; washing cutting boards and other kitchen equipment immediately; eating meat that has been cooked thoroughly (not raw or undercooked); ensuring that the correct internal cooking temperature is reached, even when using a microwave; not eating raw eggs or undercooking foods that contain them; not drinking raw milk or undercooking foods that contain it; and making sure to wash hands and ensure others do.

- **Proper pet handling** is another important step. Salmonella can be found in the feces of many pets (baby poultry, rodents, dogs, cats, hamsters and hedgehogs), especially those with diarrhea. Infection is common
when hand washing isn’t done after handling pets or their feces. Reptiles, such as turtles, lizards and snakes are particularly likely to harbor and spread Salmonella bacteria. Children and adults should wash their hands immediately after handling any animal, even if it seems healthy.

- **Precautions** for food handlers, healthcare workers, child care workers, and children who attend a childcare include not working or attending child care when they have diarrhea, and they should obtain the approval their local or state health department before returning to usual activities. Since Salmonella bacteria are shed in the feces, people with active diarrhea who are unable to control their bowel habits (e.g., infants, young children and persons with certain handicaps) should be isolated. Most infected persons may return to work or school when their stools become formed provided that they carefully wash their hands after toilet visits.

- **Medications** are unnecessary for most cases of Salmonellosis, which will resolve within four to seven days on their own, although the affected person may require fluids to prevent dehydration. The exception here is complicated cases with bloodstream infections, for which antibiotics may be indicated.

### Resources

- Pennsylvania Department of Health—
  [http://www.portal.state.pa.us/portal/server.pt/community/diseases_and_conditions/11595](http://www.portal.state.pa.us/portal/server.pt/community/diseases_and_conditions/11595)

- United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC)—
  [http://www.cdc.gov/salmonella/](http://www.cdc.gov/salmonella/)

### Endnotes


Campylobacteriosis

Campylobacteriosis is a bacterial infection that affects the intestinal tract and, rarely, the bloodstream. Caused by the bacterium Campylobacter jejuni and Campylobacter coli, the illness is one of the most common causes of diarrheal illness in the United States.

Campylobacteriosis can affect persons of any age and, similar to other foodborne infections, is reported most often in young children. Most cases are seen in the summer months, as people become infected from eating raw or undercooked poultry, consuming cross-contaminated foods, or through contact with infected people, pets, or livestock. It can occur as a single case or an outbreak; in the past, outbreaks have been associated with contaminated foods, especially undercooked poultry, unpasteurized milk or non-chlorinated water.

Symptoms of campylobacteriosis generally appear two to five days after exposure, and may include mild or severe diarrhea, often with fever, abdominal cramps, and blood in the stool. These usually resolve in about one to two weeks, although the infection can rarely lead to long-term complications such as arthritis or Guillain-Barre Syndrome, a serious neurological condition. Estimates suggest that one in 1,000 reported cases of campylobacteriosis lead to Guillain-Barre Syndrome.

Generally, persons infected with campylobacteriosis continue to pass the bacteria in their feces for a few days to a week or more. Untreated persons with campylobacteriosis may pass the bacteria for two to seven weeks. Certain antibiotics may shorten the carrier phase, but these are generally not indicated.

National Healthy People goals for 2010 and 2020 have been the same: to reduce infections caused by Campylobacter species transmitted commonly through food to 8.5 cases per 100,000 population. The baseline figure of the number of culture-confirmed cases reported to the U.S. Centers for Disease Control and Prevention (CDC) during 2006 to 2008 is 12.7 cases per 100,000 population. In 2010, the CDC reported a rate of 13.5 cases of Campylobacter species infections per 100,000 population.¹ The Foodborne Disease Active Surveillance Network (FoodNet), a collaborative program of the CDC, 10 state health departments, the U.S. Department of Agriculture’s Food and Safety Inspection Service, and the FDA, estimates the 2012 national incidence to be 14.3 cases per 100,000 population.² An estimated 1.3 million persons are affected each year, with 76 fatal cases of campylobacteriosis.³

