Infectious Diseases in New Mexico
2011 Annual Report

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INTRODUCTION

Unlike recent previous issues of this report that have dealt with infectious disease highlights of the year, the aim of the Infectious Diseases in New Mexico 2011 Annual Report is to provide a comprehensive review of infectious disease in New Mexico. The information presented in this report focuses largely on the following five aspects of health conditions in the population that guide many of the efforts of the New Mexico Department of Health to control and prevent disease:

- Incidence (i.e., new cases of disease)
- Prevalence (i.e., number of cases of disease at a given point in time)
- Historic trends of specific diseases
- Geographic distribution of cases
- Identification of risk factors

This information is used for the following purposes:

- Identification of affected and at-risk populations
- Detection of and response to outbreaks of disease
- Monitoring trends in the burden of disease
- Describing the natural history of diseases
- Monitoring changes in infectious agents
- Guiding prevention and control policies and program development
- Evaluation of prevention and control measures
- Generating hypotheses
- Undertaking epidemiological research

While this report has been prepared by New Mexico Department of Health (NMDOH) infectious disease surveillance staff, they would not have been able to do their work without significant contributions from others within NMDOH such as Scientific Laboratory Division (SLD) personnel, public health nurses (PHNs), regional epidemiologists, and others. In addition, the cooperation and active assistance from other organizations (e.g., health care, educational institutions, academia) and individuals (e.g., infection preventionists) statewide also have been vitally important in conducting this work. Appendices A – D contain additional information relevant to this report.

CHAPTER 1: VACCINE PREVENTABLE DISEASES

Highlights

- Vaccines prevent disease in people who receive them and help prevent spread of disease in the population.
- In the United States, vaccines are used to prevent many infectious diseases that were once common. These include polio, measles, diphtheria, pertussis (whooping cough), rubella (German measles), mumps, tetanus, and *Haemophilus influenzae* type b.
- Although most children have received all recommended vaccines by age two, there are still under-immunized children, adolescents, and adults. This creates the potential for disease outbreaks.

Overview

Morbidity and mortality due to vaccine preventable diseases have decreased in New Mexico and the United States. Currently, diseases that can be prevented by vaccines include:

- *Haemophilus influenzae* type b
- Hepatitis A
- Hepatitis B
- Influenza
- Measles
- Meningococcal disease
- Mumps
- Pertussis
- Pneumococcal disease
- Poliomyelitis
- Rabies
- Rubella
- Tetanus
- Varicella

Some of the vaccine preventable diseases listed above are included in other chapters of this report because they are grouped with other types of diseases such as invasive bacterial infections, enteric diseases, or zoonoses.

Influenza

Influenza or “flu” is an acute, usually self-limited, febrile illness that is spread primarily person to person through respiratory droplets and it also can be spread by airborne transmission[1, 2]. Influenza viruses are classified into three types. Influenza Type A (seasonal H1N1 and seasonal H3N2) and Type B cause epidemics of varying severity virtually every year. Type C does not cause epidemics. Influenza A and influenza B are further characterized by antigenic variations that result from frequent genetic mutations. These antigenic variations (“‘drifts”) result in seasonal yearly epidemics because the population is susceptible to these new influenza virus variants. A more significant genetic mutation (antigenic “shift”) can introduce a novel influenza A virus into the human population. This was the cause of the 2009 influenza H1N1 pandemic which resulted in significant morbidity and mortality throughout the world.

Influenza illness typically starts with an abrupt onset of respiratory and systemic signs and symptoms (e.g., fever, myalgia, headache, malaise, non-productive cough, sore throat, and rhinitis). Uncomplicated illness resolves in 3-7 days though cough and malaise can persist for greater than two weeks. Persons aged 65 years and older, children under two years of age, and those with pre-existing health conditions are at increased risk of complications and more severe disease. People with more severe disease may require hospitalization or may die from the influenza infection or complications. Because of the increased risk, these groups should be vaccinated against influenza annually. More recently, during the 2010-2011 season, vaccination was recommended not just for these high risk groups but for the entire population.

Influenza in New Mexico and the United States

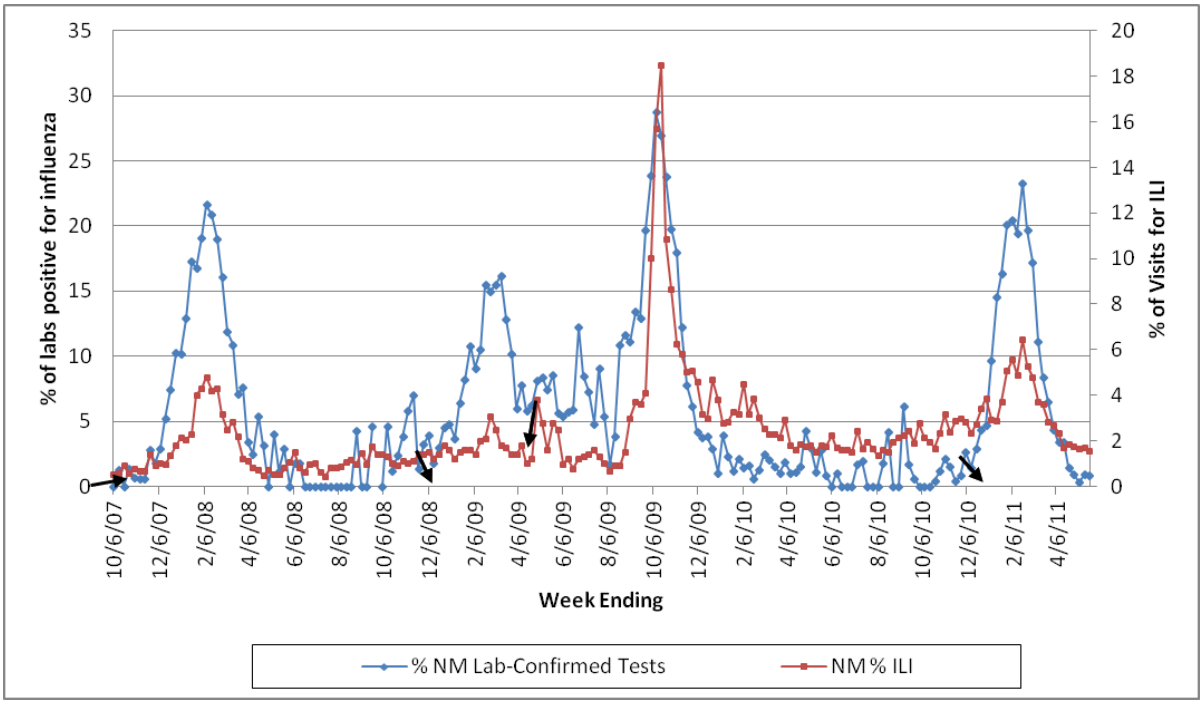
The influenza season in the United States usually occurs during October to May with typical peaks of influenza illness in January or February. Influenza surveillance is conducted on a statewide, national, and international basis using multiple systems that track influenza-associated outpatient visits, laboratory test results, hospitalizations, mortality, and vaccine coverage. In New Mexico, a sentinel outpatient surveillance system based on approximately 25 outpatient medical provider sites around the state tracks outpatient visits for influenza-like illness (ILI). ILI is defined as fever >100 degrees Fahrenheit with cough and/or sore throat. A reporting network of 35 laboratories in New Mexico uses rapid influenza test results (e.g., enzyme immunoassay and fluorescent antibody tests) to monitor positive influenza tests. These two surveillance systems detect influenza activity, including when influenza first appears in New Mexico, when it peaks during the season, and when it exits. It also is used to determine the geographical distribution of influenza in New Mexico. Influenza activity is defined as a detectable rise in ILI with accompanying laboratory test confirmation.

During the past five influenza seasons (2006-2007 to 2010-2011) influenza activity started between mid-December to early January for 3 of the 5 seasons and late November for the 2010-2011 season. During non-pandemic seasons, peak ILI activity ranged from 3-6% of patients seen at sentinel clinics, with peak activity most often occurring in mid- to late February except for 2006-2007 when peak activity was in March. Positive influenza laboratory tests, which may be more sensitive predictors of influenza onset, have had peak ranges of 16- 28% positive laboratory tests over the past five years[3].

In 2009 there was an influenza pandemic. In New Mexico there was an unusual pattern of early influenza onset in late April 2009 which continued at low levels through the summer and then increased in late September through October with the highest peak in ILI (18%) in mid-October, 2009. The influenza season continued until late March 2010. During that time, laboratory confirmed samples from the New Mexico state laboratory showed 98.8% of New Mexico influenza strains were the pandemic H1N1 virus. Epidemiologic data collected from expanded influenza-associated hospital admission surveillance and real-time tracking of influenza-associated deaths during the pandemic showed that the American Indian/Alaskan Native population was more severely affected by influenza and its complications than other racial groups in New Mexico[3].

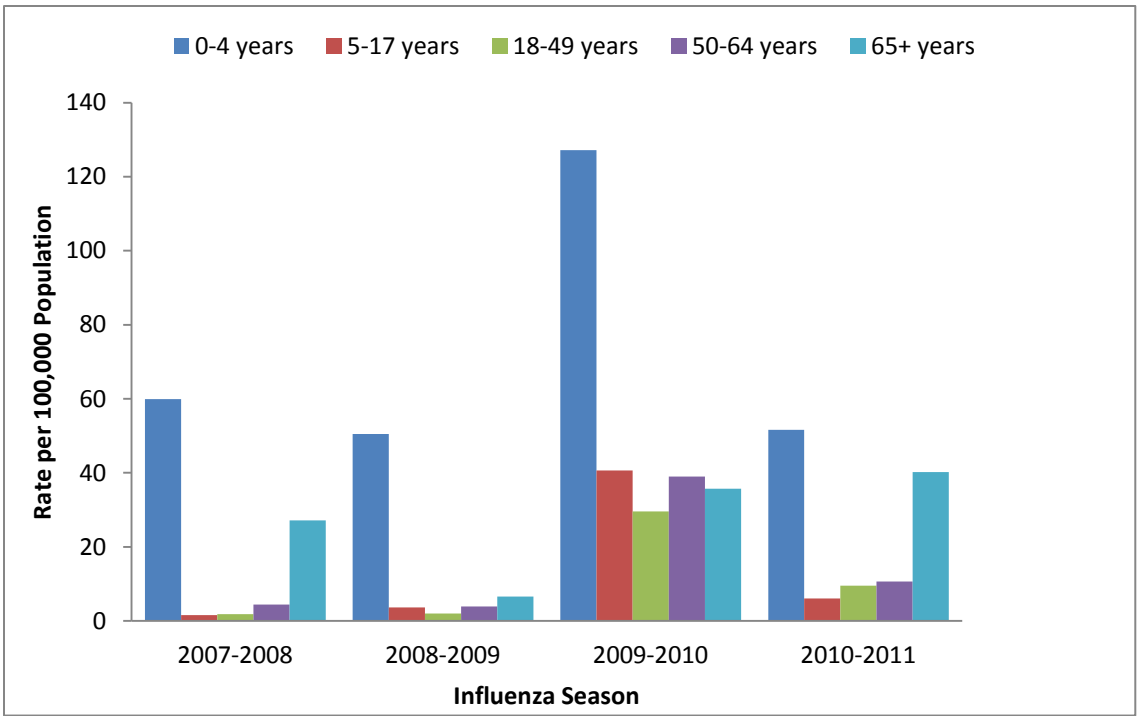
Figure 1.1 shows influenza activity in New Mexico by outpatient ILI reporting and by positive rapid influenza tests performed at hospital laboratories across the state. Arrows indicate the first positive influenza culture for each season. This figure shows that laboratories may detect the rise of influenza activity several weeks before any change is noted in ILI activity based on medical care provider sites. Also, each season's increase in ILI activity immediately followed detection of the first positive laboratory-confirmed case.

Figure 1.1 Sentinel Provider ILI Visits and Laboratory Influenza Tests, New Mexico, 2007- 2011



Currently, New Mexico conducts active population-based surveillance of hospitalized influenza cases in seven counties (Bernalillo, Chaves, Doña Ana, Grant, Luna, San Juan, and Santa Fe). These counties represent almost 58% of the population under 18 years old and almost 62% of adults 18 years or older. This surveillance relies on a review of hospital laboratory records, admissions information, infection prevention logs, and reportable conditions databases in order to identify cases. This active surveillance is conducted only for people with laboratory-confirmed influenza infection who are hospitalized during the influenza season. These data provide age-specific hospitalization rates as shown in Figure 1.2. Only data from 2007-2010 were available from this active influenza hospitalization surveillance system at the time of this report.

Figure 1.2 Influenza-related Hospitalization Rates by Age Group, New Mexico, 2007-2011



Vaccination

Prior to each influenza season pre-selected viral strains are incorporated into the annual vaccine. The decision made on which strains to include in the annual vaccine is based on nationwide viral surveillance of strains circulating in the Northern and Southern Hemispheres. Long-lasting immunity with the influenza vaccine is not possible due to the influenza virus antigenic drift. Therefore, annual production of new influenza vaccine compositions and the administration of influenza vaccine to a significant proportion of the population provide the most effective mechanism to prevent and control influenza[1].

Universal vaccination for the entire population was first recommended in the 2010-2011 season. In general, adoption of new recommendations is prompted by disease burden data that are provided by state based and national influenza surveillance systems. Additional studies further supported the benefits of vaccinating school age children and health care personnel who are primary transmitters of disease[1-4]. Vaccine formulations have advanced to include: administration of vaccine using nasal spray (introduced in 2003), offering a higher dose formulation for persons 65 of age and older to induce adequate protection (introduced in 2009), and an injection by the intra-dermal route (introduced in 2011).

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Pertussis

Pertussis, commonly known as “whooping cough”, is a highly contagious respiratory illness caused by the bacterium *Bordetella pertussis*. The bacteria release toxins that damage the upper respiratory system and cause inflammation and swelling. Pertussis is spread from person to person by droplets produced during coughing or sneezing. Symptoms of pertussis usually develop within 7-10 days after being exposed, but sometimes not for as long as three weeks in adolescents and adults and up to 6 weeks in infants. Initial symptoms include runny nose and sometimes a mild cough or fever. But after one to two weeks, severe coughing may begin and result in coughing fits (paroxysms) that can last for weeks. Infants (children less than one year of age) who become infected with pertussis are at increased risk of serious complications and even death. Infected parents, siblings, and caregivers are commonly the source of infant infections, and these caregivers frequently are unaware that they have pertussis[1].

Pertussis in New Mexico and the United States

In 2010, there were 27,550 cases of pertussis reported in the United States. However, many more cases probably were not reported. Localized outbreaks of pertussis are not uncommon and during 2006-2010 there were eight pertussis outbreaks in New Mexico. As Figure 1.3 shows, the incidence of pertussis is variable from year to year in both the United States and New Mexico. Variation by age also exists with the greatest incidence of cases occurring among infants (Figure 1.4).

Figure 1.3 Pertussis Incidence, United States and New Mexico, 2006–2010

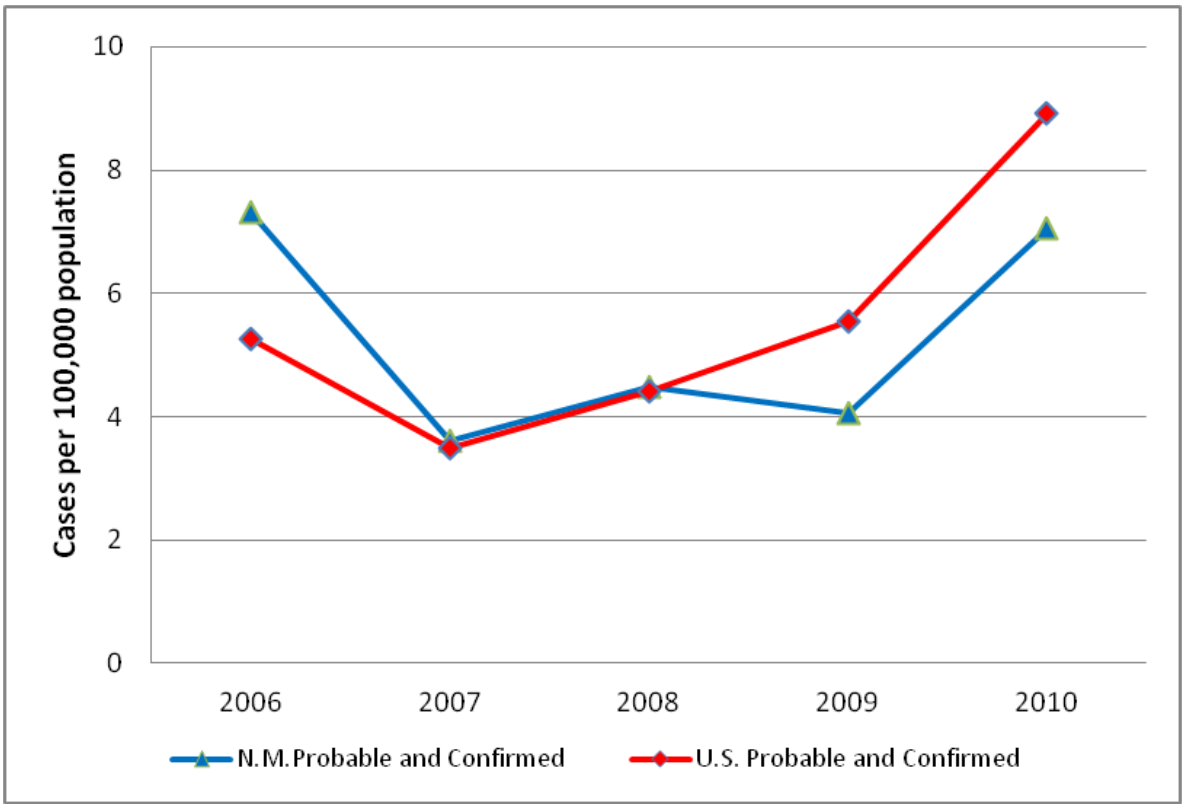
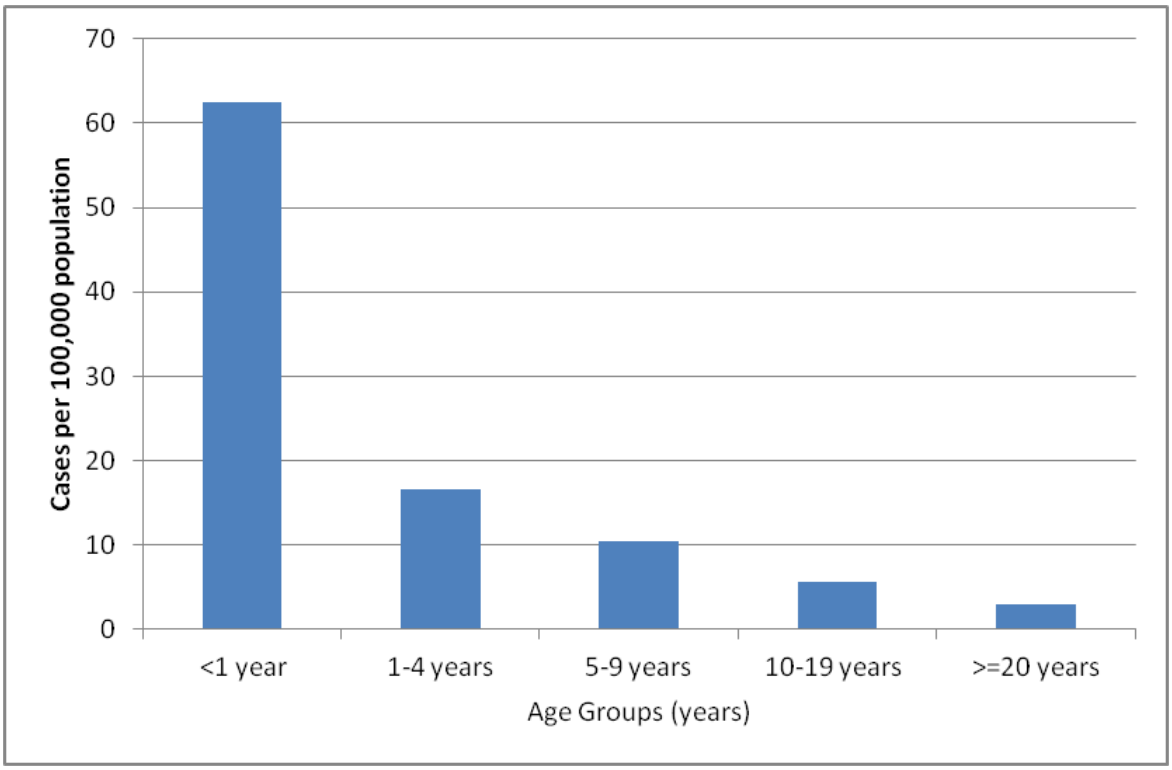


Figure 1.4 Pertussis Incidence by Age Group, New Mexico, 2006–2010



Vaccination

Most reported pertussis cases among adolescents and adults are thought to occur because of a decline in protective immunity that occurs beginning several years after immunization. Infants who are too young to have been fully vaccinated are at high risk of severe and potentially life-threatening illness from exposure to persons with pertussis. The best way to prevent pertussis is vaccination. There are different vaccines for different age groups. The childhood vaccine is “DTaP”, and the pertussis booster vaccine for adolescents and adults is “Tdap”. If pertussis is circulating in the community, there is a chance that a fully vaccinated person, of any age, may still catch this highly infectious disease.

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[1] Wendelboe AM, Njamkepo E, Bourillon A, et al. Transmission of Bordetella Pertussis to Young Infants. Pediatr Infect Dis J 2007; 26: 293-99.

Measles

Measles is a highly contagious illness caused by the rubeola virus. Measles is characterized by fever, malaise, cough, nasal inflammation, and conjunctivitis, followed by a maculopapular rash. The illness is usually mild or moderately severe but it can result in complications including pneumonia, encephalitis, and death. Before the measles vaccine was introduced in 1963, about one-half million cases were reported each year in the United States. Measles remains a serious problem in less developed countries with over 30 million cases reported annually worldwide. Measles vaccine is incorporated with mumps

and rubella as a combined vaccine (MMR) or as a combined vaccine with mumps, rubella and varicella (MMRV). There was only a single confirmed case of measles reported in New Mexico during 2006-2010.

Mumps

Mumps is an infectious viral illness occurring mostly in school age children including teenagers. The classic symptom is swelling of one or more of the salivary glands (parotitis). Other symptoms, including myalgia, anorexia, malaise, headache, and low fever, may precede parotitis by several days. Fever may persist for three to four days, and parotitis, when present, usually lasts 7–10 days. Persons with mumps are considered most infectious from one or two days before illness until five days after onset of parotitis. About 20-40% of infections are asymptomatic. Almost half of cases, especially children under 5 years of age have nonspecific or primarily respiratory symptoms[1,2]. Therefore, the diagnosis may be easily missed. On average, infection occurs between 16–18 days after exposure to the mumps virus. Less frequently, mumps can be more severe, particularly among adults.

Over the past five years, New Mexico had only seven confirmed cases of mumps. The mumps vaccine is incorporated with measles and rubella vaccine as a combined vaccine (MMR) or as a combined vaccine with measles, rubella and varicella (MMRV).

Rubella

Rubella ("German measles") is a viral disease causing rash and fever for two or three days. Other symptoms include lymphadenopathy, malaise, and conjunctivitis. Rubella is spread person to person, usually through coughing and sneezing. It is typically a mild disease in children and young adults. However, there is at least a 20% chance of serious complications if a woman is infected early in pregnancy. These include miscarriages, fetal deaths and stillbirths, and a cluster of severe birth defects known as congenital rubella syndrome (CRS). Therefore, rubella vaccination is especially important for non-immune women who may become pregnant.

Although rubella is no longer considered endemic in the United States there are more than 100,000 cases of CRS occurring throughout the world annually[3]. The rubella vaccine is incorporated with mumps and measles vaccine as a combined vaccine (MMR) or as a combined vaccine with mumps, measles and varicella (MMRV). No confirmed rubella cases have been reported in New Mexico during 2006-2010.

References

[1] Centers for Disease Control and Prevention (CDC). Mumps. In: Atkinson W, Hamborsky J, McIntyre L, Wolfe S, Editors. Epidemiology and Prevention of Vaccine-preventable Diseases. 10th Edition. Washington DC: Public Health Foundation, 2007: 149–58.

[2] Plotkin SA. Mumps vaccine. In: Plotkin SA, Orenstein WA, Offit PA, eds. Vaccines. 5th Edition. Philadelphia PA: Elsevier Inc., 2008: 441–69.

[3] Plotkin SA. Elimination of Rubella in the United States. The History of Rubella and Rubella Vaccination leading to Elimination. Clin Infect Dis 2006;43: S164–S168.

Tetanus

Tetanus (sometimes called "lock jaw") is a potentially fatal disease caused by the spore forming bacterium *Clostridium tetani.* These spores are found in soil and in animal and human feces. The spores enter the body through breaks in the skin, and germinate under low oxygen conditions. Puncture wounds and wounds with significant tissue injury are more likely to promote germination of spores. The organisms produce a potent toxin which is absorbed into the bloodstream. When the toxin reaches the nervous

system, it causes painful and often violent muscular contractions. The muscle stiffness usually first involves the jaw and neck, and later becomes generalized. It is not possible to become infected through person-to-person transmission.

Tetanus is rare in the United States and almost entirely preventable through vaccination. There is a childhood vaccine that is also protective against diphtheria and pertussis (DTaP). The tetanus (and diphtheria) booster for adolescents and adults is Tdap. Tetanus boosters are recommended every 10 years for adults. However, anyone sustaining a dirty wound should receive a tetanus booster if their previous booster was more than five years before their injury. Almost all reported cases of tetanus are in persons who did not have an up to date vaccination history or who had never been vaccinated. The last reported case of tetanus in New Mexico was in 1990.

Varicella

Varicella (chickenpox) is a febrile rash illness caused by infection with the varicella-zoster virus (VZV). Humans are the only source of infection for this virus. It is characterized by acute onset of mild fever followed by a maculopapulovesicular rash. It is often accompanied by pruritis, mild cough, and headache. Transmission occurs person to person primarily through direct contact and occasionally by airborne spread from respiratory tract secretions. Varicella is highly infectious, with secondary infection occurring in 61–100% of susceptible close household contacts.

Since a vaccine became available in 1995, varicella rates in the United States have fallen dramatically. An average of 245 confirmed or probable cases of varicella were reported annually in New Mexico during 2006-2010. However, reporting is variable from region to region in New Mexico and thought to be under-reported statewide. There is a vaccine available only for varicella (Varivax) or it can be administered in combination with mumps, measles, and rubella (MMRV). In New Mexico, varicella vaccination is a requirement for entry into licensed child daycare centers and elementary schools. However, varicella cases continue to occur and studies indicate the vaccine is only 70–90% effective for preventing disease[1,2].

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[1] Centers for Disease Control and Prevention (CDC), Varicella (Chickenpox Vaccination). Available at: http://www.cdc.gov/vaccines/vpd-vac/varicella/default.htm Retrieved November 21, 2011.

[2] CDC. Varicella Vaccines. Available at: http://www.cdc.gov/vaccines/vpd-vac/varicella/vac-faqs-clinic.htm Retrieved November 21, 2011.

CHAPTER 2: INVASIVE BACTERIAL INFECTIONS

Highlights

- *Haemophilus influenzae*, *Neisseria meningitidis,* Group A *Streptococcus* (GAS), Group B *Streptococcus* (GBS) and *Streptococcus pneumoniae* cause invasive bacterial disease, including meningitis, septicemia, and pneumonia.
- New Mexico and nine other states conduct active, laboratory based surveillance to identify people with these invasive bacterial infections as part of the Emerging Infections Program (EIP).
- Over the past five years, the invasive *Haemophilus influenzae* disease rate among children under 5 years old was higher in New Mexico than for the United States.
- The 5-year rate of *Neisseria meningitidis* in New Mexico was lower than the United States rate during 2006-2010.
- New Mexico GAS disease rates (including necrotizing fasciitis) were higher than compared to United States rates.
- GBS in New Mexico, as in the United States, was most common in infants. However, during the past five years GBS disease rates in people ≥65 years old have been higher in New Mexico than those of the United States rates.
- While New Mexico invasive pneumococcal disease rates for most age groups were similar to United States rates, rates were higher among New Mexico infants.

Overview

Haemophilus influenzae, *Neisseria meningitidis,* Group A *Streptococcus*, Group B *Streptococcus,* and *Streptococcus pneumoniae* bacteria are important causes of invasive bacterial disease, causing meningitis, septicemia, and pneumonia. New Mexico and nine other states conduct active, laboratory based surveillance to identify people with these invasive bacterial infections through Active Bacterial Core surveillance (ABCs) which is part of the CDC Emerging Infections Program (EIP).

Invasive Haemophilus influenzae Disease

Invasive *Haemophilus influenzae* often presents as meningitis or septicemia with the bacterium isolated from a normally sterile body location. Encapsulated strains of *H. influenzae* have seven antigenic serotypes (a through f) but non-encapsulated strains are designated nontypeable. Between 3-6% of *H. influenzae* type b cases are fatal and of the surviving cases, 20% have permanent hearing loss or other long-term sequelae[1,2].

Haemophilus influenzae in New Mexico and the United States

From 2006–2010 there were 205 confirmed invasive cases, with a rate of 2.0 per 100,000 New Mexico residents. The New Mexico rate during this time was higher than the United States (estimated based on EIP data) rate of 1.4 per 100,000 population. Males accounted for 47% of all cases. Rates varied by age group from a high of 23.3 per 100,000 population for children under one year old to less than one per 100,000 for those aged 18-49 years.

The most common serious clinical diseases, often requiring hospitalization, caused by *H. influenzae* in New Mexico are pneumonia, bacteremia, and meningitis. Other clinical disease includes epiglottitis, cellulitis, septic arthritis, sepsis, osteomyelitis, and pericarditis[1,2]. Cases also may have more than one clinical disease due to infection. In New Mexico, during this 5-year period 184 (90%) people were hospitalized, and of those hospitalized, 28 (15%) died.

Since the introduction of a vaccine in 1996, the incidence of invasive *H. influenzae* type b among children under 5 years has declined more than 99% in the United States[3]. New Mexico reported only six *H. influenzae, type b* cases from 2006-2010.

References

[1] Centers for Disease Control and Prevention (CDC). *Haemophilus Influenzae* Type b**.** Epidemiology and Prevention of Vaccine-Preventable Diseases. Atkinson W, Wolfe S, Hamborsky J, Editors. 12th Edition. Washington DC: Public Health Foundation, 2011. Available at: www.cdc.gov/vaccines/pubs/pinkbook/downloads/hib.pdf Retrieved November 4, 2011.

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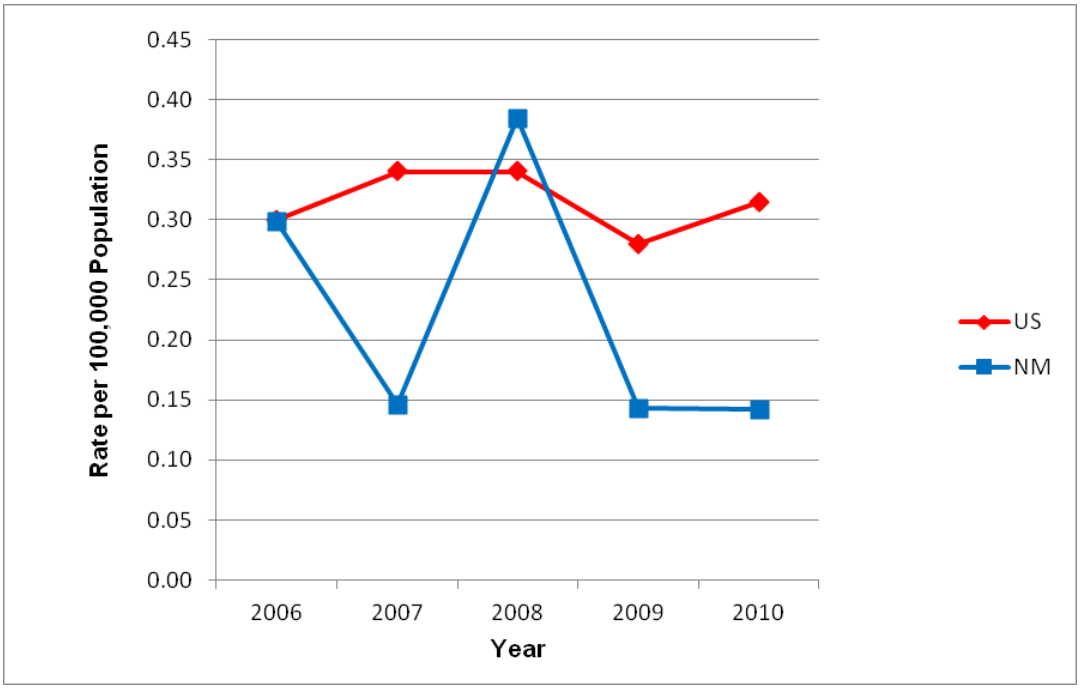
Invasive Meningococcal Disease

Clinical disease caused by infection with the bacterium *Neisseria meningitidis* includes meningitis, pneumonia, and bacteremia. *Neisseria meningitidis* is a leading cause of bacterial meningitis in the United States. Invasive meningococcal disease is confirmed by laboratory demonstration of *N. meningitidis* from a normally sterile body site (e.g., blood, cerebrospinal fluid, joint, pleural, pericardial or peritoneal fluid). Invasive meningococcal disease usually manifests itself as meningitis and/or septicemia, although other manifestations may be observed. Invasive disease may progress rapidly to shock and death. There were 23 cases of invasive meningococcal disease due to *N. meningitides* in New Mexico during 2006-2010, a rate of 0.23 per 100,000 population compared to the United States rate of 0.32 per 100,000 population. New Mexico rates have dropped substantially since 1995 similar to the decline nationwide[1]. Figure 2.1 shows that New Mexico had a lower rate of meningococcal disease than other states participating in active surveillance through the national Emerging Infections Program (EIP) network during 2006-2010. Fifty-two percent of New Mexico invasive meningococcal disease cases were male.

Figure 2.1 Invasive Meningococcal Disease, New Mexico and the United States, 2006-2010



All 23 New Mexico cases during this period were hospitalized and four died yielding a 17% case fatality ratio. Although a common risk factor for meningococcal disease is group residency (e.g., living in a college dormitory) none of the New Mexico cases reported attending college.

There are at least 13 serogroups, based on antigenic differences in the polysaccharide capsule, of *N. meningitidis*. Serogroup distribution varies worldwide but serogroups B, C, and Y caused the majority of disease in the United States and in New Mexico during 2006-2010.

Vaccination

In 2005, a new conjugate vaccine protecting against serogroups A, C, Y, and W-135, was recommended for persons at high risk of infection. This included college students living in dormitories, military personnel, people with persistent innate immunity deficiencies, and people exposed to others with meningococcal disease[2].

References

[1] Centers for Disease Control & Prevention (CDC). Prevention and Control of Meningococcal Disease. Available at: http://www.cdc.gov/mmwr/pdf/rr/rr5407.pdf Retrieved November 4, 2011.

[2] CDC. Meningococcal Vaccines. Vaccine Information Statement. Available at: http://www.cdc.gov/vaccines/pubs/vis/downloads/vis-mening.pdf Retrieved October 31, 2011.

Invasive Group A Streptococcal Disease

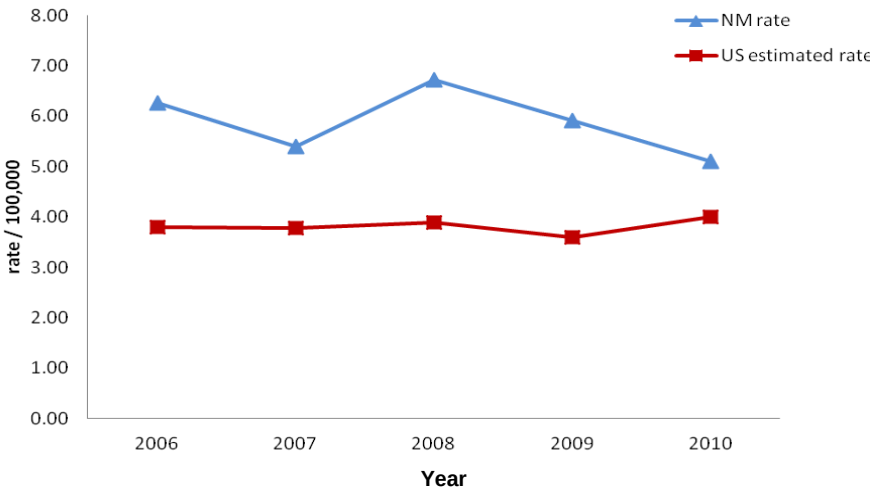
Group A *Streptococcus* (GAS) is commonly found in the throat and skin of people who are not sick[1]. Symptomatic and relatively mild infections such as “strep throat” or impetigo are common. However,

severe, sometimes life threatening, disease may occur when the GAS bacteria invade normally sterile body sites such as blood, muscle, and other internal body components. Invasive GAS can occur when a person has sores or other breaks in the skin allowing bacteria to enter the body or when the immune system is suppressed due to certain illnesses or drugs. Two of the most severe but least common forms of the disease are necrotizing fasciitis and streptococcal toxic shock syndrome (STSS). Necrotizing fasciitis destroys muscle, fat and skin tissue and STSS causes sudden hypotension and organ failure.

Group A *Streptococcus* in New Mexico and the United States

There were 608 GAS cases in New Mexico from 2006–2010. Figure 2.2 shows that during the last five years, The GAS disease rate in New Mexico was higher than the United States rate[2]. During this time 90 (15%) of New Mexico cases died. Three hundred and fifty-two (58%) of New Mexico cases occurred in men. There was no seasonal variability for GAS in New Mexico with cases distributed evenly throughout the year. The most common illnesses resulting from infection during 2006–2010 in both New Mexico and the United States were cellulitis, bacteremia, and pneumonia. However, septic arthritis and osteomyelitis occurred in New Mexico cases but only rarely in other states. Cases may have had more than one clinical illness associated with infection. Necrotizing fasciitis also occurs more often in New Mexico compared to the United States. However, Streptococcal toxic shock syndrome is less common in New Mexico than the United States.

Figure 2.2 Invasive GAS disease, New Mexico and United States, 2006–2010



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[2] CDC. Active Bacterial Core Surveillance (ABCs) Report, Group A *Streptococcus*, Provisional-2010**.** Available at: **w**ww.cdc.gov/abcs/reports-findings/survreports/gas10.html Retrieved December 13, 2011.

Invasive Group B Streptococcal Disease

Group B *Streptococcus* (GBS) can cause life threatening bacterial infections in newborns and less severe disease in pregnant women, elderly, and other adults. It is the most common cause of sepsis and meningitis in newborns and a frequent cause of newborn pneumonia[1,2]. Over half of the GBS cases in newborns occur in the first week of life ("early-onset disease") with most cases beginning a few hours after birth. It also may develop from one week up to several months after birth ("late-onset disease")[1]. Meningitis is more common with late-onset GBS in infants. Newborns can be infected during delivery from mothers who are infected but have no symptoms[1,2]. Intrapartum antibiotic prophylaxis has been highly effective at preventing early-onset GBS disease among infants born to infected women. Although the rates of serious GBS infections are much higher among newborns than any other age group, serious infections can occur at any age. After one year of age, rates of serious illness increase with age, particularly in persons with underlying medical conditions such as diabetes, liver disease, or a history of cancer. In adults, invasive disease can cause sepsis, pneumonia, skin and soft tissue infections, bone and joint infections, and rarely meningitis.

Group B *Streptococcus* in New Mexico and the United States

During 2006–2010, 726 cases of GBS were reported in New Mexico. For cases with a known outcome the case fatality ratio was 8%. The majority (61%) of cases occurred in men.

Group B *Streptococcus* in New Mexico, as in the United States, is more common in the very young (<1 year) (Figure 2.3). Rates of early-onset disease appear to be decreasing and rates of late-onset disease appear to be increasing over time as shown in Figure 2.4.

In New Mexico, early-onset GBS caused septicemia in 84% of affected infants and pneumonia in 14%. Late-onset GBS also commonly caused septicemia in infants (61%). Meningitis is more common in late-onset (31%) infant disease. These patterns are similar to those for United States cases. In older New Mexico adults, septicemia was also common (47%) along with pneumonia (19%), cellulitis (21%), osteomyelitis (12%), and septic arthritis (5%).

Figure 2.3 Five Year Average Rate of Invasive GBS, New Mexico and United States, 2006–2010

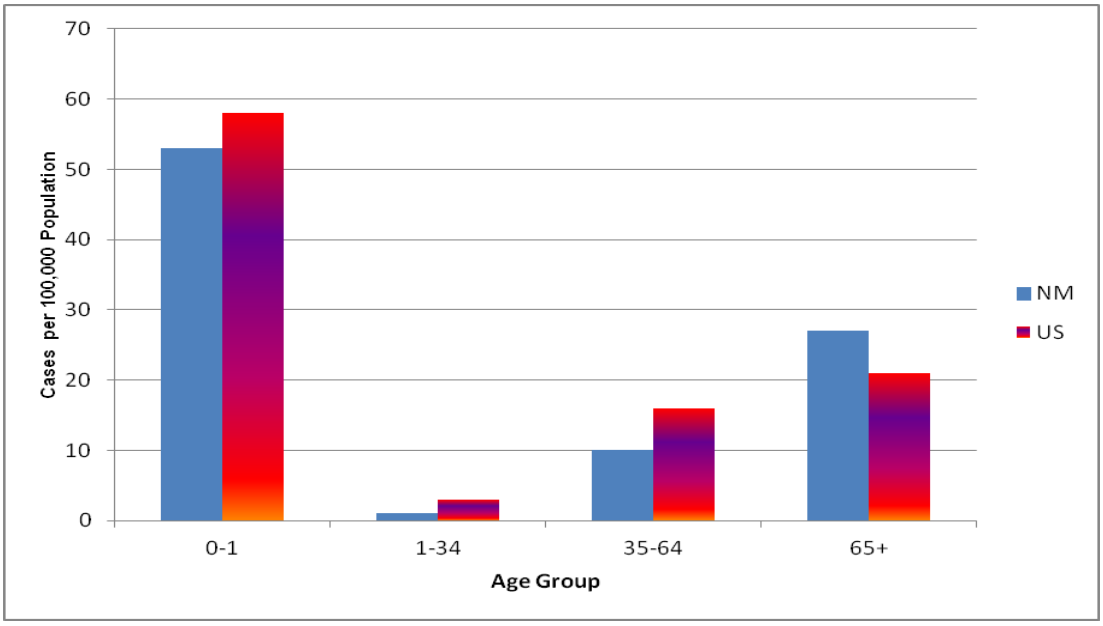
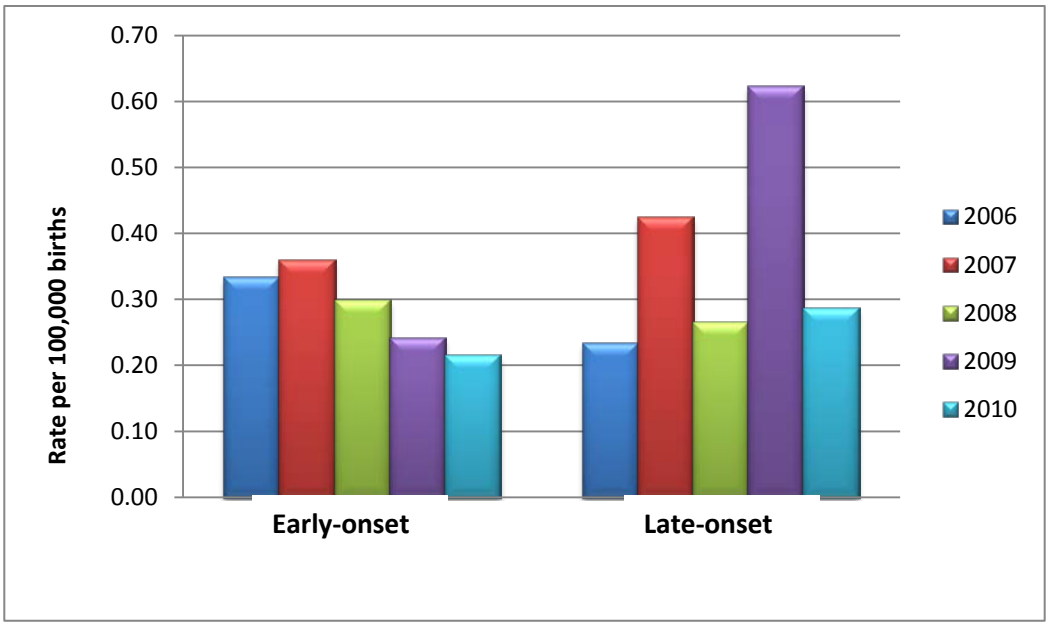


Figure 2.4 Early and Late Onset GBS Infections among Infants, New Mexico, 2006–2010



References

[1] Centers for Disease Control and Prevention (CDC). 2010 Guidelines for the Prevention of Perinatal Group B Streptococcal Disease. Available at: http://www.cdc.gov/groupbstrep/guidelines/guidelines.html Retrieved November 1, 2011.

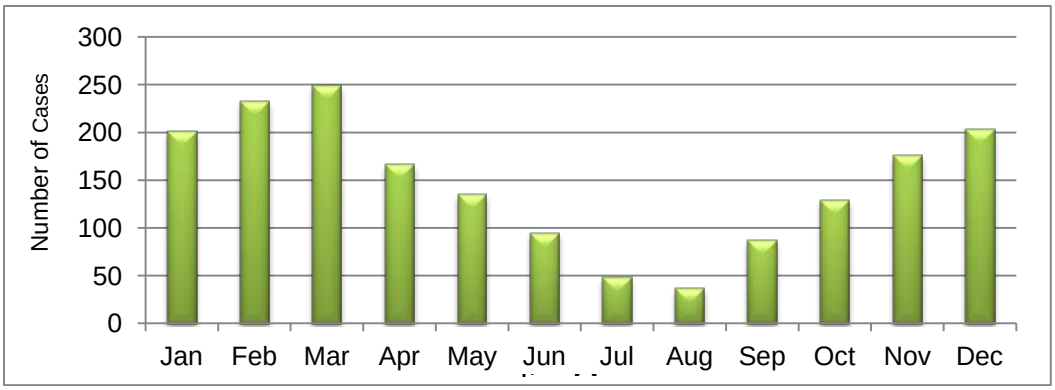
[2] CDC. Active Bacterial Core Surveillance (ABCs) Report, Emerging Infections Program Network, Group B *Streptococcus*, 2006. Available at: http://www.cdc.gov/abcs/reports-findings/survreports/gbs06.html Retrieved November 4, 2011.