Pennsylvania data also exceed Healthy People goals. In 2010, the state reported 13.0 cases of campylobacteriosis per 100,000 population.⁴ That year, the Pennsylvania Department of Health investigated two noteworthy outbreaks of campylobacteriosis. In March 2010, it worked with the Pennsylvania Department of Agriculture about a cluster of 12 confirmed and 10 probable cases of campylobacteriosis in several western counties. As association with raw milk consumption was established among interviewees, at which time the Agriculture department suspected the raw milk permit for the dairy that was the source.

In May 2010, the Department of Health investigated a cluster of six confirmed and four probable cases in one eastern county. Case interviews identified chicken consumption from one restaurant/caterer as an associated risk for illness.

Fourteen small Campylobacter clusters were reported statewide in 2011, but altogether these affected less than 40 residents. During January and February 2012, a cluster of 81 confirmed and 67 probable cases of campylobacteriosis were identified in Pennsylvania and three neighboring states; these were associated with consumption of raw or unpasteurized milk from a single dairy.

Pennsylvania reported 1,762 cases of campylobacteriosis in 2011, a small increase from 2010, as shown in Figure 5.32.
Figure 5.32 Confirmed Cases of Campylobacteriosis, Pennsylvania, 2007 to 2011

Figure 5.33 shows cases of Campylobacteriosis in Pennsylvania during 2011, by month. An expected seasonal trend is evident, with peak occurrence in June.

**Figure 5.33 Confirmed Cases of Campylobacteriosis by Month, Pennsylvania, 2011**

**Intervention Strategies**

The guidance from the Department of Health for preventing campylobacteriosis is consistent with the recommendations for other primarily foodborne illness.

- **Proper hand washing** can reduce the risk. Most cases of campylobacteriosis occur as a result of eating or drinking contaminated food or water, by contact with an infected person or animal, or through contact with a contaminated environmental source. Campylobacter live in the intestinal tracts of humans and other animals, including birds. Washing hands with soap and water after using the bathroom and before any food prep can help.

- **Proper meat and poultry handling** in the kitchen is perhaps the best strategy. Treating raw poultry, beef and pork as if it is contaminated by containing it in plastic bags at the market to prevent blood from dripping on other foods; refrigerating the foods promptly; washing cutting boards and other kitchen equipment immediately; eating meat that has been cooked thoroughly (not raw or undercooked); ensuring that the correct
internal cooking temperature is reached, even when using a microwave; not eating raw eggs or undercooking foods that contain them; not drinking raw milk or undercooking foods that contain it; and making sure to wash hands and ensure others do.

- **Proper pet handling** is another important step. Campylobacter can be found in the feces of many pets (baby poultry, rodents, dogs, cats, hamsters and hedgehogs), especially those with diarrhea. Infection is common when hand washing isn’t done after handling pets or their feces. Reptiles, such as turtles, lizards and snakes are particularly likely to harbor and spread Campylobacter bacteria. Children and adults should wash their hands immediately after handling any animal, even if it seems healthy.

- **Precautions** for food handlers, healthcare workers, child care workers and children who attend a childcare include not working or attending child care when they have diarrhea, and they should obtain the approval their local or state health department before returning to usual activities. Since Campylobacter bacteria are shed in the feces, people with active diarrhea who are unable to control their bowel habits (e.g., infants, young children and persons with certain handicaps) should be isolated. Most infected persons may return to work or school when their stools become formed provided that they carefully wash their hands after toilet visits.