Invasive *Streptococcus pneumoniae* Disease

Streptococcus pneumoniae bacteria colonize the upper respiratory tract and can cause severe pneumococcal disease especially among young children, immunocompromised adults, and the elderly. Infection results in bacteremia, meningitis, pneumonia, and upper respiratory tract infections, including otitis media.

From 2006-2010, there were 1,762 invasive *Streptococcus pneumoniae* cases in New Mexico, an overall rate of 18 per 100,000 population. Two hundred and thirty-five people died resulting in a mortality rate of 2.4 per 100,000 population. Nine hundred and fifty-eight (54%) cases were men. Invasive pneumococcal disease cases were more common during the fall and winter months (Figure 2.5). Seventy-four percent of cases were in people 40 years and older. People 65 years and older had the highest percentage of cases (35%) with a rate of 39 per 100,000 New Mexico residents. This rate is similar to the United States rate. The 2006–2010 rate among infants was 42 cases per 100,000 population which is slightly higher than the United States rate of 37 per 100,000 population.

Figure 2.5 Invasive *Streptococcus pneumoniae* Cases by Month, New Mexico, 2006–2010



Although symptoms of pneumococcal disease vary by age and health status, commonly fever, fatigue, pneumonia, cough, chest pain, shortness of breath, and altered mental status occur. Pneumococcal meningitis may present with a stiff neck, headache, lethargy, or seizures. During 2006 –2010 cases, 93% of invasive pneumococcal disease cases in New Mexico had bacteremia. (Table 2.1)

Table 2.1 Clinical presentation of invasive *S. pneumoniae* infections, New Mexico, 2006–2010

	Number	(Percent)
Pneumonia	1294	(73)
Bacteremia without Focus	356	(20)
Meningitis	89	(5)
Otitis Media	45	(3)
Cellulitis	38	(2)
Peritonitis	25	(1)
Septic Arthritis	25	(1)
Abscess (not skin)	14	(<1)

There are more than 90 *Streptococcus pneumoniae* serotypes. The serotypes causing disease in New Mexico from 2006–2010 were 7F, 19A, 003, 12F, 001, 22F, 008, 06C, 33F, and 35B. Several vaccines have been developed to protect against many of these serotypes. A heptavalent pneumococcal conjugate vaccine (PCV7), containing the seven most common pneumococcal serotypes causing invasive infections in children, was licensed for infants and young children in 2000. Since the introduction of that vaccine, rates of pneumococcal disease have dramatically declined. In 2010, a 13-valent pneumococcal conjugate vaccine was licensed for use in children under 2 years old. Before there was a vaccine available, there were an increasing number of multidrug-resistant S*treptococcus pneumoniae* infections in New Mexico cases[1].

References

[1] Centers for Disease Control and Prevention. Invasive Pneumococcal Disease in Young Children before Licensure of 13-Valent Pneumococcal Conjugate Vaccine – United States, 2007. MMWR 2010; 59: 253-257.

CHAPTER 3: ENTERIC (FOODBORNE) DISEASES

Highlights

- Enteric (foodborne) diseases are commonly reported infectious diseases in New Mexico and have a significant public health impact.

- The incidence of many foodborne diseases is higher among very young children for a number of reasons including that they have not had the chance to build up a strong immunity to these infections, their underlying health status, hygiene and other behaviors, and possibly partly because they may be more likely to receive medical attention for diarrheal illness. Although many foodborne diseases are relatively mild and resolve quickly, some may cause life-threatening illness or death.

Overview

Enteric diseases are typically caused by consuming food or water that is contaminated by the feces of a person or animal with a bacterial, viral, or parasitic infection. However, these infections also can be transmitted in other ways, such as from person to person.

Antibiotics are usually not recommended for treatment. However, dehydration may be a problem with prolonged diarrhea or vomiting. Pregnant women, elderly people, very young children, and those with weakened immune systems are more likely to develop serious illness from enteric infections and may require medical treatment or even hospitalization.

While advances in sanitation and food safety have greatly reduced the impact of many enteric diseases in the United States, they remain an important cause of illness nationwide. Contaminated food is estimated to be responsible for approximately 48 million illnesses, 128,000 hospitalizations and 3,000 deaths annually in the United States[1]. It is difficult to accurately estimate the true burden of enteric disease for several reasons. First, many cases of enteric disease are never reported because sick people may not always seek medical care. Also, health care providers may not always order laboratory testing for patients with diarrheal disease. Therefore, the true number of people with enteric disease may be far greater than reported.

The New Mexico Notifiable Diseases or Conditions list (Appendix D) specifies reporting requirements for 15 infectious enteric diseases that are commonly transmitted through food or water: Botulism, campylobacteriosis, cryptosporidiosis, cyclosporiasis, giardiasis, hepatitis A infections, listeriosis, Shiga toxin-producing *Escherichia coli* (STEC) infections, shigellosis, salmonellosis, trichinellosis, typhoid fever, *Vibrio* infections (including cholera), and yersiniosis. In addition, suspected outbreaks of foodborne or waterborne illness from any organism also are reportable in New Mexico.

References

[1] Centers for Disease Control and Prevention. Vital Signs: Incidence and Trends of Infection with Pathogens transmitted commonly through Food—Foodborne Diseases Active Surveillance Network. Ten US Sites, 1996-2010. MMWR 2011; 6022: 749-55.

Campylobacteriosis

This disease is caused by group of bacteria called *Campylobacter*. Most human illness is caused by one species, *Campylobacter jejuni*. Typically people infected with *Campylobacter* get diarrhea (sometimes bloody), cramping, abdominal pain, and fever within 2 to 5 days after exposure to the bacteria. The illness typically lasts one week and most people recover without treatment. However, up to 20% may have prolonged illness.

Campylobacter is not usually spread from person to person. This disease usually occurs in single, sporadic cases, but there was one outbreak detected in New Mexico during 2006-2010. Most sporadic cases are associated with handling or eating raw or undercooked meat. Animals also can be infected and some people have become infected from contact with the feces of an infected dog or cat.

In 2010, campylobacteriosis was the most commonly reported bacterial foodborne disease in New Mexico with 369 cases. Over the last five years, the incidence of campylobacteriosis has remained steady with 15-20 cases per 100,000 New Mexico residents (Figure 3.1). This disease is not nationally reportable; therefore, United States data are not available for comparison. Cases occurred year round with more cases during the summer months as shown in Figure 3.2. The incidence was highest among young children under 5 years of age (Figure 3.3).

Figure 3.1 Incidence of Campylobacteriosis by Year, New Mexico, 2006-2010

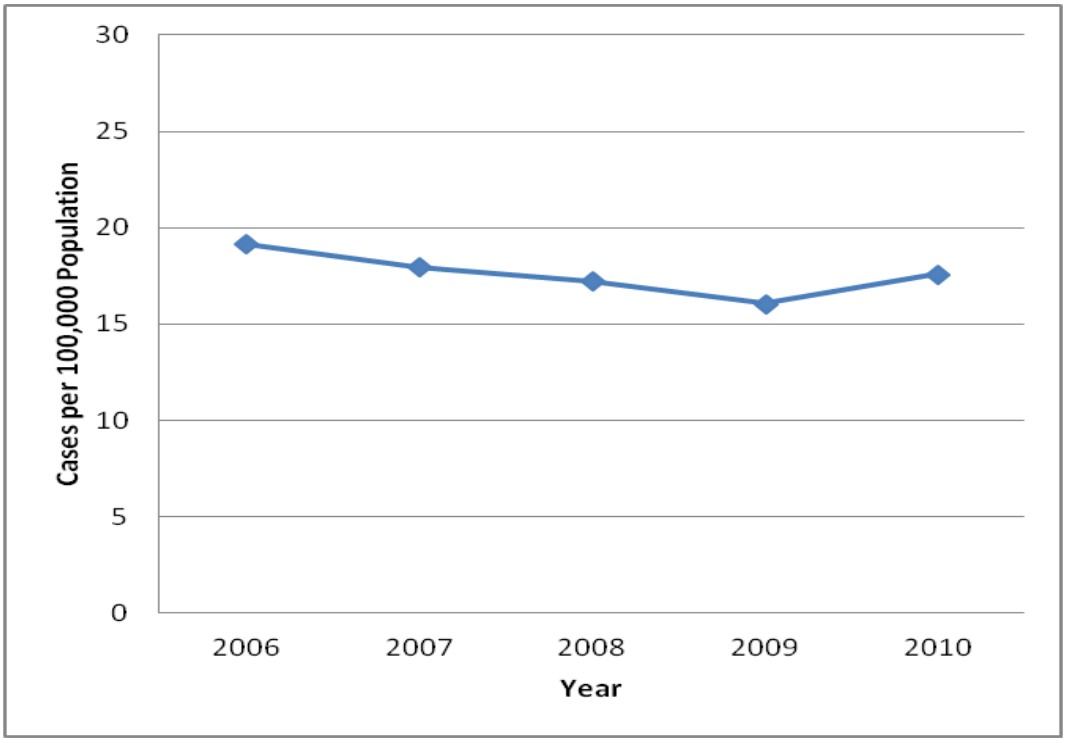


Figure 3.2 Cases of Campylobacteriosis by Month, New Mexico, 2010

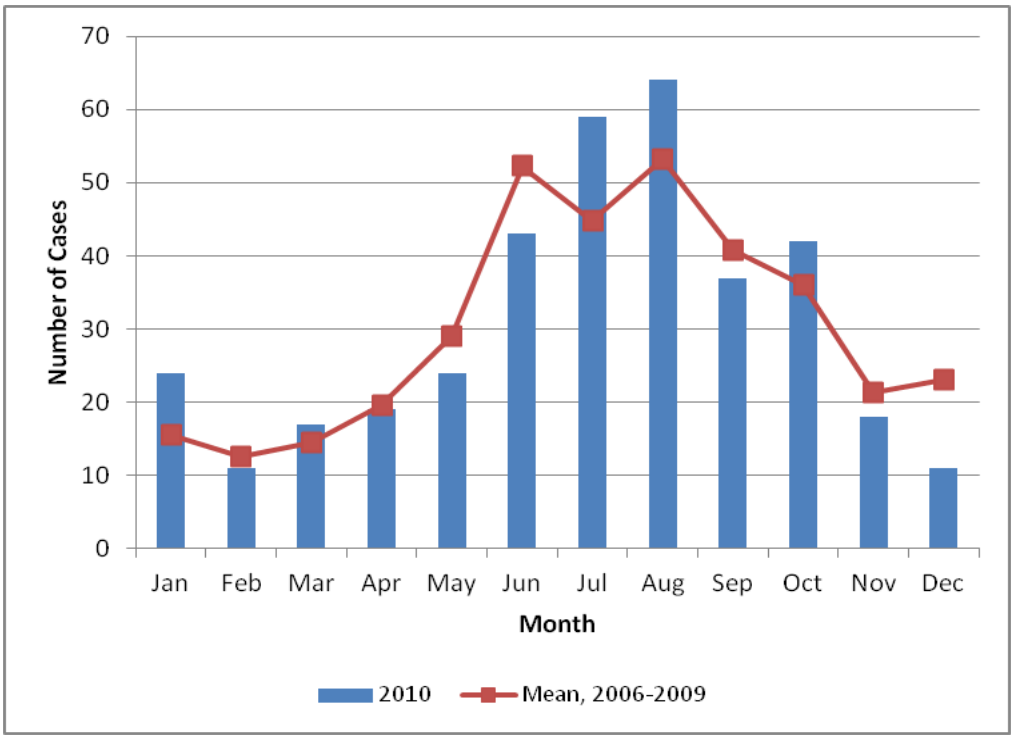
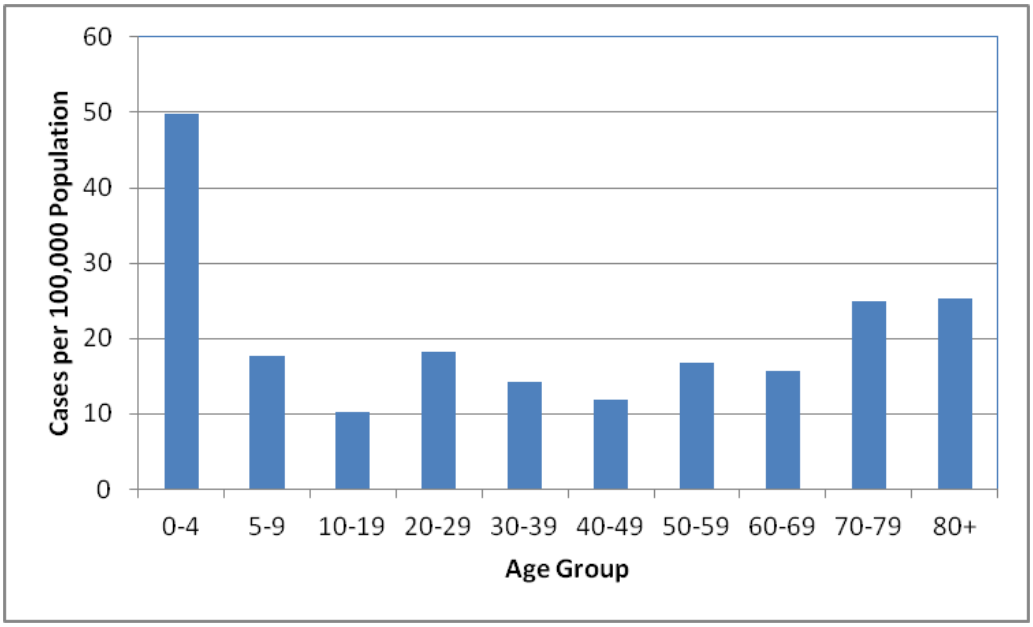


Figure 3.3 Incidence of Campylobacteriosis by Age Group, New Mexico, 2010



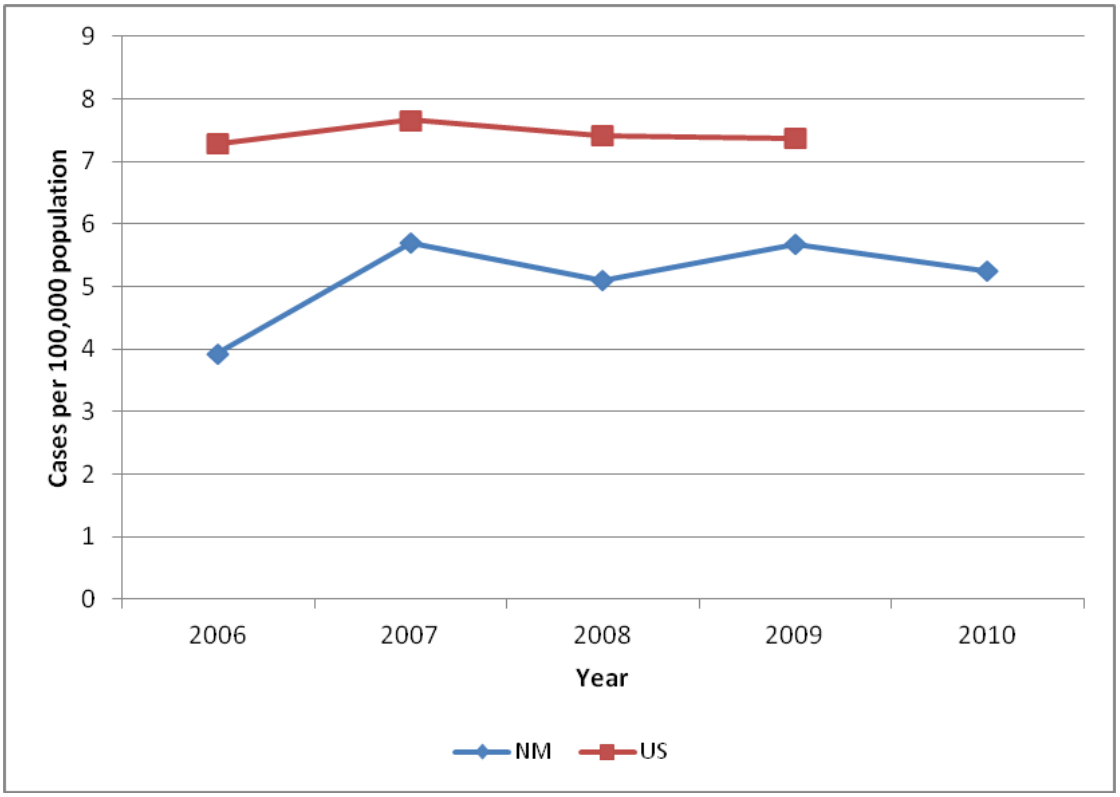
Giardiasis

Giardiasis is caused by a parasite called *Giardia lamblia*. About 60% of people with giardiasis have no symptoms at all. However, infection with *Giardia intestinalis* can cause intestinal problems including diarrhea, gas, greasy floating stools, abdominal cramps, and nausea. Over time the infected person may lose weight and become dehydrated. Symptoms normally begin one to two weeks after infection and usually last one week to one month. Some people may have ongoing intermittent symptoms while others recover completely. Giardia infections are treatable but some people have a relapse of symptoms.

Giardia parasites live in the intestines of infected animals and humans and can also survive in the environment for long periods of time. *Giardiasis* can spread from person to person or from an infected animal to a person. It is one of the most common causes of waterborne disease. Drinking unfiltered, untreated water and even unintentionally swallowing water while in lakes, rivers, and ponds may result in infection.

The incidence of giardiasis in New Mexico is lower than that of the United States as shown in Figure 3.4. Generally, over the last five years, the incidence of giardiasis has been steady in New Mexico. In 2010, it was the most commonly reported parasitic foodborne disease, with 110 cases. Cases occurred year round with more cases during the summer months (Figure 3.5). Incidence was highest among young children, especially those under 5 years of age (Figure 3.6).

Figure 3.4 Incidence of Giardiasis, New Mexico and the United States, 2006-2010*



* United States incidence data for 2010 were not available at the time of this report.

Figure 3.5 Incidence of Giardiasis by Month, New Mexico, 2010

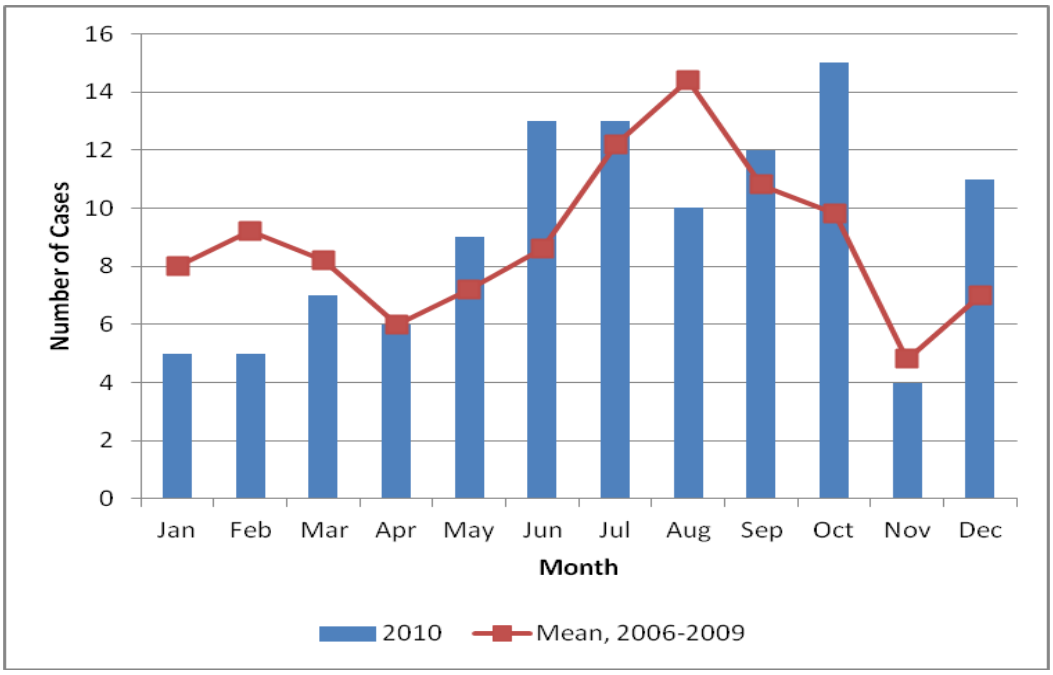
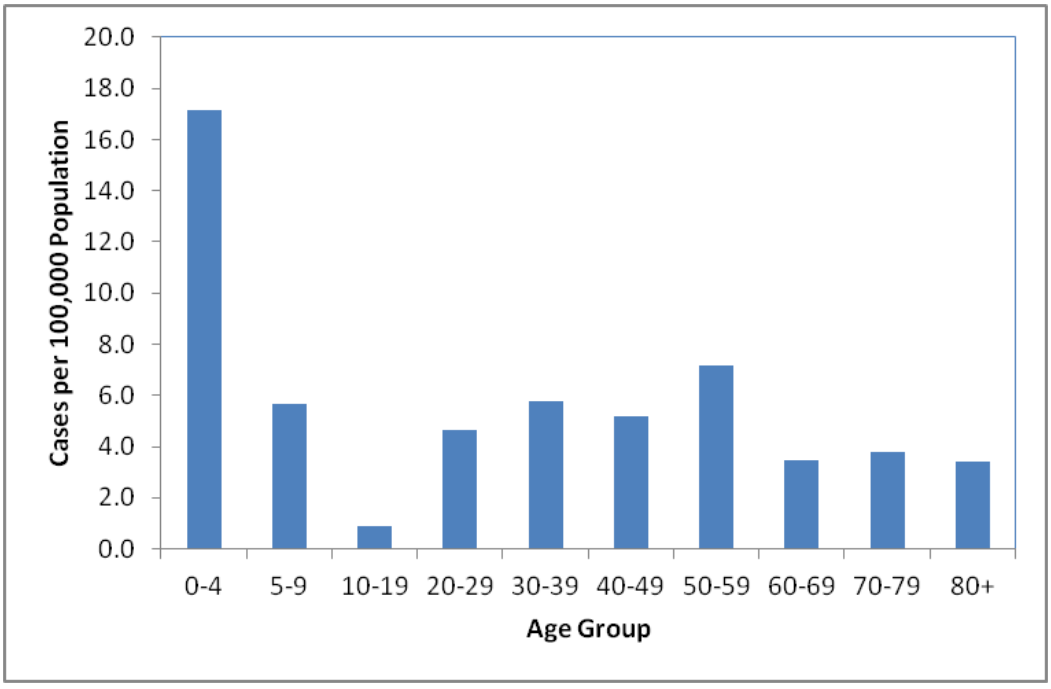


Figure 3.6 Incidence of Giardiasis by Age Group, New Mexico, 2010



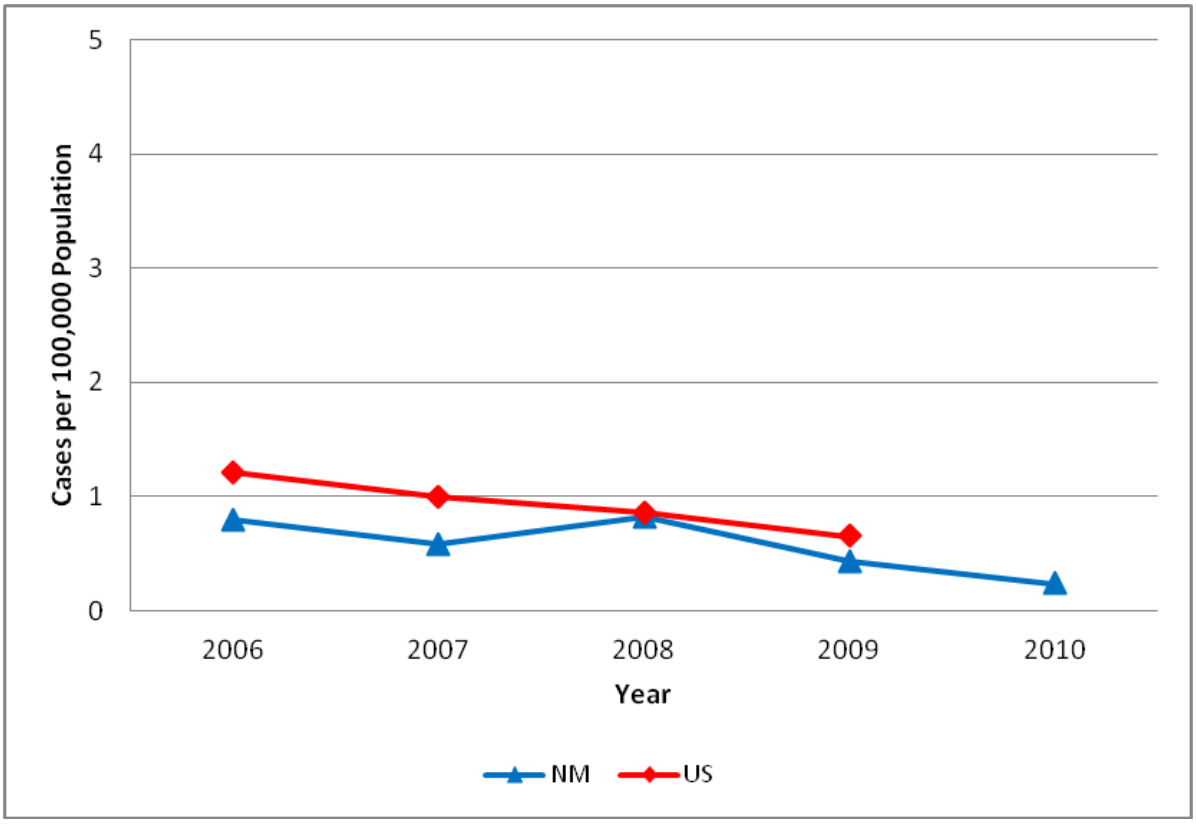
Hepatitis A

Hepatitis A (HAV) is a viral infection. Hepatitis A symptoms typically begin about one month after infection and include fever, fatigue, nausea, loss of appetite, abdominal pain, diarrhea, and jaundice. Infected adults and older children are more likely than young children to have symptoms. Hepatitis A usually resolves quickly and, unlike other types of viral hepatitis, such as hepatitis B and hepatitis C, chronic infection does not occur.

The hepatitis A virus is found in the feces of infected people who can transmit the virus several weeks before they become sick. Hepatitis A infection is primarily spread either by person-to-person contact or by consuming contaminated food or water, sometimes during international travel. Although outbreaks of hepatitis A can occur (e.g., through ingestion of contaminated food or water or among injection drug users), during 2006-2010 New Mexico detected no outbreaks of hepatitis A.

In 1995, the hepatitis A vaccine was licensed for use in the United States and since that time the incidence of hepatitis A has fallen dramatically in both New Mexico and the United States. As shown in Figure 3.7, the incidence continues to decrease both in New Mexico and the United States. In 2010, only five cases of acute hepatitis A infection were reported in New Mexico.

Figure 3.7 Incidence of Hepatitis A, New Mexico and the United States, 2006-2010*



* United States incidence data for 2010 were not available at the time of this report.

Salmonellosis

Salmonellosis is caused by a group of bacteria called *Salmonella*. *Salmonella* serotypes t*yphimurium* and *enteritidis* are the most common in the United States. Infected persons develop diarrhea, fever, and abdominal cramps 12 to 72 hours after infection. Illness usually lasts less than one week and most people recover without treatment. Antibiotics may actually increase the amount of time the bacteria is excreted in the feces of the infected person. However, in some persons the infection may spread from their intestines to the blood stream and throughout the body. If this happens, death may result unless the person is treated promptly with antibiotics. The elderly, infants, and those with impaired immune systems are more likely to have severe illness.

Salmonellosis usually results from handling or eating undercooked or raw eggs, milk, meat, poultry, and other animal products. Outbreaks in New Mexico have also been associated with consuming fresh produce and handling pet chicks. New Mexico had 17 outbreaks of salmonellosis during 2006-2010.

In 2010, salmonellosis was the second most commonly reported bacterial foodborne disease in New Mexico with 337 cases. Figure 3.8 shows, except in 2008 when New Mexico experienced multiple outbreaks of salmonellosis, the incidence has been steady in both the United States and New Mexico. Cases occurred year round with more cases during the summer months (Figure 3.9). As with other enteric infections, the incidence was highest among young children (Figure 3.10).

Figure 3.8 Incidence of Salmonellosis, New Mexico and the United States, 2006-2010

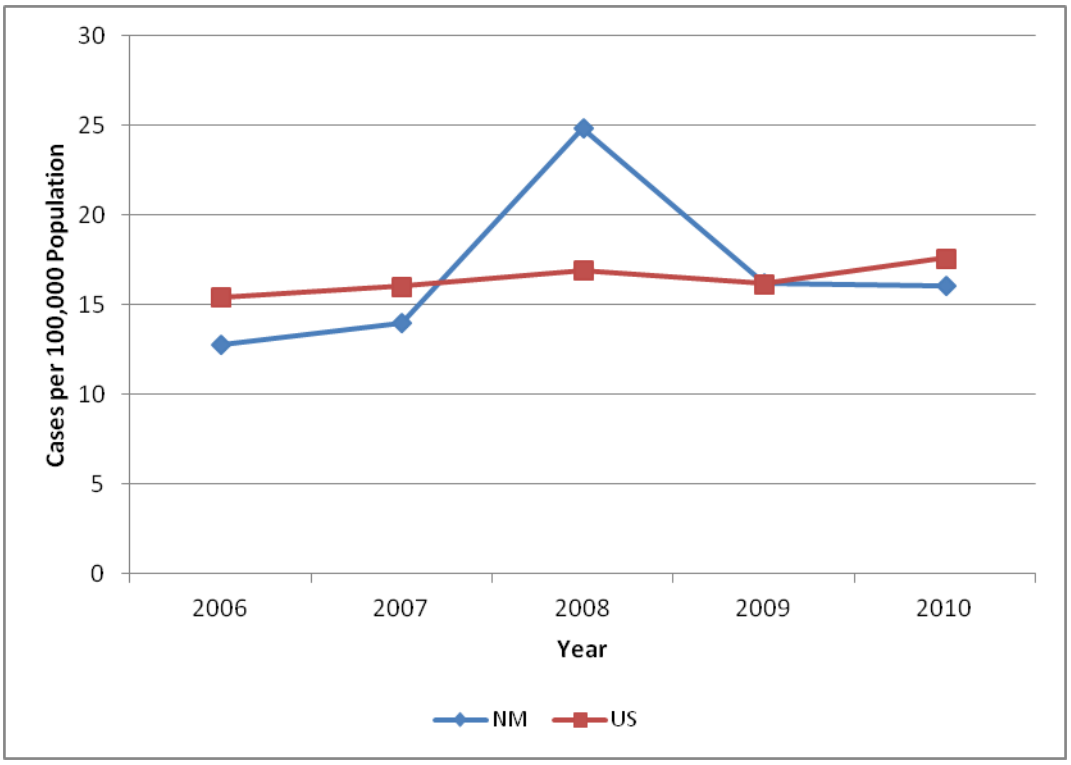


Figure 3.9 Incidence of Salmonellosis by Month, New Mexico, 2010

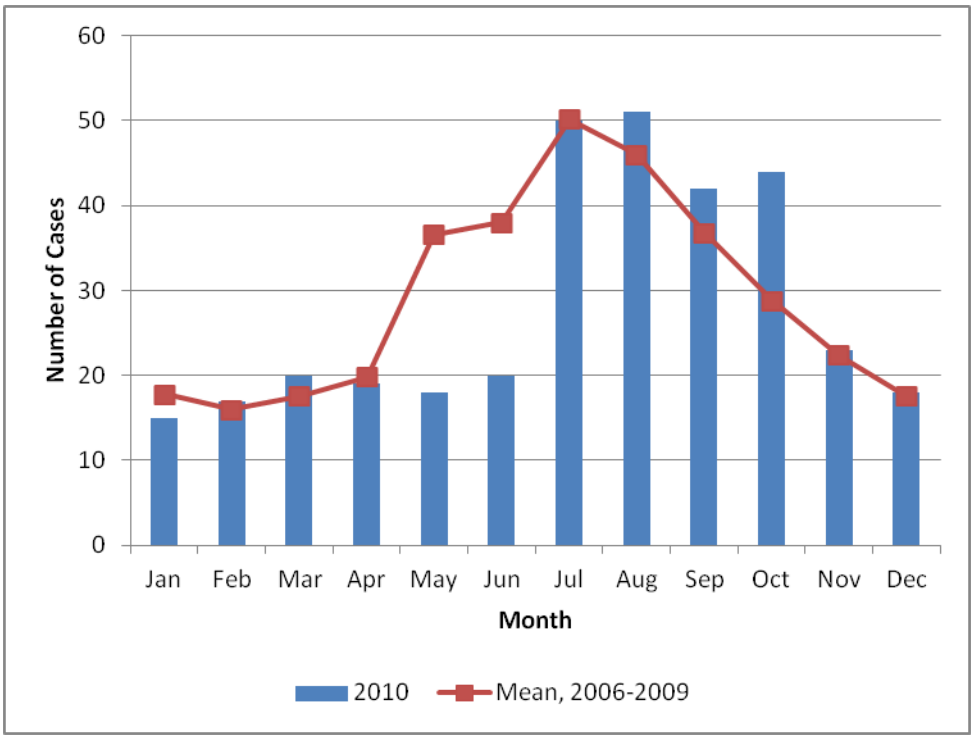
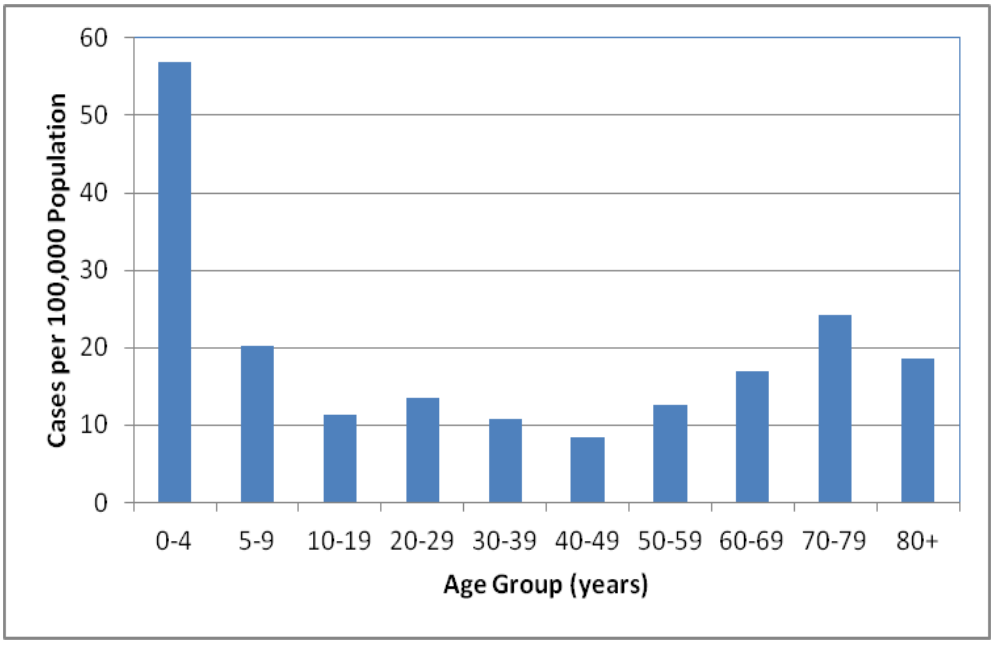


Figure 3.10 Incidence of Salmonellosis by Age Group, New Mexico, 2010



Shigellosis

Shigellosis is caused by a group of bacteria called *Shigella*. *Shigella sonnei*, (“Group D”) and *Shigella flexneri* ("Group B") account for most of the cases. Most infected people develop diarrhea (often bloody), fever, and stomach cramps starting a day or two after they are infected. Usually the illness only lasts 5-7 days and does not require antibiotic treatment. However, antibiotic treatment can shorten the duration of diarrhea and eradicate the organism from feces. *Shigella* infections are usually transmitted from person to person. It also can be transmitted by ingesting fecal contaminated food or water, swimming in contaminated water, or contact with contaminated objects. Some persons who are infected may have no symptoms at all, but may still pass the *Shigella* bacteria to others. Children in child care settings and people living in crowded conditions are at increased risk of infection. Shigellosis can sometimes spread quickly through entire communities, primarily through person-to-person transmission, causing what is known as a community-wide outbreak. During 2006-2010 there were seven outbreaks of shigellosis in New Mexico, primarily in day care centers.

Figure 3.11 shows that the yearly incidence of shigellosis was variable from year to year during 2006-2010 in both New Mexico and the United States reflecting the occurrence of outbreaks. In 2010, 161 cases of shigellosis were reported in New Mexico. Cases occurred year round with more cases during the late summer and fall months (Figure 3.12). The incidence was highest among children under 10 years old (Figure 3.13).

Figure 3.11 Incidence of Shigellosis, New Mexico and the United States, 2006-2010

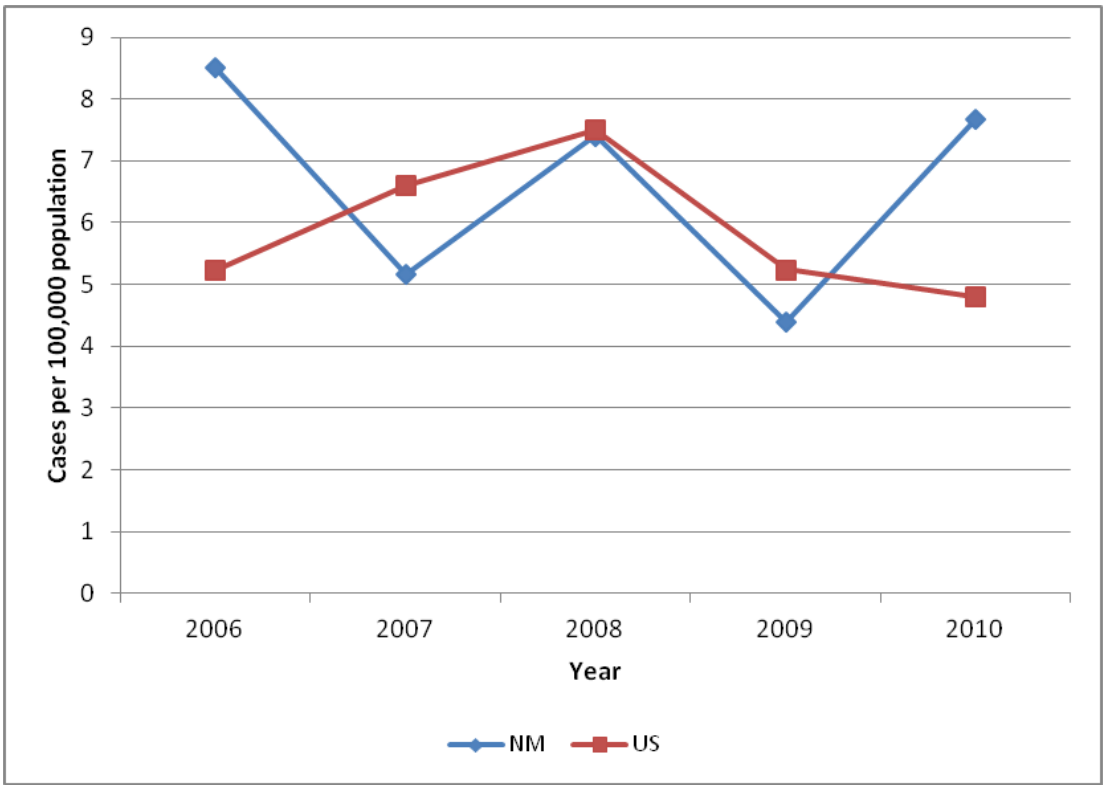


Figure 3.12 Cases of Shigellosis by Month, New Mexico, 2010

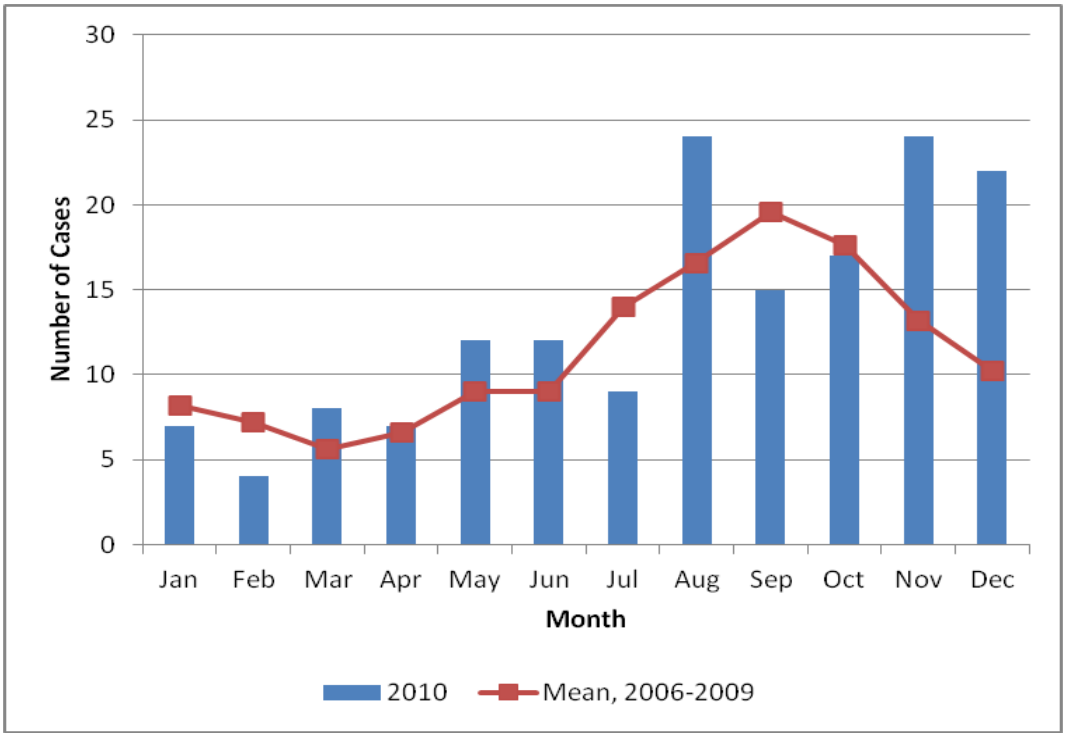
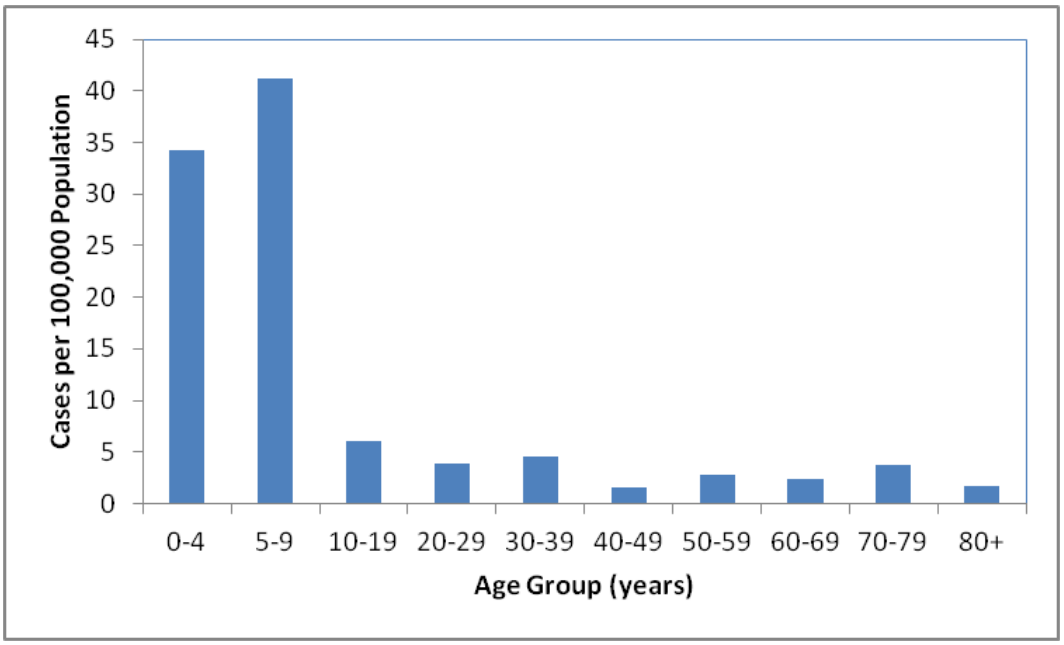


Figure 3.13 Cases of Shigellosis by Age Group, New Mexico, 2010



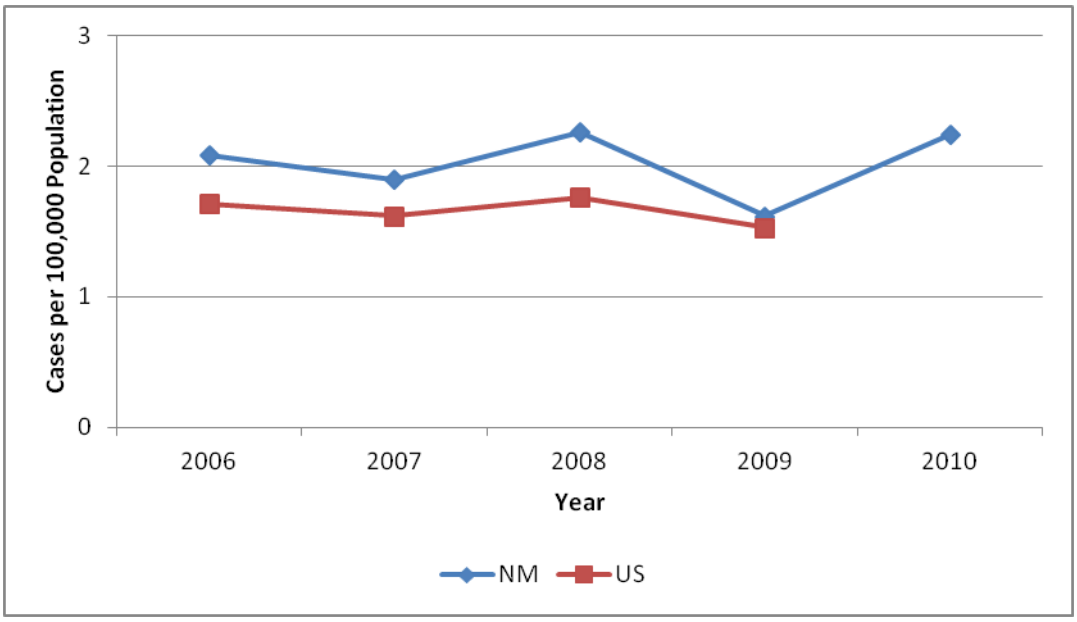
Shiga toxin-producing *E. coli* (STEC) infection

Escherichia coli (*E. coli*) are a large and diverse group of bacteria and most are harmless. Shiga toxin-producing *E. coli (*STEC) cause disease by producing a toxin (Shiga toxin). The most common STEC in the United States is *E. coli* O157:H7 although other types also may cause disease. Illness caused by STEC often begins three to four days after infection with non-bloody diarrhea and severe abdominal cramping. After several days the diarrhea usually becomes bloody. About 5-10% of people with STEC infection develop a potentially life threatening complication known as Hemolytic Uremic Syndrome (HUS). This complication can lead to chronic kidney failure. Children under the age of 5 years and the elderly are more likely to develop HUS. Antibiotics are not recommended for treating STEC infections because antibiotic use during *E. coli* O157 infections has been associated with an increased risk of HUS in children.