**Resources**

Pennsylvania Department of Health—
http://www.portal.state.pa.us/portal/server.pt/community/diseases_and_conditions/11595

United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC)—

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**Endnotes**


Enterohemorrhagic Escherichia Coli

Escherichia coli O157:H7 is just one of hundreds of strains of the Escherichia coli bacterium. Although most strains of E. coli are harmless and live in the intestines of healthy humans and animals, Escherichia coli O157:H7 produces a powerful toxin, shiga, which can cause severe illness. Other types of toxin-producing E. coli (e.g., E. coli O111) can cause similar illness and spread the same way, but these are less commonly identified in the U.S.

This particular strain of E. coli was first recognized in 1982 during an outbreak of severe bloody diarrhea, which was traced to contaminated hamburgers. The infection usually, but not always, causes severe bloody diarrhea (30 to 75 percent of cases, by day two or three of illness) and abdominal cramps. Fevers occur less than one-third of the time. Illness usually sets in after a three to four day incubation period and resolves in five to ten days. In about 2 to 7 percent of cases, particularly among children and elderly persons, the infection can cause a complication called hemolytic uremic syndrome (HUS), in which a bacterial toxin damages the kidney, reduces platelet counts and destroys red blood cells. HUS is a life-threatening condition usually treated in an intensive care unit with blood transfusions and kidney dialysis.

An estimated 70,000 cases of infection and 61 deaths occur in the United States each year as a result of this particular foodborne illness. In Pennsylvania, the incidence of shiga-toxin producing E. coli was 0.9 per 100,000 in 2009 and 1.6 per 100,000 in 2012. The U.S. Centers for Control and Prevention estimates that for every E. coli O157:H7 case reported, approximately 26 cases are undiagnosed.

In 2006, the national surveillance definition for Enterohemorrhagic E. coli (EHEC) was changed to STEC (Shiga-Toxin producing E. Coli) and serotype specific information on this condition was initiated. In 2010, the Pennsylvania Department of Health received information about 156 cases of STEC, including 51 cases of E. coli O157:H7, 16 cases of E. coli O103:H2, 15 cases of E. coli O111:NM, 13 cases of E. coli O45:H2 and 6 cases of E. coli O26:H11. Additionally, single cases of the following serotypes of E. coli were also reported: O156, O69, O98, O145, O165, O28, O104:H21 and O121:H19. For the purpose of this report, these serotypes will be collectively referred to as E. coli non-O157:H7.

**Figure 5.34 Reported Cases of STEC, Pennsylvania, 2006 to 2010**

![Graph showing reported cases of STEC, Pennsylvania, 2006 to 2010]

*Note: STEC data includes both confirmed cases and probable cases.*

A seasonal pattern has been observed in STEC, with the highest number of cases emerging in the warmest months. In 2010, more than 50 percent of cases were reported in the combined summer months of June, July, and August. Historically, this pattern has remained consistent.
In 2010, men and women had similar rates of infection with STEC (1.1 cases and 1.3 cases per 100,000 population, respectively). More notable was the occurrence of the infection young children, aged 0 to 4 years old at the highest rate of any age group: 4.3 cases per 100,000 population. Children are among the most susceptible to hemolytic uremic syndrome (HUS), a serious complication that may occur after STEC infection and can result in renal complications or renal failure.
Intervention Strategies

E. coli O157:H7 will continue to be an important public health concern for as long as it contaminates meat and other foods. Preventive measures may reduce the number of cattle that carry it, and the contamination of meat during slaughter and grinding. Research into such preventive measures is ongoing. In the meantime several steps can help prevent this illness:

- **Testing** is important to stopping the spread of infection. Infection with E. coli O157:H7 is diagnosed by detecting the bacterium in the stool. However, most laboratories that culture stool do not routinely test for it, so it is important to request that the stool specimen undergo this test. All persons who suddenly have diarrhea with blood should get their stool tested for this bacteria.

- **Proper hand washing** can reduce the risk. Most cases of E. coli O157:H7 occur as a result of eating contaminated food, by contact with an infected person or animal, or through contact with a contaminated environmental source. Washing hands with soap and water after using the bathroom and before any food prep can help.