STEC infections commonly result from handling or eating raw or undercooked ground beef or drinking unpasteurized milk. Shiga toxin-producing *E. coli* also may be passed from person to person. Infection also may occur from improper hand washing following contact with infected animals or surfaces contaminated with feces from an infected animal or person.

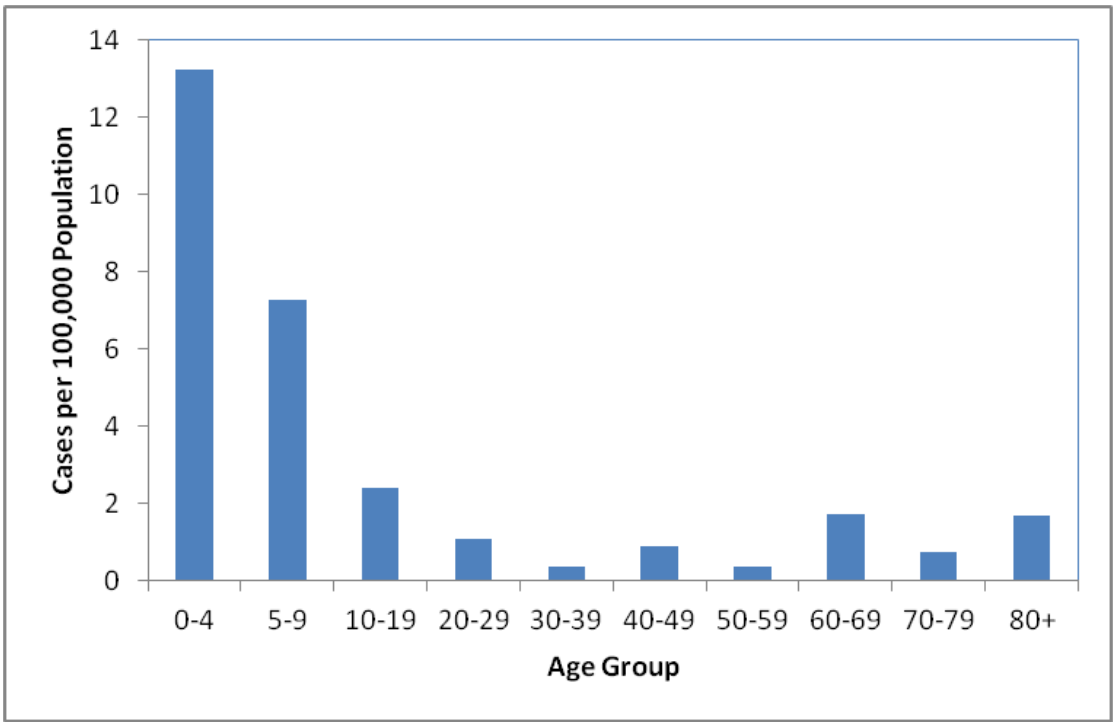
In 2010, 47 cases of STEC infection were reported in New Mexico. As shown in Figure 3.14, over the past five years, the rate of STEC infections remained relatively stable in both the United States and New Mexico, with the incidence in New Mexico slightly above the United States rates. During the past five years, three of the outbreaks in New Mexico were associated with consuming soft cheese, ground beef, and spinach. Rates in New Mexico were highest among children under 5 years old as shown in Figure 3.15.

Figure 3.14 Incidence of STEC by Year, New Mexico and United States, 2006- 2010*



* United States incidence data for 2010 were not available at the time of this report.

Figure 3.15 Incidence of STEC by Age Group, New Mexico, 2010



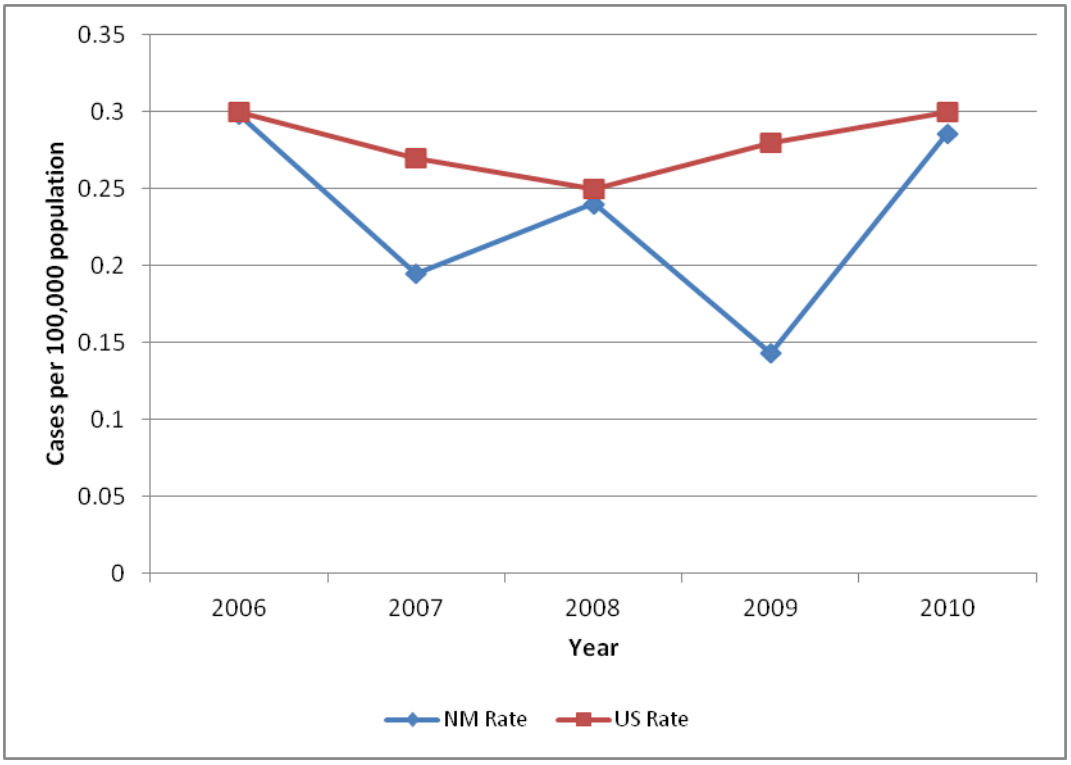
Listeriosis

Listeriosis is a serious infection usually caused by eating food contaminated with the bacterium *Listeria monocytogenes.* It is a rare disease, and while healthy adults and children are occasionally infected they rarely become seriously ill. However, older adults, pregnant women, and newborns may become so severely ill that they require hospitalization. The symptoms of listeriosis include fever, headache, muscle aches, nausea, and diarrhea.

Listeriosis results from eating foods contaminated with *Listeria*, including cantaloupes, unpasteurized milk, soft cheeses, hot dogs, deli meats, undercooked poultry, and unwashed raw vegetables. *Listeria* can be found in soil and water and is killed by pasteurization and cooking. Sometimes contamination may occur after cooking but before packaging. Unlike most bacteria, *Listeria* can grow and multiply in some foods in the refrigerator.

In 2006-2010, only 24 cases of listeriosis were reported in New Mexico. Over the five years, the incidence of listeriosis in New Mexico has varied whereas the incidence in the United States has been relatively stable (Figure 3.16).

Figure 3.16 Incidence of Listeriosis, New Mexico and the United States, 2006-2010



Botulism

Botulism is a severe paralytic illness caused by exposure to toxins produced by the bacterium *Clostridium botulinum*. Exposure to the toxins can occur by ingestion of contaminated food (foodborne botulism), contamination of a wound (wound botulism), or colonization of the gastrointestinal tract, usually in infants less than 6 months of age (infant botulism). Although rare, all forms of botulism can be fatal and are considered medical emergencies. In 2010, there was one case of infant botulism and one case of foodborne botulism reported in New Mexico.

Cholera

Cholera is an acute intestinal infection causing profuse watery diarrhea, vomiting, circulatory collapse, and shock. Many infections include milder diarrhea or are asymptomatic. It is caused by certain types of the bacteria *Vibrio cholerae*. The usual source of infection is consumption of contaminated water or food, particularly raw or undercooked fish or shellfish. Cholera is rare in the United States and usually results from international travel. In 2010 no cases of cholera were reported in New Mexico.

Cyclosporiasis

Cyclosporiasis is a diarrheal disease caused by the parasite *Cyclospora cayetanensis*. Infection occurs by ingesting sporulated oocysts which are the infective form of the parasite. Cyclosporiasis is typically spread through ingestion of food or water contaminated by the feces of an infected person. Outbreaks

have been associated with contaminated fresh fruits, vegetables, and herbs. In 2010, no cases of cyclosporiasis were reported in New Mexico.

Typhoid fever

This is a life-threatening illness caused by the bacterium *Salmonella typhi*. Typhoid fever is rare in the United States but common in the developing world, and about 75% of infections in the United States are acquired during international travel. Typhoid fever can be prevented and can be treated with antibiotics. This disease occurs by consuming foods or beverages that have been handled by an infected person or washed with water contaminated with *Salmonella typhi*. In 2010, no cases of typhoid fever were reported in New Mexico.

Vibrio

Vibrio infections are caused by bacteria from the same family as those that cause cholera. *Vibrio* bacteria are commonly found in seawater, particularly in the warmer summer months. The two most common types are *Vibrio parahaemolyticus*, usually causing diarrheal disease, and *Vibrio vulnificus*, usually causing wound and bloodstream infections. Infection usually results from eating raw or undercooked shellfish or exposure of an open wound to seawater, particularly in immunocompromised persons. In 2010, two cases of *Vibrio* infections were reported in New Mexico.

Yersiniosis

Yersiniosis is a diarrheal disease caused by a group of bacteria called *Yersinia*. The bacterium that causes plague, *Yersinia pestis*, is also in this family. In the United States, yersiniosis is usually caused by a single species, *Yersinia enterocolitica*. Yersiniosis usually results from eating contaminated food, especially raw or undercooked pork products. Infection with *Y. enterocolitica* can cause a variety of symptoms depending on the age of the person infected. In 2010, no cases of yersiniosis were reported in New Mexico.

CHAPTER 4: ZOONOTIC DISEASES

Highlights

- New Mexico leads the United States in the number of human plague and hantavirus cases.
- The incidence of animal rabies in New Mexico remains low. However, people with bites from skunks, bats, and foxes are considered at high risk for possible rabies exposure.
- Risk of exposure and infection with West Nile virus (WNV) depends on many factors, including early spring rain, warm temperatures, and human behavior.
- Tularemia cases in wild rodents and rabbits continue to occur with occasional cases in domestic pets and humans.

Overview

Zoonotic diseases are diseases transmitted to people from animals, sometimes by a vector such as an insect or a tick. Some zoonotic infections can be quite serious and cause life threatening illness, especially if not diagnosed quickly and treated promptly. Examples of important zoonotic diseases in New Mexico include viral diseases such as hantavirus, rabies, and West Nile Virus. Plague, tularemia, brucellosis, and Q Fever are bacterial zoonotic diseases that occur in New Mexico. Tick-borne diseases such as Lyme Disease, Rocky Mountain Spotted Fever (RMSF), and tick-borne relapsing fever are uncommon in New Mexico.

Hantavirus Pulmonary Syndrome

Hantavirus Pulmonary Syndrome (HPS) is a viral zoonotic disease contracted from rodents. In the United States, deer mice are one of the primary carriers of different hantavirus strains that cause HPS. Rodents excrete the virus in their urine, feces, and saliva. Human infection is usually acquired through inhaling aerosolized rodent urine or feces, although it may potentially be transmitted through rodent bites. Direct or indirect contact with contaminated environmental surfaces may also be a source of exposure through mucus membranes such as the nose or mouth. The incubation period (from time of infection until symptoms start) can vary from 1 to 5 weeks, but is typically around 2 to 3 weeks. Person-to-person transmission has not been shown to occur with the hantavirus strains found in the United States.

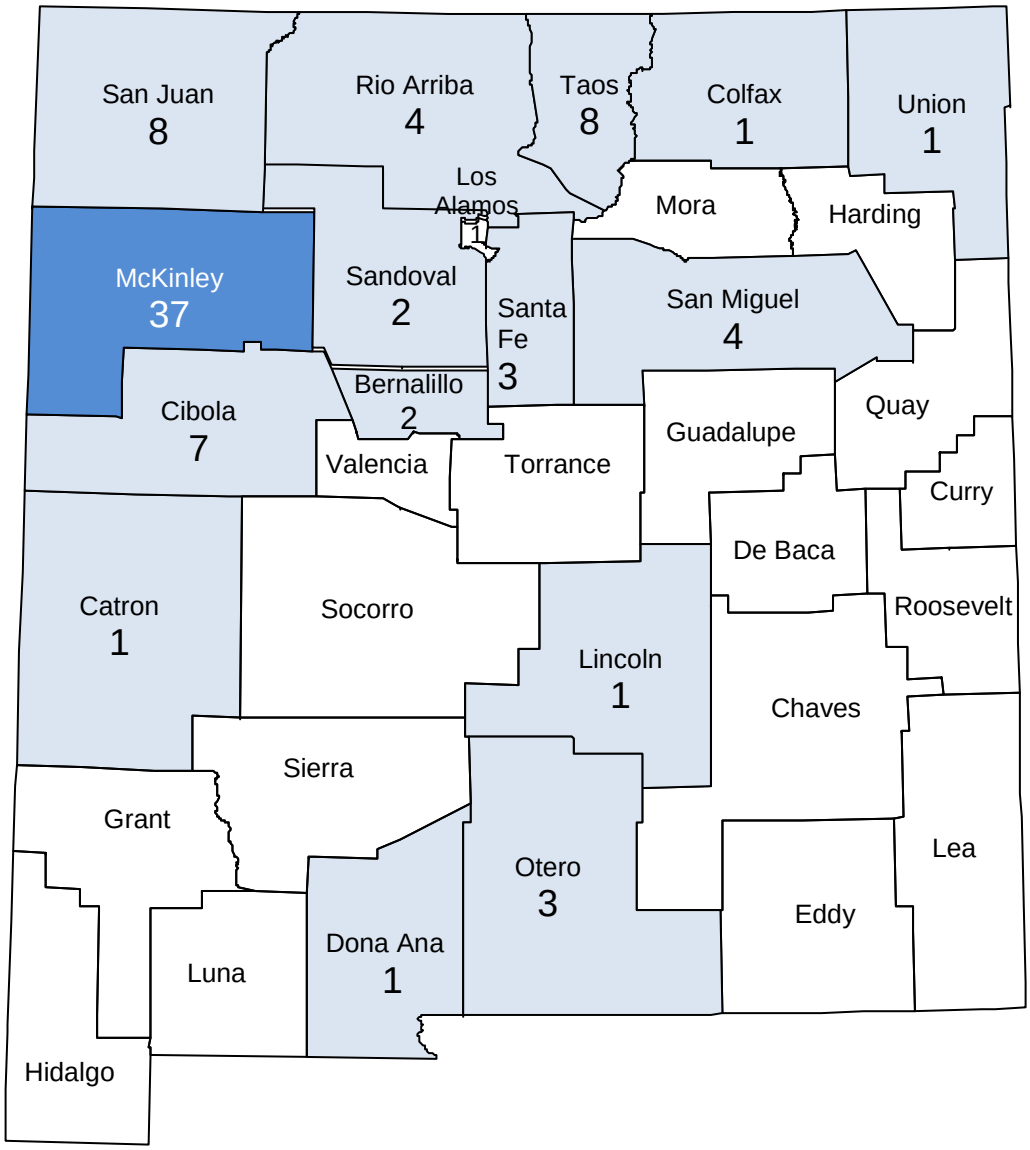
Early symptoms of HPS include fever, fatigue, and muscle aches. Headache, dizziness, chills, abdominal pain, nausea, vomiting, and diarrhea also may be present. Within 4 to 10 days after the initial symptoms occur, there may be coughing and shortness of breath due to fluid buildup in the lungs. There is no specific treatment, but supportive care until the immune system clears the virus has been shown to decrease mortality.

Hantavirus Pulmonary Syndrome in New Mexico and the United States

From 1993 through 2010, a total of 529 HPS cases were reported in the United States. Thirty-six percent of all reported cases have been fatal. The ”Four Corners” states of Arizona, New Mexico, Colorado, and Utah reported 43% of total United States cases from 1993–2010. New Mexico has reported a total of 84 cases through the end of 2010, including four that occurred prior to 1993 (Figure 4.1). In 2010 there were 21 cases in the United States, two of which occurred in northwestern New Mexico. Exposure to

hantavirus may be prevented by eliminating or reducing rodent habitat around the home and cleaning up rodent urine and droppings with disinfectants.

Figure 4.1 Human HPS cases by County, New Mexico, 1975–2010



Plague

Plague is a zoonotic disease caused by the bacterium *Yersinia pestis*. The natural reservoir of plague is wild rodents. Human infection is usually acquired through the bites of infected rodent fleas and has an incubation period of 1 to 7 days. Plague can also be contracted from handling infected animals, especially rodents, rabbits and domestic cats, or through close contact with people or cats with pneumonic plague. Person to person transmission is extremely rare.

The principal clinical forms of plague are bubonic, septicemic, and pneumonic. Symptoms include high fever, headache, chills, malaise and weakness. Bubonic plague is characterized by the presence of an enlarged, tender lymph node. Septicemic and pneumonic plague progress rapidly and are usually fatal without prompt antibiotic treatment.

Plague cycles between rodents and their fleas which become infected by taking a blood meal from an infected host. Infected fleas can then pass the infection on to other rodents when taking another blood meal. Domestic cats and dogs can become infected in this way and they can also be infected by ingesting infected rodents. Pets may bring fleas into the home with the potential of their owners being bitten by infected fleas. Human cases of plague have occurred from the bites of infected domestic pets, flea bites, handling infected rodents or rabbits or, rarely, through the cough of a cat with pneumonic plague.

Plague in New Mexico and the United States

During 2006–2010, 20 plague cases were reported in New Mexico, an average of four cases per year. Nationally, there were 37 cases of plague reported throughout the United States during this 5-year period. Also, during 2006-2010, plague was confirmed in 96 dogs and cats in New Mexico, an average of 19 animal cases per year.

The geographic distribution of plague is strongly associated with southwestern Pinyon-Juniper woodlands at 5,000 to 7,500 foot elevations. Increasing human encroachment in this habitat, especially in north-central New Mexico, has led to greater risk of exposure for people living in this region. A greater proportion of plague cases are occurring in the north-central portion of New Mexico resulting from the 40% increase in population in this area since 1990[1].

Preventing exposure to plague includes eliminating or reducing rodent habitat around the home and ensuring pets in endemic areas are not exposed to infected rodents. Appropriate use of flea control products also may help prevent infection in pet animals.

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Rabies

Rabies is a viral disease carried by mammals and is most often transmitted through the bite of an infected "rabid" animal. In the United States the large majority of animal rabies occurs in wildlife, especially raccoons, skunks, bats, and foxes. Due to required rabies vaccination for pets, the number of rabies infection in dogs and cats has fallen dramatically over the last 50 years in the United States. In many developing countries, rabies continues to be a threat, especially from unvaccinated stray dogs. The World Health Organization (WHO) estimates that over 70,000 people—mainly children from Asia and Africa—die from rabies every year due to the bites of rabid dogs. Rabies in humans is almost always fatal if post-exposure prophylaxis is not started before symptom onset. Therefore, emphasis is placed on careful evaluation of animal bites, quarantine of dogs and cats when they have bitten a person, and laboratory testing of brain tissue when indicated. The incubation period can vary from 10 days up to a year, though the majority of cases have an incubation period of 1 to 3 months.

Rabies in the United States and New Mexico

From 1990 to 2010, there were 45 human cases of rabies reported in the United States. Thirty-four of these cases were associated with exposure to bats. Other exposures included overseas exposure to rabid dogs, a domestic exposure to a rabid raccoon, a domestic exposure to a fox infected with a bat strain of rabies, and exposure to infected donor tissues. In New Mexico, the last human rabies case was in 1956.

A total of 6,690 animal rabies cases were reported in the United States in 2009 (the last year data were available). Raccoons (34.8%), bats (24.3%), and skunks (24.0%) made up the majority of animal cases. Other animals contribute smaller percentages and include foxes (7.5%), cats (4.5%), dogs (1.2%), and cattle (1.1%). Bat variant rabies is found throughout New Mexico (Figure 4.2). Skunk variant rabies is most common in New Mexico's eastern counties bordering Texas and southern counties bordering Mexico (Figure 4.3). Only seven canine cases and four feline cases have been diagnosed in New Mexico since 1990 as shown in Figures 4.4 and 4.5. All of these cases were in unvaccinated animals and most of them had skunk variant rabies except for one cat with bat variant rabies and a dog with a fox rabies variant. In 2010, there were 14 animal rabies cases reported in New Mexico. These cases included bats, skunks, a bobcat, a fox, and a raccoon.

New Mexico has low rates of rabies in its domestic animal populations because of mandatory rabies vaccination of pet dogs and cats. Therefore, bites from these pets are usually considered low risk exposures to the rabies virus. However, if a dog or cat is infected with rabies, due to the close interaction between humans and their pets, rabies prophylaxis is typically recommended. Skunk and fox bites and bat exposures are considered high risk and if the animal is not available for testing, prophylaxis is generally recommended. Human rabies is preventable with rapid intervention, including wound care and administration of rabies vaccine and rabies immune globulin. Preventing rabies includes reducing human and pet cats and dogs exposure to wild animals. It is also important to ensure pet cats and dogs are up to date on their rabies vaccinations. People should also prevent bat entry into homes and avoid exposure to any bats.