- **Cooking all ground beef thoroughly** requires use of a digital instant-read meat thermometer. Ground beef can turn brown before disease-causing bacteria are killed, so color is not an indicator of meat safety. Rather, ground beef should be cooked until a thermometer inserted into several parts of the patty, including the thickest part,
reads at least 160°F. If cooking without a thermometer, avoid patties that are still pink in the middle. Never place cooked meats on the same plate that held uncooked patties. Wash meat thermometers in between testing.

- **Drinking only pasteurized milk, juice or cider.** Commercial juice sold at room temperature and those in juice concentrates have been heat-treated to kill pathogens.
- **Washing fruits and vegetables thoroughly.** Consider boiling all vegetables for at least 15 seconds to reduce any disease risk.
- **Drinking municipal water that has been treated with chlorine/other disinfectants.** Avoiding drinking pool or lake water while swimming.
- **Precautions** for food handlers, healthcare workers, child care workers and children who attend a childcare include not working or attending child care when they have diarrhea, and they should obtain the approval their local or state health department before returning to usual activities. Since E. coli O157:H7 bacteria are shed in the feces, people with active diarrhea who are unable to control their bowel habits (e.g., infants, young children and persons with certain handicaps) should be isolated. Most infected persons may return to work or school when their stools become formed provided that they carefully wash their hands after toilet visits. Foregoing the pool or shared baths is recommended if diarrhea is ongoing.

### Resources

Pennsylvania Department of Health—
http://www.portal.state.pa.us/portal/server.pt/community/diseases_and_conditions/11595

United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC)—
http://www.cdc.gov/ecoli

### Endnotes


Vaccine Preventable Diseases

Viral hepatitis, influenza and tuberculosis (TB) remain among the leading causes of illness and death in the United States.⁰ According to the U.S. Centers for Disease Control and Prevention (CDC) 2010 National Immunization Survey, only 70 percent of the nation’s children were fully immunized by 35 months of age. Levels in some areas of the country were as low as 57 percent, and 28 states had coverage rates below the national average. Despite progress, approximately 42,000 adults and 300 children in the United States die each year from vaccine-preventable diseases. This includes influenza, but does not include deaths due to 2009 H1N1.¹

Pennsylvania’s immunization coverage level was better than the national rate, at 75 percent in 2010.² Still, there were 1,967 vaccine preventable disease cases reported in Pennsylvania in 2011. After investigation, the following were confirmed: 13 cases of measles, two cases of mumps, 547 cases of pertussis, 337 cases of varicella, five cases of Haemophilus influenza type b (Hib), 60 cases of hepatitis A and 84 cases of acute hepatitis B.

Table 5.17 Confirmed and Probable Cases of Vaccine Preventable Diseases by Age Group, Pennsylvania, 2011⁴

<table>
<thead>
<tr>
<th>Age group</th>
<th>Measles</th>
<th>Mumps</th>
<th>Pertussis</th>
<th>Rubella</th>
<th>Tetanus</th>
<th>Varicella</th>
<th>Hib</th>
<th>Acute Hepatitis A</th>
<th>Acute Hepatitis B</th>
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<tr>
<td>&lt;1</td>
<td>1</td>
<td>0</td>
<td>74</td>
<td>0</td>
<td>0</td>
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<td>4</td>
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<td>0</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
<td>175</td>
<td>0</td>
<td>2</td>
<td>0</td>
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<tr>
<td>15 to 19</td>
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<td>31</td>
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<td>0</td>
<td>86</td>
<td>0</td>
<td>3</td>
<td>1</td>
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<td>20 to 24</td>
<td>0</td>
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<td>13</td>
<td>0</td>
<td>0</td>
<td>23</td>
<td>0</td>
<td>6</td>
<td>2</td>
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<td>25 to 29</td>
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<td>30 to 49</td>
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<td>74</td>
<td>0</td>
<td>0</td>
<td>78</td>
<td>0</td>
<td>16</td>
<td>48</td>
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<tr>
<td>50 and over</td>
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<td>68</td>
<td>0</td>
<td>1</td>
<td>18</td>
<td>1</td>
<td>21</td>
<td>27</td>
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<tr>
<td>Total reported</td>
<td>13</td>
<td>3*</td>
<td>742*</td>
<td>0</td>
<td>1</td>
<td>1,101</td>
<td>5</td>
<td>61*</td>
<td>95*</td>
</tr>
<tr>
<td>Total confirmed</td>
<td>13</td>
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<td>547</td>
<td>0</td>
<td>0</td>
<td>337</td>
<td>5</td>
<td>60</td>
<td>84</td>
</tr>
</tbody>
</table>

*Note: Unknown ages are included in Total Reported and Total Confirmed.

Measles

Measles is a vaccine preventable disease spread through coughing or sneezing and is characterized by rash, high fever, coughing and runny nose. Complications can occur. Nationally, about one out of 10 children with measles also gets an ear infection, and up to one out of 20 gets pneumonia. About one out of 1,000 gets encephalitis, and one or two out of 1,000 die.⁵

Although countries in the Region of the Americas adopted the goal of eliminating endemic measles transmission in the Western hemisphere by 2000,⁶ 2011 saw the largest number of reported measles cases in the United States since 1996. This trend was evident in Pennsylvania: there were 13 confirmed measles cases during three outbreaks during 2011.

Mumps

Mumps is a contagious vaccine preventable disease caused by the mumps virus. Symptoms can include fever, headache, muscle aches, tiredness, loss of appetite and swelling of salivary glands.

In 2010, an outbreak of mumps occurred among adolescents in the New York City metropolitan area and spread into Pennsylvania. Since that time, the number of mumps cases has decreased markedly. There were only two cases of mumps reported in 2011.
Pertussis

Pertussis (whooping cough) is a contagious, vaccine preventable respiratory disease caused by the bacteria Bordetella pertussis. Characteristic symptoms of the illness include spasms of severe coughing, whooping and post-coughing vomiting which can persist for weeks or months. However, some infected persons do not have these symptoms, or not in the typical presentation. Young infants may have apnea and no other symptoms; adults and teens may have mild symptoms, or just a prolonged cough. Most serious cases are in children, especially young infants who have not yet received vaccination and are at risk for serious complications, including pneumonia, seizures, encephalopathy and death.

In 2009, the U.S. incidence of reported pertussis cases was 5.54 per 100,000 population. The incidence remains highest among young infants, and most of the pertussis deaths that year were in babies too young to have been vaccinated (12 of 14 fatalities).

In 2011, Pennsylvania had 547 confirmed cases of pertussis, and an additional 195 probable cases. Thirty-four outbreaks were investigated. Fifty-three persons with pertussis were hospitalized as a result of the illness, and 22 had pneumonia. No deaths occurred from pertussis in Pennsylvania that year, although 227 confirmed and probable cases occurred in children under the age of seven years old.
Haemophilus Influenza Type b (Hib)

Haemophilus influenzae invasive disease is caused by the bacteria Haemophilus influenzae. Transmission is by direct contact or by droplets during coughing or sneezing. Compared to cases of Hib disease prior to the introduction of Hib vaccine into the routine childhood immunization schedule, the number of invasive Hib cases remains low, particularly in highly vaccinated populations.

In 2011, there were a total of 146 invasive Haemophilus influenzae isolates submitted to the Pennsylvania Bureau of Laboratories, of which five were type b. Of the cases with isolates submitted to PA BOL, 22 were in children 5 years of age and under: four were type b, two were another serotype and 15 were nontypable.
**Meningococcal Disease**

Meningococcal disease is a vaccine preventable type of meningitis caused by the bacteria Neisseria meningitides. It is one of the major types of bacterial meningitis and can result in serious complications, including brain damage, hearing loss or learning disability.