Figure 4.2 Bat Rabies by County, New Mexico, 1984–2010

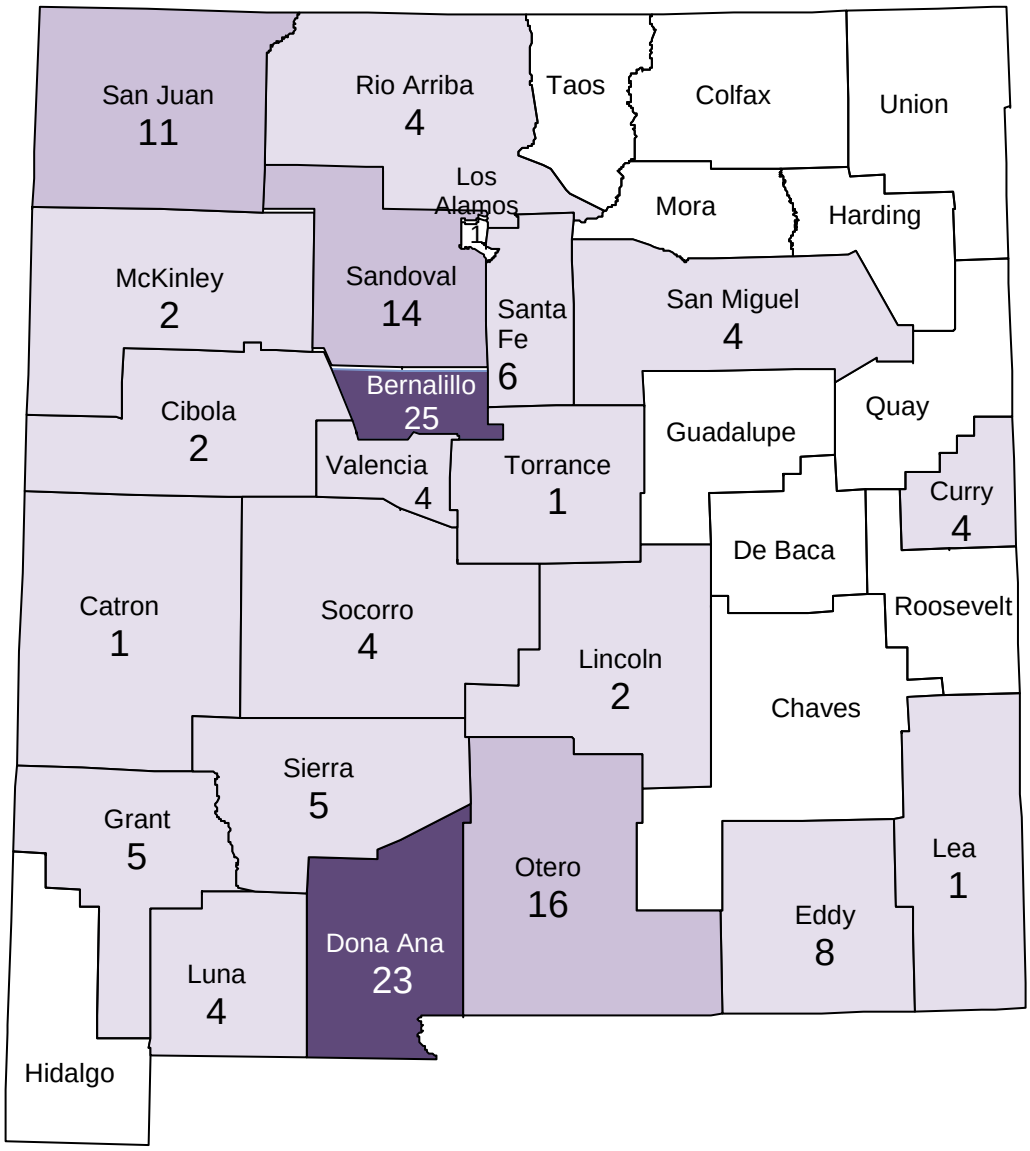


Figure 4.3 Skunk Rabies by County, New Mexico, 1984–2010

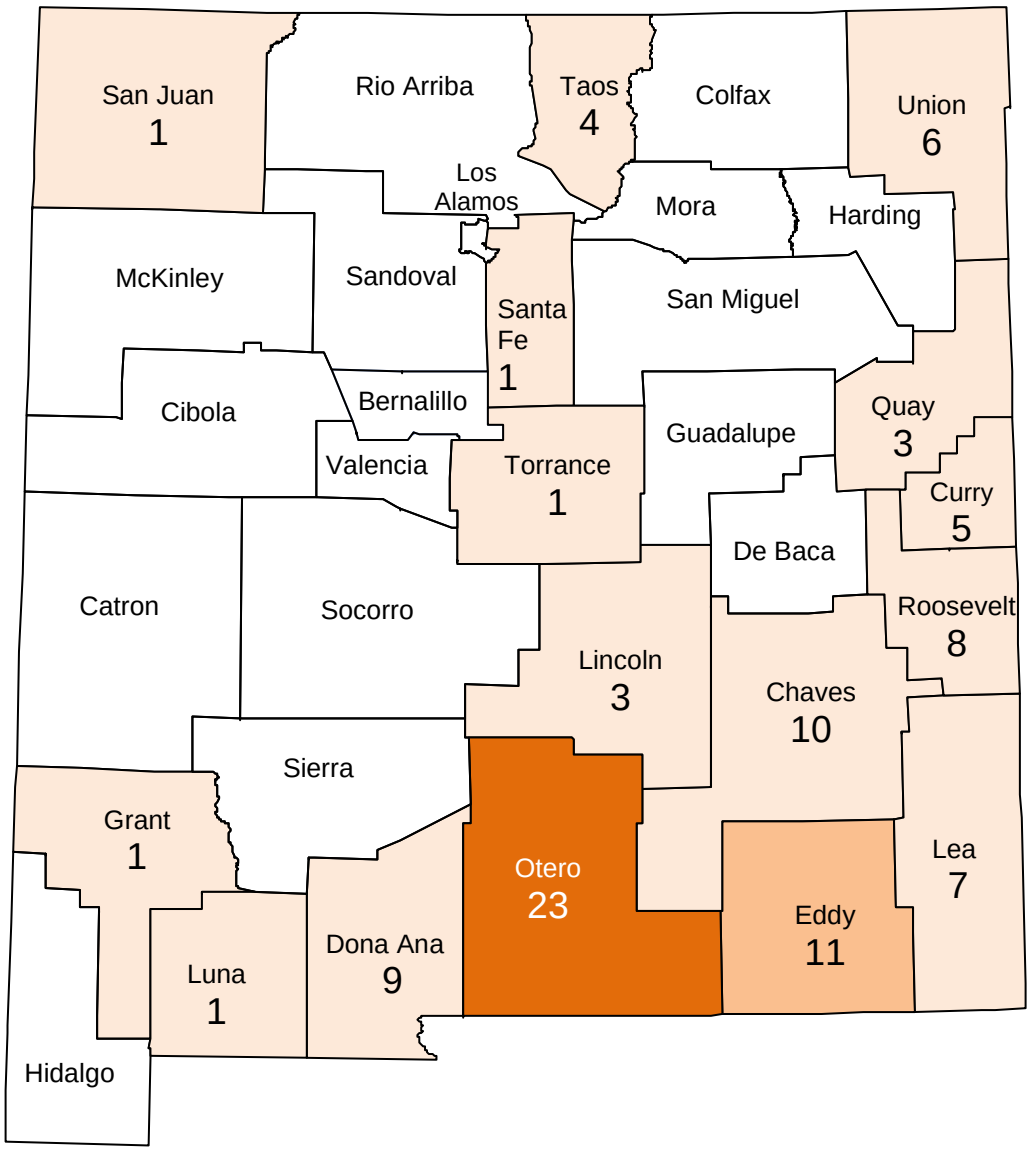


Figure 4.4 Canine Rabies by County, New Mexico, 1984–2010

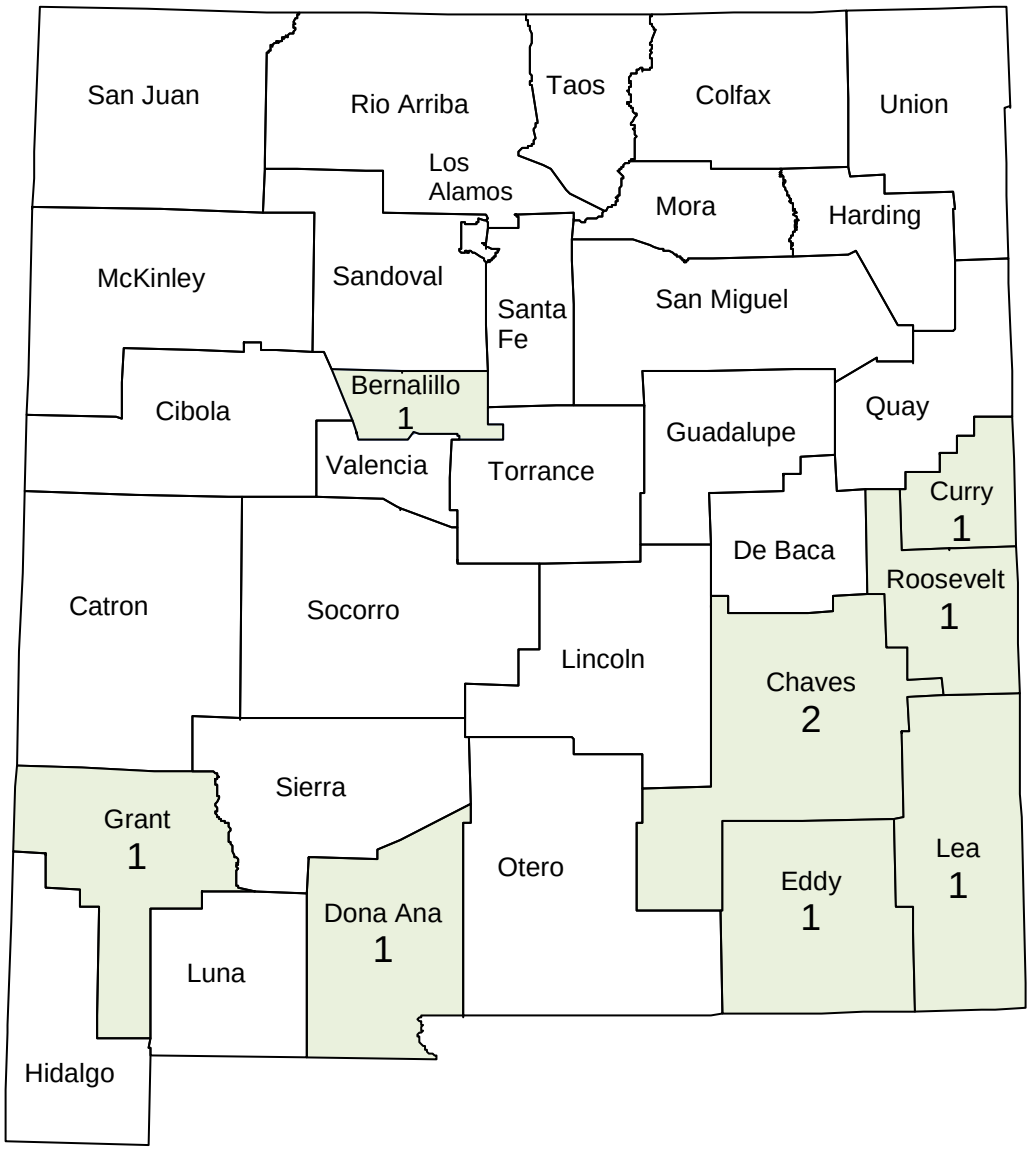
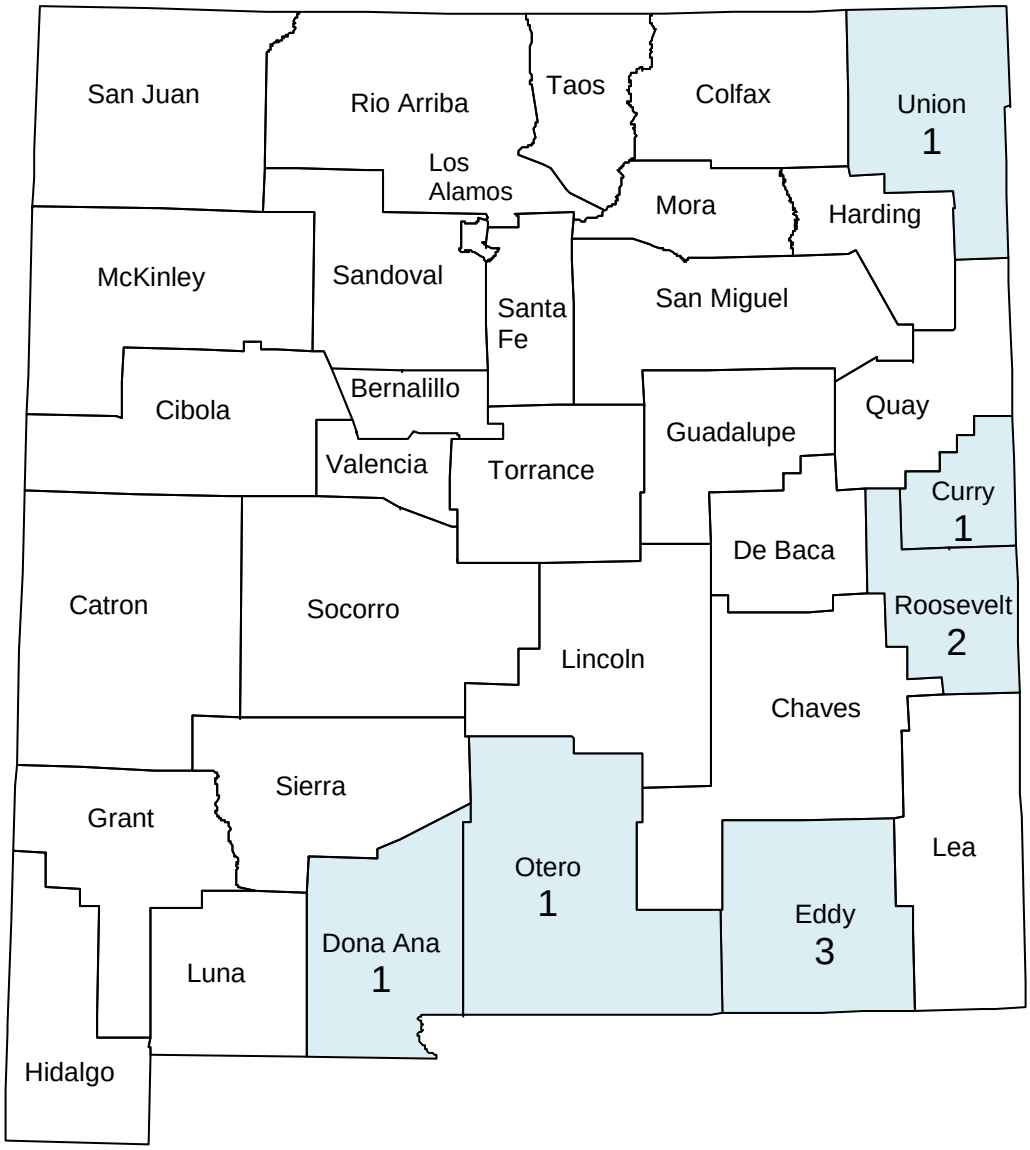


Figure 4.5 Feline Rabies by County, New Mexico, 1984–2010



West Nile Virus

West Nile virus (WNV) is a mosquito borne disease that is transmitted between certain mosquito species and multiple species of birds. WNV infection symptoms range from none to severe nervous system involvement. West Nile Virus has caused epidemics throughout Europe, Africa and Asia and more recently in North America. In 1999, WNV was identified for the first time in the Western Hemisphere (New York City), resulting in 62 cases and seven deaths.

West Nile Virus in New Mexico and the United States

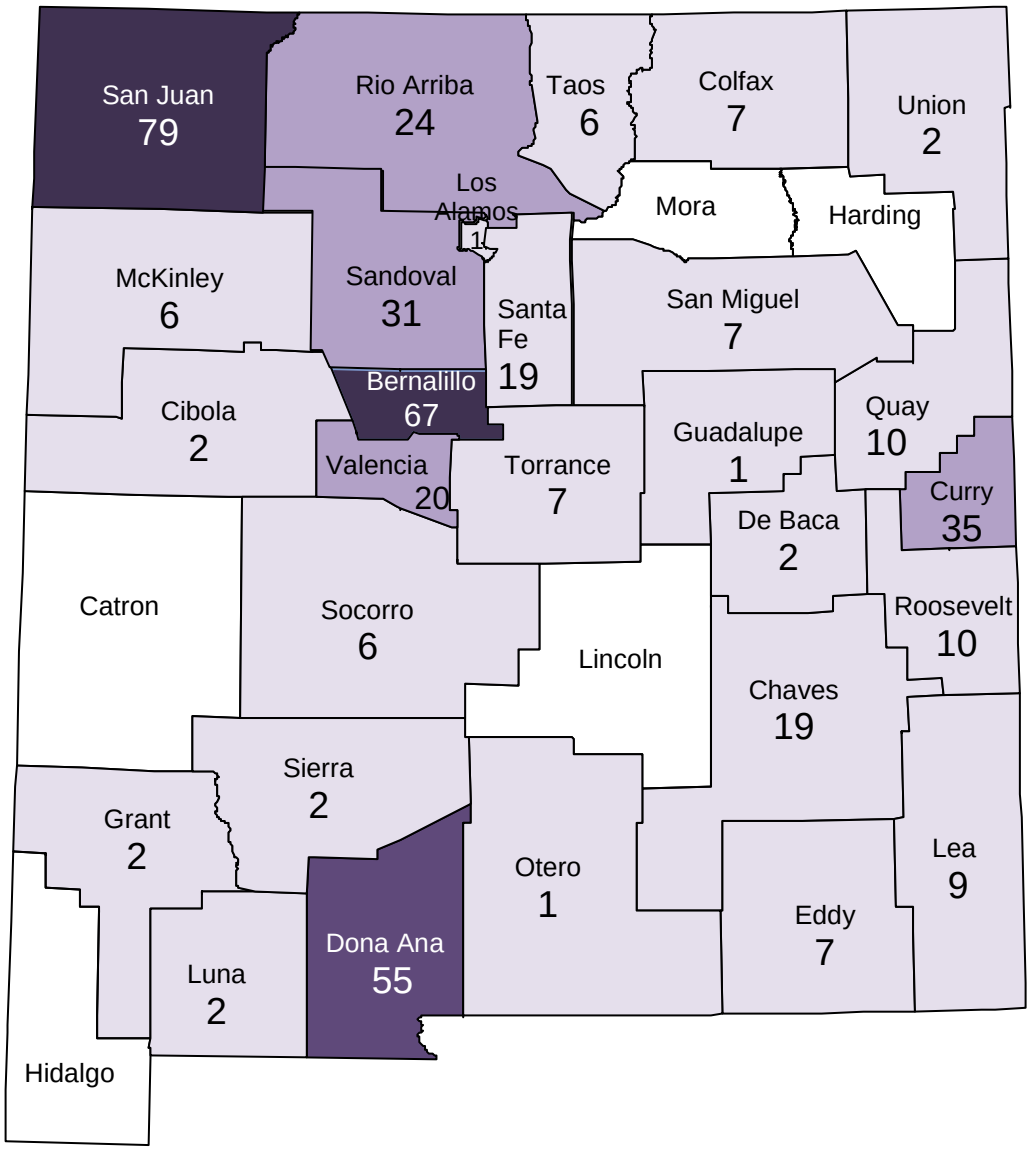
WNV has now been identified in all states except Alaska and Hawaii. The majority of cases are asymptomatic. Therefore, the number of infections is far greater than the number of reported cases. The number of human cases first recorded in 1999 increased to a peak of 9,862 cases with 264 fatalities in 2003. Since then the number of United States cases and fatalities has shown a decline, to 1,021 cases with 57 fatalities in 2010. Multiple species of mosquitoes have been identified as infected with this virus; however, only a few can transmit the virus from birds to humans.

In New Mexico, the first human case of WNV was documented in 2003 with a total of 209 cases and four deaths that year. Since that peak the average number of cases in New Mexico has been 33 human cases per year. The virus has been identified in 14 mosquito species tested from throughout most of the state, but only three species typically test positive for WNV. Two of these species are common throughout New Mexico and are important vectors in transmitting WNV to people. Figure 4.6 shows the geographic distribution of WNV cases in New Mexico.

WNV transmission by mosquitoes depends on environmental variables as well as human behavior. In New Mexico a number of human cases have occurred near rivers and areas with agricultural irrigation. If large numbers of viremic birds and mosquitoes occur in an area, then transmission of WNV to human populations living in those areas is more likely. The number of human cases fluctuates with climatic changes and the susceptibility of the bird population over time.

People are encouraged to prevent mosquito bites to prevent WNV infection. Prevention includes using insect repellent and wearing protective clothing as well as avoiding outdoor activities from dusk to dawn (peak biting times for mosquitoes). Environmental changes such as eliminating open water containers where mosquitoes lay their eggs or regularly changing the water in birdbaths, wading pools and pet water bowls may decrease mosquito populations. An annual equine vaccine also is available to protect horses against infection.

Figure 4.6 Human WNV cases by County, New Mexico, 2003–2010



Tularemia

Tularemia, also known as “rabbit fever”, is a zoonotic disease caused by the bacterium *Francisella tularensis*. Tularemia is found throughout the Northern Hemisphere and the primary mammalian reservoir hosts are rabbits and rodents. Ticks serve both as reservoirs and vectors of tularemia. Dogs and cats are susceptible to tularemia and can become infected through tick bites, direct contact with infected animals or their tissue, or by ingestion of infected animals.

Tularemia in New Mexico and the United States

New Mexico reported 12 tularemia cases during 2006-2010, accounting for a small percentage of the 572 reported cases in the United States during that 5-year period. In 2010 New Mexico reported 11 canine cases, six feline cases, and two human cases.

Typically, humans become infected through tick or deerfly bites or by handling infected animals. Less commonly, infection may be acquired by direct contact or ingestion of contaminated water, food or soil, inhaling airborne bacteria, or from animal bites. Person to person transmission has not been reported but tularemia has been directly transmitted from an infected cat to a person, usually through a bite[1]. Pneumonic tularemia is not known to be transmitted person to person or animal to person. However, tularemia has been shown to aerosolize in laboratory culture and can survive several weeks in optimal conditions[2]. Infection control practices at human and veterinary hospitals should include standard precautions and disinfection of contaminated surfaces and equipment.

References

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[2] Feldman KA, Stiles-Enos D, Julian K, Matyas BT, Telford SR, et al. Tularemia on Martha's Vineyard: Seroprevalence and Occupational Risk. Emerg Infect Dis 2003; 9:350-4.

Brucellosis

Brucellosis is a zoonotic disease caused by bacteria of the genus *Brucella*. These bacteria cause disease in different animal species including sheep, goats, cattle, deer, elk, pigs, dogs, and humans. *Brucella* species have a strong host preference; however, almost all *Brucella* species can infect mammalian species other than their preferred hosts[1]. Transmission to people usually occurs through consumption of infected animal products such as unpasteurized dairy products or through exposure to infectious aerosolized particles. Person-to-person transmission of brucellosis is very rare; however, exposures during medical procedures do occur. The incubation period for brucellosis is usually two to three weeks but can range from 5 days to 5 months[1]. Brucellosis in humans can manifest in a variety of ways. Symptoms are usually nonspecific but can include malaise, arthralgia, fever, and night sweats. Acute infection may not be immediately evident and, if left untreated, it can lead to persistent chronic symptoms that may include recurrent fevers, arthralgia, and fatigue. Serologic testing is the most common diagnostic method used to identify acute *Brucella* infection[3].

From 2006–2010, New Mexico reported five confirmed human brucellosis cases and one probable case from three different counties. One case was diagnosed upon presentation for replacement of a hip prosthesis. Due to the nature of the surgery and the presence of *Brucella* bacteria, all persons in the operating room during the surgery and the cleaning crew who came in after the procedure were considered exposed. Post-exposure prophylaxis was administered and all exposed persons underwent serial serologic testing. None of those exposed became infected. Exposures such as this one are rare but emphasize the need for appropriate post-exposure risk assessment to prevent brucellosis.

Brucella infection in New Mexico is uncommon. In most developed countries human brucellosis is prevented through disease control programs in domestic animals and through appropriate pasteurization and cooking of animal products[1]. However, control among wildlife reservoirs of disease is challenging and may prevent the disease from being eradicated among domestic animals. Precautions should be taken when hunting or working with potentially infected animal tissues. Dairy products should be pasteurized and meat products cooked to temperatures which kill bacteria. Laboratory exposures can be prevented through the use of appropriate laboratory practices.

References

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[2] Centers for Disease Control and Prevention. Brucellosis: Description, Testing, Treatment and Laboratory Risk Assessment with Post-Exposure Prophylaxis Recommendations for Exposure to *Brucella* spp. 2010. Available at: http://www.cdc.gov/nczved/divisions/dfbmd/diseases/brucellosis/recommendations.html Accessed October 19, 2011.

Q Fever

Q fever is caused by the bacterium *Coxiella burnetii.* Cattle, sheep, and goats are the primary reservoirs of the bacteria. It usually does not cause illness in these animals, although abortion in goats and sheep has been linked to *C. burnetii* infection. Bacteria are excreted in milk, urine, and feces of infected animals and during birthing in the fluids and the placenta. Infection of humans usually occurs by inhalation of these organisms from air containing dust contaminated by dried placental material, birth fluids, and feces of infected animals. Rarely, less frequently, drinking raw milk has caused infection.

About half of all people infected with *C. burnetii* become sick. Most acute cases of Q fever begin with sudden onset of one or more of the following: high fevers up to 104–105°F, severe headache, muscle aches, confusion, sore throat, chills, sweats, non-productive cough, nausea, vomiting, diarrhea, abdominal pain, and chest pain. In general, most patients will recover within several months without any treatment. Chronic Q fever is uncommon, but is a serious disease. Patients who have had acute Q fever may develop the chronic form as soon as one year or as long as 20 years after initial infection. Endocarditis (i.e., infection of the lining of the heart) is a serious complication of chronic Q fever.

Transplant recipients, cancer patients, and those with chronic kidney disease are at risk of developing chronic Q fever. Chronic Q fever may cause death in up to 65% of those with chronic infections. In 2010, there were five acute cases of Q fever reported in New Mexico.

Lyme Disease

Lyme disease is caused by the spirochete *Borrelia burgdorferi* and is carried by specific tick vectors in the Northeast, Midwest, and Pacific Coast of the United States. Lyme disease cases are reported rarely in New Mexico except in residents who travel to Lyme disease endemic areas of the United States. Neither of the tick vectors is found in New Mexico[1]. In 2010, five imported cases of Lyme disease were reported in New Mexico.

Rocky Mountain Spotted Fever

The infectious agent of Rocky Mountain Spotted Fever (RMSF) is a bacterium, *Rickettsia rickettsii*. In the eastern and southern United States, the vector is the American dog tick, while in the western United States, the vector is typically the Rocky Mountain wood tick. RMSF cases near the New Mexico border in eastern Arizona have occurred, including several fatalities. The tick responsible for these infections was the dog tick, which is found on dogs and around people's homes. Almost all of the cases occurred within communities with a large number of free roaming dogs[2]. Despite the name, the highest incidence rates for RMSF are in North Carolina and Oklahoma. In 2010 there was only one reported case of RMSF in New Mexico.

Tick-borne Relapsing Fever

In the United States, tick-borne relapsing fever (TBRF) is caused by bacteria associated with three tick species with one species accounting for most human illness. Most cases occur in the summer months and are associated with sleeping in rodent and tick infested cabins in mountainous areas of the western United States. There are approximately 25 cases of TBRF reported in the United States each year. The last cases in New Mexico occurred in 2002 and included 11 people who all spent time in the same rustic cabin.

References

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CHAPTER 5: SEXUALLY TRANSMITTED AND BLOODBORNE INFECTIONS

Highlights

- Sexually transmitted infections (STIs) are among the most common infectious diseases in the United States. STIs are typically passed from person to person through sexual activities.
- STIs and bloodborne infections are caused by different viruses and bacteria found in blood and body fluids.
- Chlamydia is the most commonly reported infectious disease in the United States. New Mexico had the 8th highest rate of Chlamydia in the United States.
- New Mexico had lower rates of gonorrhea and syphilis as compared to the United States.

Overview

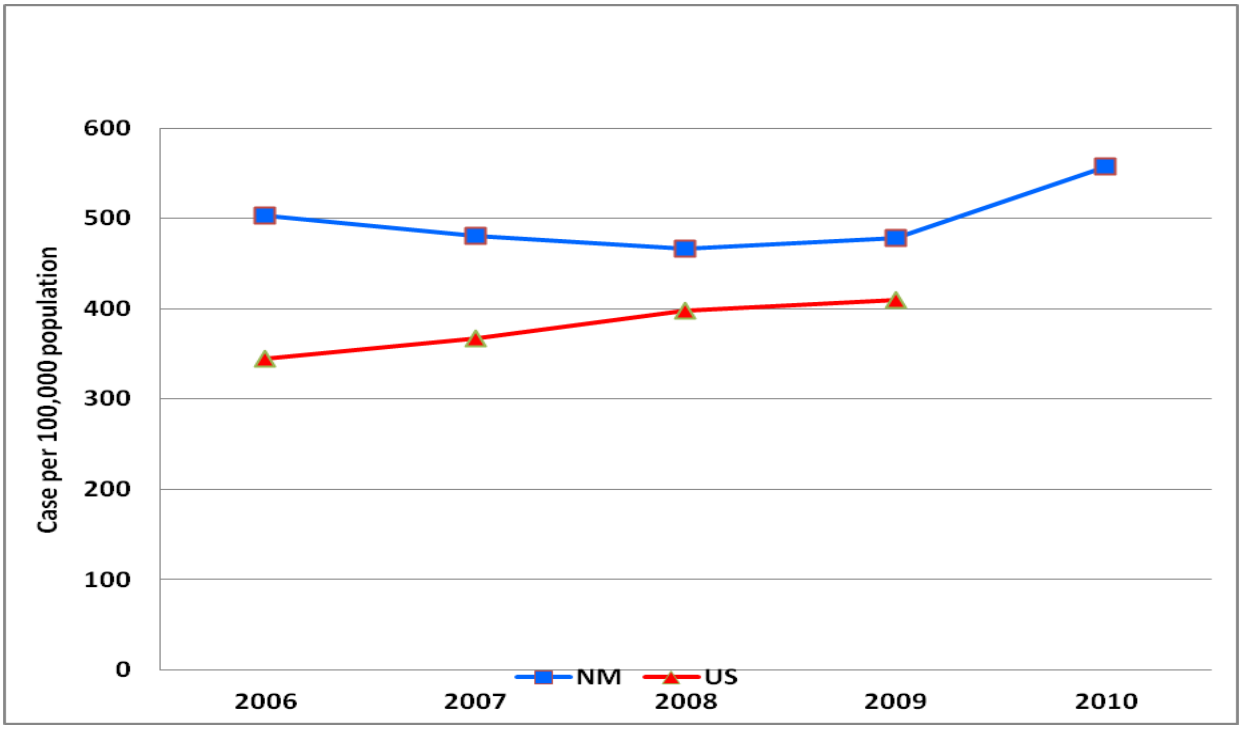
Chlamydia and gonorrhea are bacterial infections caused by *Chlamydia trichomatis* and *Neisseria gonorrhea,* respectively. Both infections are typically transmitted by direct sexual contact and co-infection is common in both sexes. The most common infection site in men is the urethra and in women it is the endocervix. Other infection sites include but are not limited to the pharynx, the rectum, and the eye. Non-genital infections are more common with gonorrhea than chlamydia. Both infections can be transmitted from mother to baby during birth and eye infections are more common in neonates than adults. Fortunately, both infections respond well to antibiotic treatment if treated early after infection. However, if treatment is delayed both infections can spread and cause serious complications, particularly in women where pelvic inflammatory disease and ectopic pregnancies are not uncommon. Both conditions can lead to permanent infertility. In approximately 0.5 to 3.0% of untreated gonococcal cases the infection can become disseminated (spread to other organ systems). Complications of infection include a painful and crippling form of arthritis, endocarditis (infection of the lining of the heart), and meningitis. Because of the potential serious sequelae of untreated infection, it is vital to detect and treat these diseases early before complications develop. STIs may be prevented by refraining from sex, having monogamous sex with an uninfected partner, and by using latex condoms during sex.

Chlamydia, gonorrhea, and syphilis are most common among people in 20-24 years old. Gonorrhea and chlamydia cases drop steeply for those 30 and older, and routine screening for asymptomatic persons age 30 and above is not recommended except for those with high risk behavior. Syphilis also declines after the second decade but continues with high rates even into the fourth decade.

Chlamydia

Chlamydia is the most commonly reported notifiable infectious condition (not just among STIs) in the United States with 1,244,180 cases reported nationally in 2009 (the last year national data were available). New Mexico consistently has rates above the United States rates (Figure 5.1) and had the eighth highest population rate nationally at 478 per 100,000 population compared to a United States rate of 409 per 100,000 in 2009. From 2006 to 2010 the population rate in New Mexico rose from 503 to 558 per 100,000.

Figure 5.1 Chlamydia Incidence, New Mexico and the United States, 2006-2010



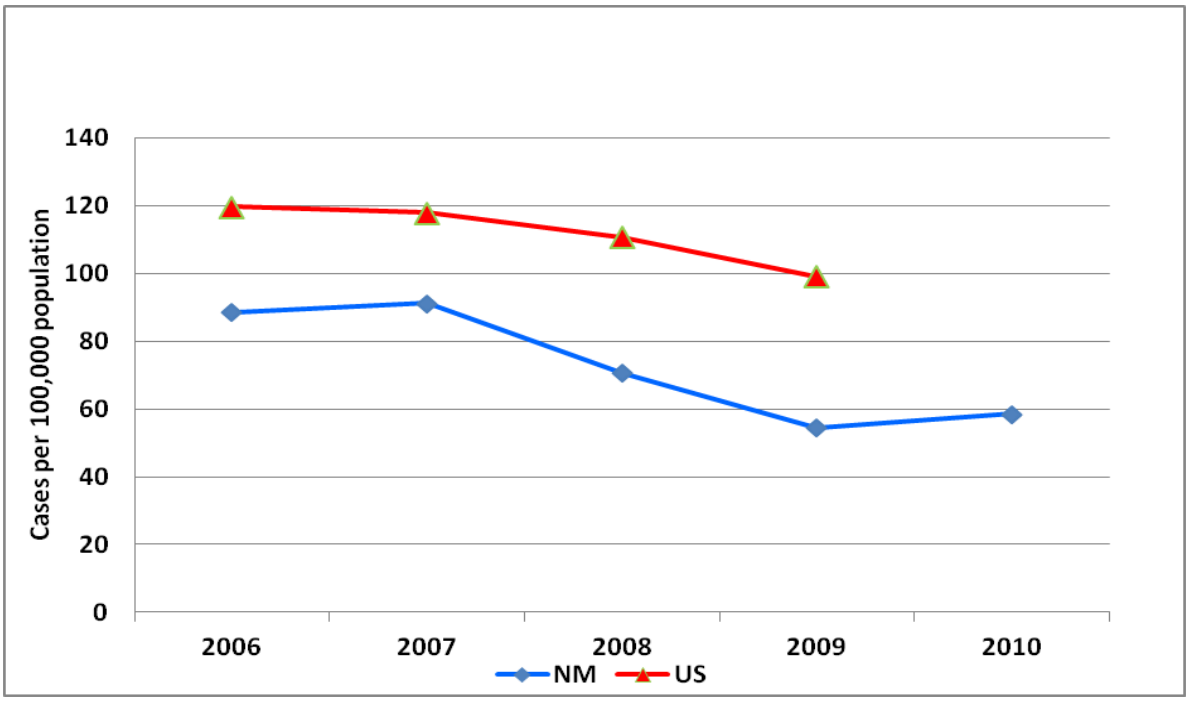
* United States incidence data for 2010 were not available at the time of this report.

Gonorrhea

Gonorrhea was the second most commonly reported notifiable infectious condition in the United States with 301,174 cases reported in 2009. New Mexico consistently has population rates below the national rate (Figure 5.2). However, gonorrhea is still an important public health disease in New Mexico. In 2009 New Mexico ranked 33rd with a rate of 54 compared to a United States rate of 99 per 100,000 population. From 2006 to 2010 the rate in New Mexico fell from 89 to 59 cases per 100,000 population.

Gonorrhea may be treated with antibiotics; however, because of progressively developed antimicrobial resistance, this disease now presents more of a treatment challenge. New treatment guidelines suggest administering both injectable and oral antimicrobials. Public health officials are closely monitoring gonorrhea's susceptibility to existing antimicrobials since few effective treatment alternatives remain available.

Figure 5.2 Gonorrhea Incidence, New Mexico and the United States, 2006-2010



* United States incidence data for 2010 were not available at the time of this report.

Syphilis

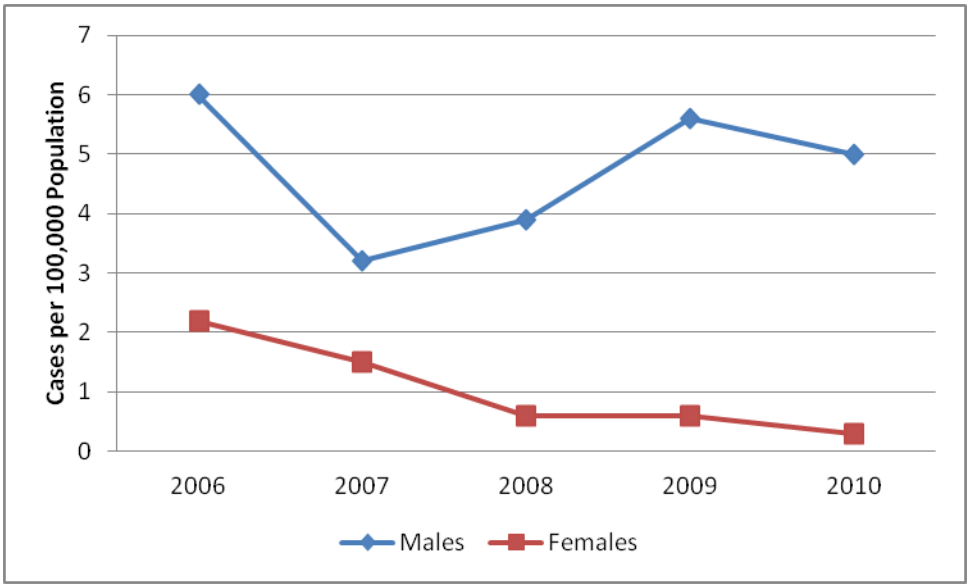
Syphilis is a bacterial STI caused by *Treponema pallidum*. Syphilis is treated with antimicrobials and complications can usually be avoided with early treatment. Because so many of its signs and symptoms are similar to those of other diseases, it can be difficult for health care providers to diagnose syphilis.

Syphilis infection has four stages: primary; secondary; early latent; and late latent. Acute disease, or primary and secondary (P&S) syphilis, is characterized by primary lesions, such as an ulcer or chancre at the site of infection, followed by secondary infection typically including a skin rash and mucous membrane lesions. Untreated P&S syphilis progresses to chronic disease with periods of latency in which there are no signs or symptoms. Late stage syphilis may manifest as coordination difficulty, paralysis, numbness, gradual blindness, dementia, and even death.

Syphilis is passed from person to person through direct contact with a P&S sore or lesion during sexual activity. Pregnant women with any stage of syphilis can also pass it to their infants. Infection during pregnancy may result in birth defects, miscarriages, premature births, or fetal death.

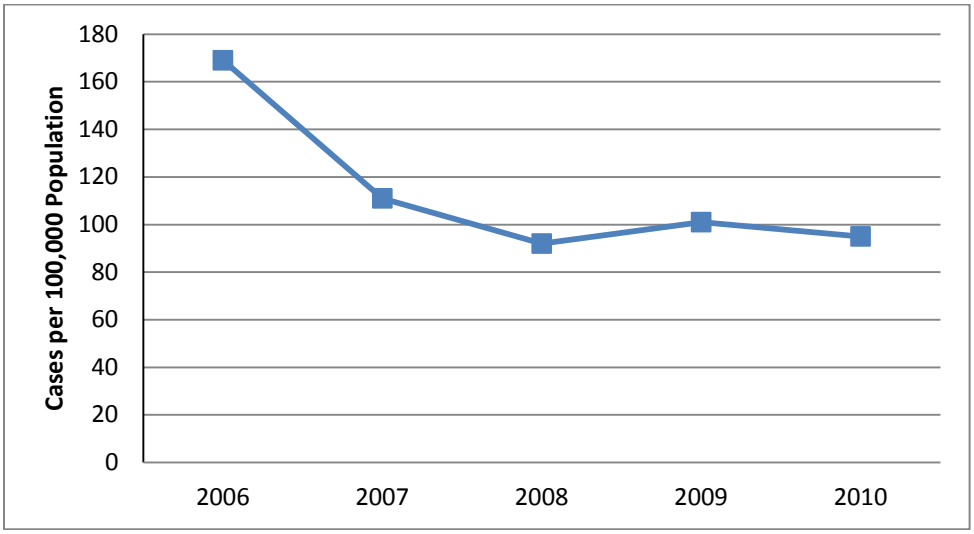
The New Mexico syphilis rate ranked 20th in the United States with a rate of 3 per 100,000 population. This compared to almost 5 per 100,000 for the United States in 2009. As shown in Figure 5.3, New Mexico mirrors the national trend of increasingly higher ratios of men to women in syphilis infection.

Figure 5.3 Primary and Secondary Syphilis Rates by Gender, New Mexico, 2006-2010



New Mexico experienced an outbreak of syphilis starting in 2003 and peaking in 2006. This outbreak was primarily concentrated in American Indians living in the northwest counties of the state. State, Tribal and Indian Health Service personnel and community based organizations collaborated to promote testing and treatment among syphilis cases and their partners in this region. This effort successfully lowered the number of cases as shown in Figure 5.4.

Figure 5.4 Primary and Secondary Incidence of Syphilis, New Mexico, 2006-2010



HIV

Human immunodeficiency virus (HIV) directly kills immune system cells. Body fluids, including blood, semen, vaginal fluid, and breast milk can all transmit HIV. The main routes for infection are through sex, sharing of needles, and from pregnant mothers to their fetus. AIDS (Acquired Immunodeficiency Syndrome) is the most severe stage of disease in which the immune deficient person is vulnerable to severe opportunistic infections and some cancers. Fortunately, improved treatment for HIV has led to a improved prognosis for people with HIV.

New Mexico conducts active surveillance and follow-up on HIV cases. During 2010, 152 new cases of HIV (reflecting an incidence rate of 7 per 100,000 population) were diagnosed in New Mexico residents. A comprehensive Department of Health report containing detailed information and data on HIV and AIDS in New Mexico is available for further information[5].

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Hepatitis B

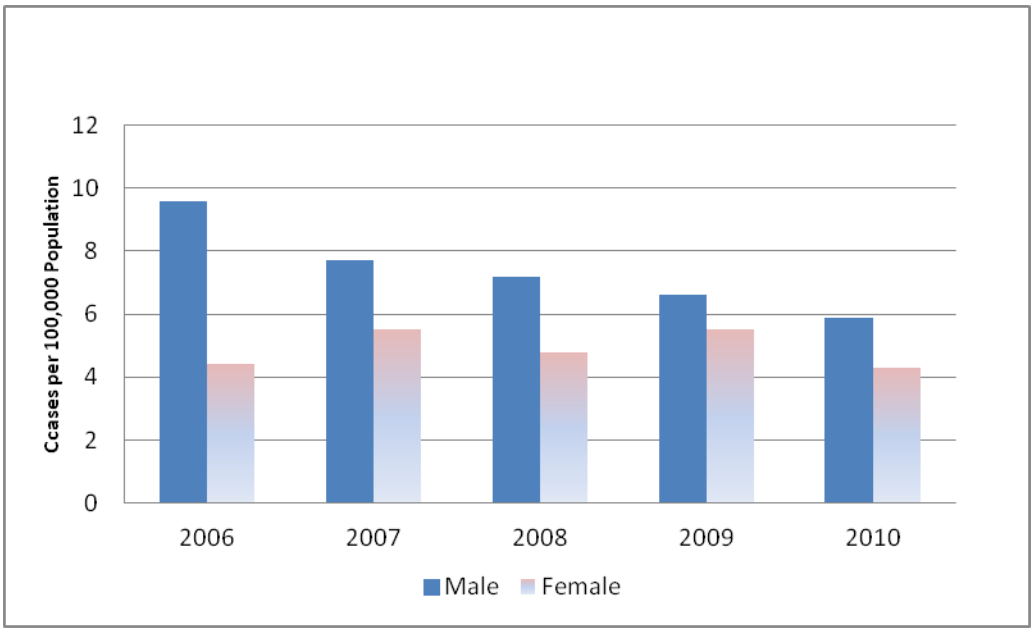
Hepatitis B is an infection of the liver caused by the hepatitis B virus (HBV). This virus is transmitted by blood through a skin puncture or by direct contact with mucous membranes. Infection can also be spread from mother to infant during birth. Risk factors for infection include high risk sexual activity (i.e., more than one partner or male sexual activity with other males) and injection drug use. There is a wide spectrum of illness caused by HBV, ranging from no symptoms to mild illness (e.g., loss of appetite, fatigue, nausea, vomiting) to severe liver disease. Ninety percent of infected infants, 30% of infected children under 5 years, and less than 5% of infected people over 5 years of age become chronically infected[1]. Long-term complications of infection include cirrhosis, liver cancer, and severe liver disease.

New infections of HBV in the United States peaked in the mid-1980s at about 280,000 cases and by 2000 new infections had decreased by 70%[2]. The most dramatic decline occurred among children who received routine vaccination for HBV. An estimated 1.25 million people are chronically infected with HBV in the United States. Foreign-born persons who have emigrated from countries in which HBV is endemic contribute disproportionately to the burden of chronic HBV infection in the United States[2].

There are almost 6,000 estimated people living with chronic hepatitis B in New Mexico. These people are disproportionately male, young, and Hispanic. Many are current or past injection drug users and many are incarcerated or have a history of incarceration. The majority of those infected with HBV in New Mexico do not know that they are infected. Reflecting national trends, the incidence of acute hepatitis B in New Mexico declined significantly, from 24 cases in 2006 to 5 cases in 2010. The incidence rate of

acute hepatitis B in New Mexico was 0.4 per 100,000 in 2010. From 2006 through 2010, there was an average of 128 cases of chronic hepatitis B reported annually in New Mexico. During this same time period, the incidence rate of chronic hepatitis B fell from 7 to 4 per 100,000. This decline was driven by falling incidence rates among men, where the incidence rate fell from 10 per 100,000 in 2006 to 6 per 100,000 in 2010. However, as Figure 5.5 shows, the rate of chronic hepatitis B remained higher in men compared to women for each year during 2006-2010. Since most newly infected people are asymptomatic, there is under-reporting of infections. Hepatitis B vaccination is currently required for school entry in New Mexico.