In 2011, there were 13 cases of invasive meningococcal disease for which isolates were submitted to the state Bureau of Laboratories for serogrouping. Of these, five were serogroup B, one was serogroup W135, six were serogroup Y and one was serogroup X. There were three pediatric cases, and three young adult (ages 19 and 20) cases. Of these, one was an
infant, and two (ages two and four years) were in children between 2 and 10 years of age (for whom routine vaccination is not recommended). All the young adult cases were serogroup B.

**Influenza**

Influenza (or the “flu”) is a respiratory illness caused by influenza A and B viruses. Although most cases of influenza are relatively mild, severe illness and death can occur. The virus is transmitted from person to person primarily by coughing or sneezing. In Pennsylvania, the occurrence of influenza has a strong seasonal pattern; case counts typically begin to mount in late fall and peak in February. Nationally, on average influenza leads to an estimated 200,000 hospitalizations and 3,000-49,000 deaths each year. Influenza is vaccine-preventable; however, because the viruses frequently mutate, a new vaccine must be formulated and administered every year.

Influenza monitoring and control are high priorities for public health because influenza is both potentially preventable and one of the principal causes of infectious disease-related morbidity and mortality. Furthermore, it is highly unpredictable in terms of incidence and severity from year to year, and major genetic changes to the virus can trigger pandemics. Constant monitoring and testing is required to identify novel influenza viruses that may have pandemic potential. In Pennsylvania, influenza cases with laboratory evidence of infection are reportable to the Department of Health. Thus, Pennsylvania collects a large amount of data with which to characterize each influenza season.

There are a number of caveats to using passively collected influenza data. Case counts underestimate the true burden of influenza by an undetermined but undoubtedly large degree. Most persons ill with influenza do not seek treatment, most people who seek treatment are not tested, and many positive tests are not reported to the Department because reporting such a prevalent disease is a substantial burden on healthcare providers. Furthermore, a majority of reports are submitted by laboratories, most of which do not have access to information regarding hospitalization or death. Therefore, when reviewing Pennsylvania’s influenza surveillance data, it is more important to focus on trends and relative differences rather than the specific numbers.

The most recent pandemic occurred in 2009, when a new strain of influenza A/H1N1 caused an estimated 274,000 hospitalizations and 12,470 deaths in the United States. In Pennsylvania, an initial surge in May 2009 was followed by a larger surge in October which lasted into 2010 (Figure 5.44). Please note that standard influenza surveillance seasons run from October of one year to September of the following year. The pandemic thus began in the 2008-2009 season and continued into the 2009-2010 season. A striking feature of the new strain was that children and young adults were more likely to develop severe disease in comparison to the elderly (Table 5.18). Following the pandemic, there was very little flu activity for a year. The 2010-2011 influenza season was a fairly typical season with influenza A/H3N2 predominating. The 2011-2012 season was unusually mild and occurred later than is typical, with a very modest peak in March.

On the other hand, the 2012-2013 season started earlier, peaked higher and lasted longer than usual. Several hospitals activated surge plans to cope with the number of people seeking care. There were spot shortages of influenza vaccines, testing supplies and antiviral medications. The number of hospitalizations and deaths reported to the Department of Health exceeded the 2009 pandemic. A majority of illness was caused by influenza A/H3N2, an influenza subtype that tends to cause more severe illness in the elderly (Figure 5.45). Persons 65 years of age and older represented 21 percent of all reported cases, but represented 64 percent of hospitalizations and 83 percent of deaths. The number of influenza outbreaks in institutional settings (primarily long-term care facilities) was unprecedented, with over 500 outbreaks reported (Table 5.18).
Table 5.18 Influenza Cases, Hospitalizations, Deaths, and Institutional Outbreaks Reported to the Pennsylvania Department of Health*, by Influenza Season13

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cases reported</td>
<td>15,546</td>
<td>34,083</td>
<td>19,208</td>
<td>2,550</td>
<td>44,713</td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>20.9</td>
<td>18.5</td>
<td>31.01</td>
<td>34.73</td>
<td>38.32</td>
</tr>
<tr>
<td>Hospitalizations*</td>
<td>466</td>
<td>1,402</td>
<td>1,586</td>
<td>250</td>
<td>3,725</td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>38.26</td>
<td>34.17</td>
<td>55.67</td>
<td>54.21</td>
<td>66.25</td>
</tr>
<tr>
<td>Deaths</td>
<td>26</td>
<td>79</td>
<td>90</td>
<td>11</td>
<td>210</td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>39.7</td>
<td>42.9</td>
<td>65.4</td>
<td>61.9</td>
<td>78.1</td>
</tr>
<tr>
<td>Institutional Outbreaks</td>
<td>35</td>
<td>9</td>
<td>205</td>
<td>32</td>
<td>508</td>
</tr>
<tr>
<td>Total outbreak-related cases</td>
<td>298</td>
<td>164</td>
<td>2,369</td>
<td>396</td>
<td>5,968</td>
</tr>
</tbody>
</table>

*Note: Philadelphia is relatively underrepresented, as most Philadelphia reports go directly to the Philadelphia Department of Public Health.

Figure 5.44 Multi-Season Comparison of Reported Lab-Positive Influenza Cases, Pennsylvania, 2007-08 Season to 2012-13 Season14
**Intervention Strategies**

The Pennsylvania Department of Health Immunization Program objectives are to reduce and eliminate cases of vaccine-preventable disease, achieve and maintain effective vaccination coverage levels for all ages, and ensure stewardship and accountability for publicly-funded vaccines.

Vaccines are provided to public and private health care providers for infants, children, adolescents and adults to protect against influenza and other diseases. Other areas of focus include influenza immunization outreach and health care provider education.

Vaccine administration and services are available through the Department of Health's district offices, state health centers, county and municipal health departments, private providers enrolled in the Vaccines for Children (VFC) program, federally qualified health centers (FQHCs), and rural health clinic services. Available services include:

- Provision of low or no cost immunizations through the Department's network of public and private provider sites;
- Assessment of immunization coverage rates in public and private provider offices;
- Education in provider offices, schools, childcare settings, hospitals and other sites with an interest in immunizations and vaccine-preventable disease;
- Enforcement of immunization regulations in schools and childcare group settings, and completion of surveys to ensure compliance with immunization requirements;
- Education for new parents;
- Development of and collaboration with coalitions, local community organizations and other agencies for immunization outreach and education;
- Quality assurance monitoring, site visits and reviews for providers with Department-supplied vaccines.

Beginning in the summer of 2011, the Pennsylvania Department of Health collaborated with several professional organizations to promote institutional mandates for influenza vaccination among healthcare workers. Before this campaign, only five hospitals and two nursing homes in Pennsylvania were known to have achieved the Healthy People 2020 goal of 90 percent of their healthcare workforce vaccinated against influenza. As of May 2012, over 40 hospitals and
18 long-term care facilities had achieved at least 90 percent vaccine uptake among employees. Healthcare institutions with over 90 percent vaccine uptake are given a certificate of excellence and posted on the state honor roll.16

**Resources**

Pennsylvania Department of Health, Immunization Program—717-787-5681

Pennsylvania Influenza site—http://www.flufreepa.com

Pennsylvania Department of Health, Healthcare Personnel Influenza Vaccination Honor Roll —
http://www.portal.state.pa.us/portal/server.pt?open=514&objID=1008994&mode=2

United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC) --Seasonal hospitalization and death estimates— http://www.cdc.gov/flu/about/qa/disease.htm
--2009 pandemic estimates— http://www.cdc.gov/h1n1flu/estimates_2009_h1n1.htm

**Endnotes**