Figure 5.5 Chronic Hepatitis B Incidence by Sex, New Mexico 2006-2010



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[1] Centers for Disease Control and Prevention (CDC). A Comprehensive Immunization Strategy to eliminate Transmission of Hepatitis B Virus Infection in the United States. MMWR 2005; 54(RR-16):1–23.

[2] CDC. Surveillance for Acute Viral Hepatitis—United States, 2007. MMWR 2009;58 (SS-3):7-8.

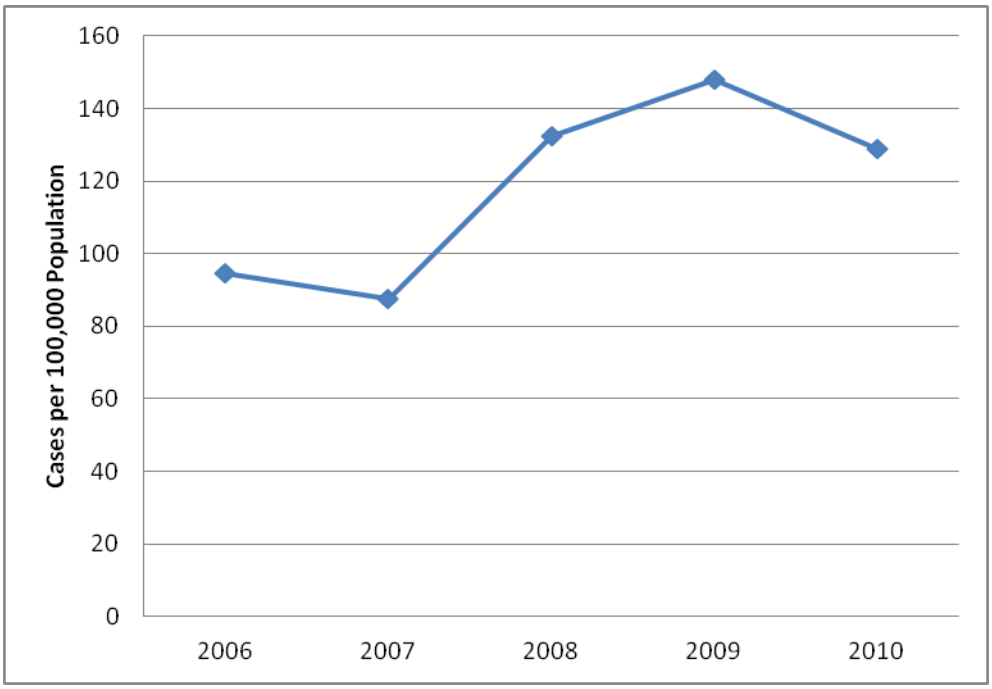
Hepatitis C

This disease is caused by infection with the hepatitis C virus (HCV). HCV infection sometimes results in an acute illness, but most often it becomes a chronic condition that can lead to liver cirrhosis and liver cancer. Many of these chronically ill persons are not sick and are not even aware of their infection. However, these asymptomatic infected persons serve as a source of transmission to others. Infection occurs through contact with the blood of an infected person, primarily through sharing contaminated needles. Infection also can occur in newborns during birth to a mother with hepatitis C.

HCV infection is the most common chronic bloodborne infection in the United States, with an estimated 3.2 million chronically infected people[1,2]. Figure 5.6 shows the 5-year trend of chronic hepatitis C in New Mexico. The true number and population rate of Hepatitis C is unknown because of asymptomatic infections and under-reporting. In fact, acute hepatitis C is rarely identified or reported because most newly infected cases are asymptomatic. While most infected people do develop chronic infection, about 15%–25% clear the virus from their bodies without treatment and never develop chronic infection.

Previously, prior to widespread screening of blood which began in 1992, blood transfusions and organ transplants were also sources of infection. There is no vaccine for hepatitis C, although there is treatment and approximately 40% of people with HCV can rid their bodies of this virus[3]. Chronic liver disease due to HCV infection typically progresses slowly--often without any signs or symptoms--for several decades.

Figure 5.6 Chronic Hepatitis C Virus Rates, New Mexico, 2006-2010



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[1] CDC. Recommendations for Prevention and Control of Hepatitis C Virus (HCV) Infection and HCV-Related Chronic Disease. Available at: http://www.cdc.gov/mmwr/PDF/RR/RR4719.pdf Retrieved December 13, 2011.

[2] Armstrong GL, Wasley AM, Simard EP, et al. The Prevalence of Hepatitis C Virus Infection in the United States, 1999 through 2002. Ann Intern Med 2006;144:705–14.

[3] CDC. Surveillance for Acute Viral Hepatitis—United States, 2007. MMWR 2009; 58 (SS-3):8-9.

CHAPTER 6: RESPIRATORY INFECTIONS

Highlights

- Coccidioidomycosis, legionellosis, and tuberculosis are all respiratory diseases of importance in New Mexico. Coccidioidomycosis is a fungal infection while the other two diseases are caused by bacterial infection. Despite the relatively low incidence of these diseases, they present unique public health challenges for New Mexico.

- Coccidioidomycosis occurs in the southwestern United States, parts of Mexico and South America. It is a reportable disease in states where the disease is endemic, such as California, New Mexico, Arizona, and Nevada.

- Legionellosis is important to detect and report because multiple people may be exposed to the same source of contaminated aerosolized water.

- Tuberculosis is especially serious for people with other infections, such as HIV. Worldwide, tuberculosis is one of the leading causes of death among people coinfected with HIV.

Coccidioidomycosis

Coccidioidomycosis ("Valley Fever"), is caused by infection with the *Coccidioides* fungal species. Infection is caused by inhaling the fungal spores which are in the topsoil of semiarid areas, including the southwestern United States. This disease is not spread person to person or from animals to people. The majority of people infected with *Coccidioides* have no symptoms and infection leads to lifelong immunity[1,2]. Some people who develop symptoms 1-3 weeks after exposure have a flu-like illness, with fever, cough, headache, rash, and muscle aches. Most people recover within weeks to months but a small number of people may develop chronic pulmonary infection or widespread disseminated infection affecting the skin, brain, bones and/or joints. Older persons, young children, pregnant women, and immunocompromised individuals are at increased risk for severe disease. Some people recover without treatment. For people with more severe infections, treatment with antifungal drugs is necessary. These include people with bilateral or chronic pneumonia or disseminated disease.

During 2006 to 2010, New Mexico had an average of 36 cases of coccidioidomycosis reported each year. However, the number of reported cases varied considerably during the past five years, ranging from 22 cases in 2006 to 54 cases in 2010. This may reflect the level of dust particles in the air, due to construction or climatic events, which influences the exposure to the spores causing infection; however, other factors may also contribute to variability of detected and reported cases.

References

[1] American Academy of Pediatrics. Coccidioidomycosis. In: Pickering LK Ed. Red Book: 2009 Report of the Committee on Infectious Diseases. 28th Edition. Elk Grove Village, IL: American Academy of Pediatrics, 2009.

[2] Centers for Disease Control and Prevention (CDC), Division of Bacterial and Mycotic Diseases. Coccidioidomycosis. Available at: www.cdc.gov/nczved/divisions/dfbmd/diseases/coccidioidomycosis Retrieved December 13, 2011.

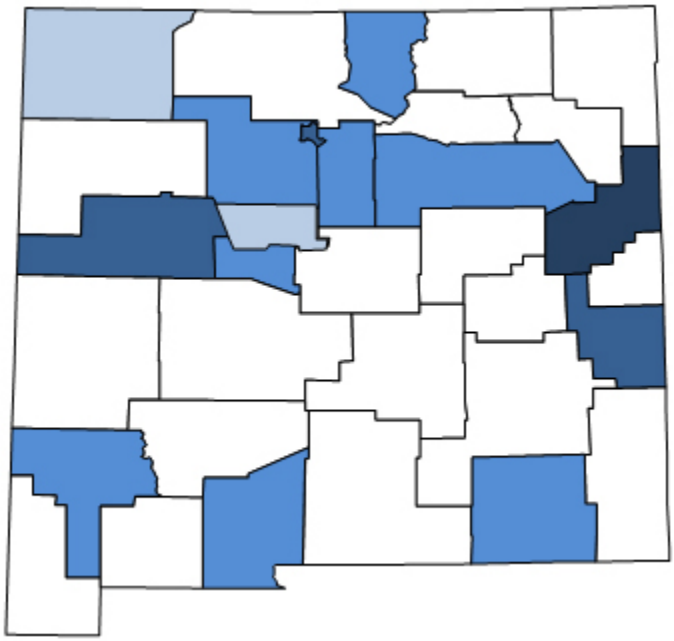
Legionellosis

Legionnaires' disease, also called legionellosis, is an infection caused by the bacterium *Legionella pneumophila*[1]. Infection occurs by inhalation of a water aerosol containing the bacteria, which is found in warm freshwater environments. Contaminated sources of water aerosols include showers, spas, whirlpools, and fountains. Person to person transmission does not occur. Symptoms of cough, fatigue, high fever, headache and muscle aches can appear between 2 to 14 days after exposure. Severe infections lead to pneumonia and death may occur in 5%–30% of Legionnaires' cases[2]. Older people, smokers, people with chronic lung disease or weakened immune systems are more likely to become sick after an exposure. Pontiac fever, a less severe form of legionellosis, is a flu-like illness without pneumonia that occurs within a few hours to two days after an exposure and resolves spontaneously. People with the milder form of legionellosis may recover without treatment. However, for those with pneumonia, antimicrobial medications and sometimes hospitalization are required.

The CDC estimates that between 8,000 and 18,000 people are hospitalized with Legionnaires' disease in the United States each year[2]. Many infections are not diagnosed or reported; therefore, this number may be higher. In 2011, New Mexico and other states began conducting active surveillance for Legionnaires' disease. This will improve the capacity for detecting this disease throughout the United States.

More illness is usually found in the summer and early fall, but infection can occur any time of year. During 2006-2010, the legionellosis rate in the United States averaged one case per 100,000 population while New Mexico's rate was less than half the United States rate. During 2006–2010, 45 cases of Legionnaires' disease were reported in New Mexico, with an average of 9 people infected each year, and a rate of 0.45 per 100,000 population. Over half (64%) of the cases were men. Cases ranged from 20 to 87 years of age and about half of the cases occurred in people 40-59 years of age. Cases occurred in 14 counties throughout the state as shown in Figure 6.1. Many cases had pre-existing illness, including cancer and diabetes. All but two cases were hospitalized for their illness and there were five deaths.

Figure 6.1 Rates of Legionnaires' Disease by County, New Mexico, 2006–2010



County	Cases	2006–2010 Rate
San Juan	2	0.31
Bernalillo	15	0.46
Valencia	2	0.54
Taos	1	0.61
Sandoval	4	0.64
Grant	1	0.67
San Miguel	1	0.68
Doña Ana	7	0.69
Santa Fe	5	0.71
Eddy	2	0.76
Roosevelt	1	1.03
Los Alamos	1	1.11
Cibola	2	1.47
Quay	1	2.22
Total	45	0.45

References

[1] Heymann DL. Editor. Control of Communicable Diseases Manual 19th Edition. Washington DC: American Public Health Association, 2008.

[2] Centers for Disease Control and Prevention (CDC). Increasing Incidence of Legionellosis in the United States, 2000-2009. MMWR 2011;60:1083-1086.

Tuberculosis

Tuberculosis (TB) infection is caused by the *Mycobacterium tuberculosis* bacteria. TB is spread through the air from one person to another. The TB bacteria are expelled into the air when a person with active TB disease of the lungs or throat coughs, sneezes, speaks, or sings. People nearby may breathe in these bacteria and become infected. TB usually infects the lungs, but also can infect other parts of the body such as the kidney, spine, and brain. If not treated properly, it can be fatal. However, not everyone infected with TB bacteria becomes sick. As a result, two TB-related conditions exist: latent TB infection and active TB disease.

Some infected people have latent TB infection with no illness. Most people who breathe in TB bacteria are able to fight the infection. These people with latent TB infection do not feel sick and do not have any symptoms. The only sign of latent TB infection is a positive reaction to the tuberculin skin test or the Interferon Gamma Release Assay (IGRA) blood test. People with latent TB infection are not infectious and cannot spread TB bacteria to others. Many people who have latent TB infection never develop TB disease. However, if latent TB bacteria become active in the body and multiply, the person will become ill with TB disease. TB bacteria can become resistant to the medications used to treat TB disease.

TB bacteria become active if the immune system can't stop them from growing. When TB bacteria are active (i.e., multiplying in the body), this is referred to as TB disease. People with TB disease may spread the bacteria to household contacts or others they spend time with daily. Some people develop TB disease within weeks after becoming infected before their immune system can fight the TB bacteria. Other people may get sick years later, when their immune system becomes weak for another reason. For persons whose immune systems are weak, especially those with HIV infection, the risk of developing TB disease is much higher than for persons with normal immune systems

TB in New Mexico and the United States

In 2010, the number of TB cases reported (11,182) and rate (3.6 per 100,000 population) both decreased in the United States. This represented decreases of 3% and almost 4%, respectively, compared to 2009. TB case rates vary by factors such as age, race and ethnicity, and country of origin. In 2010, 60% of TB cases occurred in foreign born persons and foreign born persons have accounted for most of TB cases in the United States every year since 2001. Moreover, the case rate among foreign born persons in 2010 was approximately 11 times higher than among United States born persons.

In 2010, the number of TB cases reported for New Mexico (50) and rate (2 per 100,000 population) has remained relatively stable (Figure 6.2). As shown in Figure 6.3, racial and ethnic minorities which were 57% of New Mexico population accounted for 94% of total TB cases. Nationwide TB deaths decreased by 7%, from 590 deaths in 2008 to 547 deaths in 2009 after a small increase from 554 deaths in 2007. For the years 2007- 2009 New Mexico had a TB mortality rate of almost 16%.

Figure 6.2 Tuberculosis Rates, New Mexico and the United States, 2006-2010

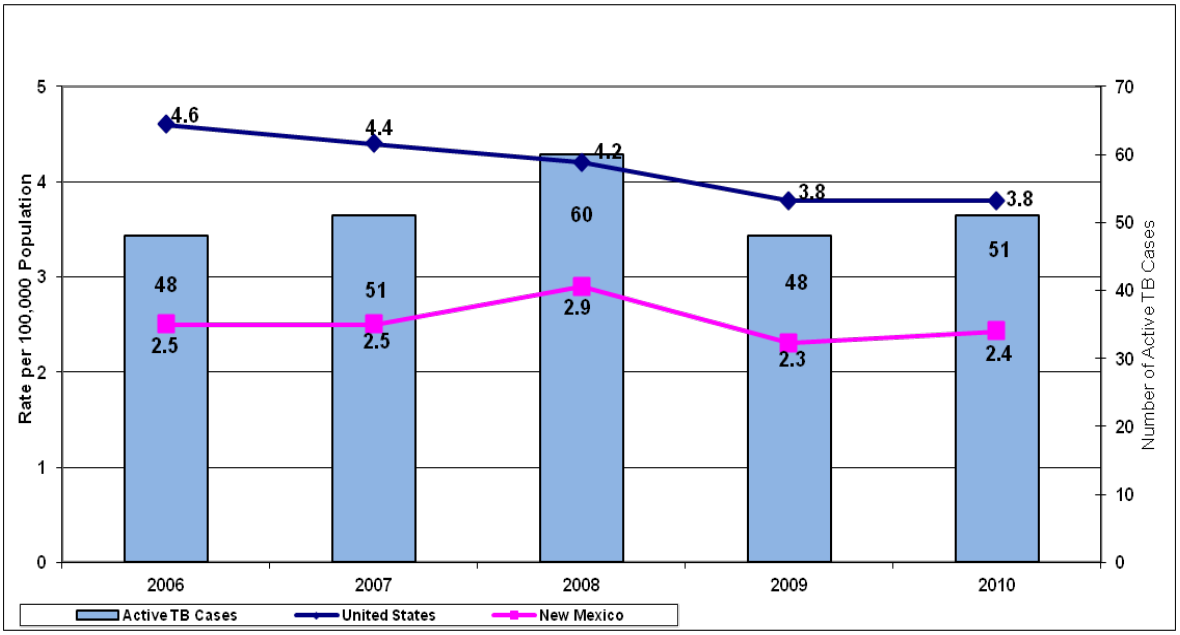
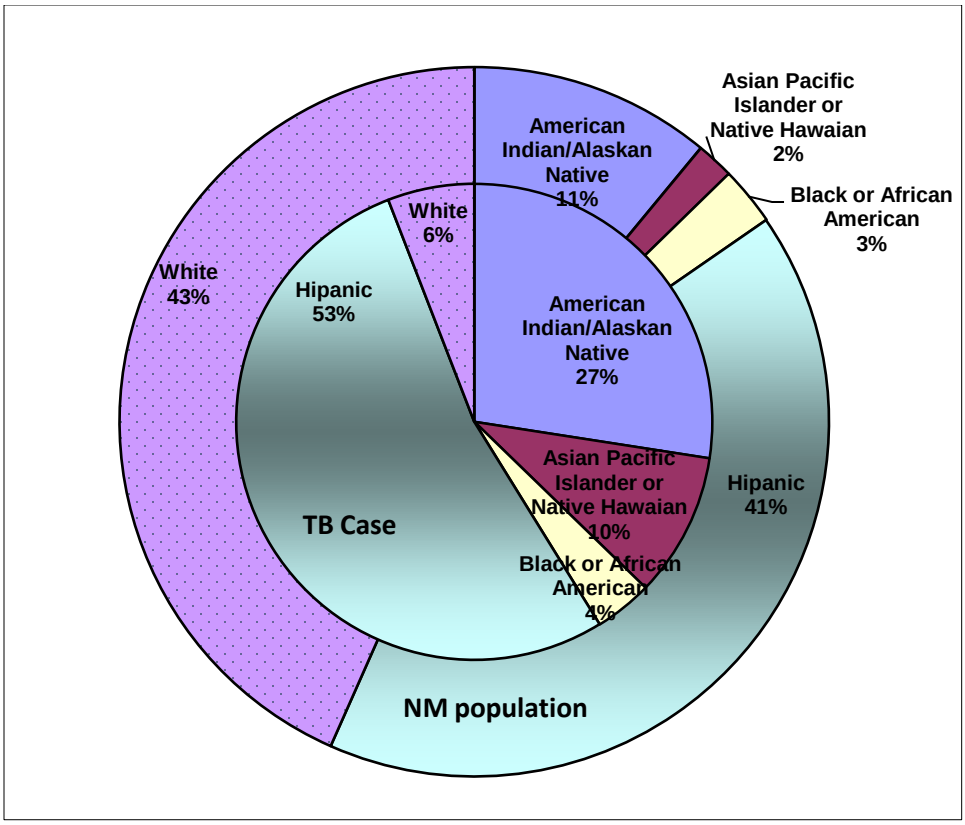


Figure 6.3 Tuberculosis by Race and Ethnicity, New Mexico, 2010



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[1] Centers for Disease Control and Prevention (CDC). Reported Tuberculosis in the United States: 2010. Available at: http://www.cdc.gov/tb/statistics/reports/2010/default.htm Retrieved December 13, 2011.

[2] CDC. Basic TB Facts. Available at: http://www.cdc.gov/tb/topic/basics/default.htm Retrieved December 13, 2011.

APPENDIX A: METHODS

Standard Council of State and Territorial Epidemiologists (CSTE) case definitions are used by NMDOH to classify the infectious diseases in this report. Incidence rates were calculated for each 12 month calendar period of January 1 through December 31 and displayed as numbers of cases per 100,000 population. The numerators represent the number of reported cases that were confirmed or, for some diseases, the number of confirmed plus probable cases. The data source used numerators for New Mexico cases was the New Mexico National Electronic Data Surveillance System (NMEDSS). All data are considered provisional.

New Mexico denominators were based on population estimates from 2006-2009 from the Bureau of Business and Economic Research (BBER), University of New Mexico. Because 2010 population counts were not available at the time of this report, the 2009 population was used for 2010 denominators. For influenza rates, denominators were based on 2007 (for the 2007-2008 season), 2008 (for the 2008-2009 season) and 2009 (for the 2009-2010 season) population estimates. All data are considered provisional.

The United States incidence rates were obtained from the Centers for Disease Control and Prevention (CDC) Summary of notifiable diseases – United States, 2010. For some conditions, there were no 2010 data available at the time of this publication. All data are considered provisional.

Maps of zoonotic diseases were based on data collected through the Zoonoses Program, New Mexico Department of Health.

APPENDIX B: GLOSSARY

Aerosol	Small solid or liquid particles suspended in air.
Agent	Microorganism or other factor whose presence is essential for causing disease.
Anorexia	Loss of appetite.
Antigenic	Having the properties of an antigen (substance capable of inducing a specific immune response).
Arthralgia	Joint pain.
Arthritis	Disorders marked by inflammation, degeneration, or metabolic derangement of the connective tissue structures of the body, especially the joints and related structures, including muscles, bursae, tendons, and fibrous tissue.
Asymptomatic	Person who is infected but not ill.
Bacteremia	Bacteria in the blood.
Blood borne	Microorganisms present in blood that cause disease.
Bursae	Tiny fluid filled sacs around a joint.
Case	Person or animal identified as having a particular disease, infection, or condition under investigation.
Chancre	Painless ulceration occurring during early stages of syphilis.
Cellulitis	Acute, diffuse, spreading, edematous inflammation of the deep subcutaneous tissues and sometimes muscle, which may be associated with abscess formation.
Chronic	Long term or ongoing disease.
Cirrhosis	Scarring of the liver often associated with chronic liver disease.
Conjugate	Type of vaccination.
Colonization	Multiplication of an infectious agent inside the body.
Conjunctivitis	Inflammation of the conjunctiva (the delicate membrane that lines the eyelids).
Contagious	Disease that is transmitted by contact with an infected host.
Dementia	Loss of brain function that may be associated with disease.
Disseminated	Spread to other organ systems.
Ectopic	Pregnancy complication when embryo implants outside uterus.
Encapsulated	Protein coating on virus or bacterium.
Endocervix	Area of cervix opening into uterus.
Encephalitis	Inflammation of the brain.

Endemic	Disease or infectious agent usually in a population or geographical area at all times.
Endocarditis	Infection of the heart lining.
Enteric	Pertaining to the small intestine.
Epidemic	Greater number of cases in a defined population or geographical area than normal.
Epiglottitis	Cartilaginous structure at base of tongue.
Febrile	Fever associated with disease present.
Foodborne	Type of illness associated with eating contaminated food.
Gastrointestinal	Digestive system.
Genetic	Determined by heredity.
Hemolytic Uremic Syndrome	Disease characterized by microangiopathic hemolytic anemia, acute renal failure, and a low platelet count (thrombocytopenia).
Heptavalent	Type of vaccine.
Host	An animal or plant that harbors or nourishes another organism.
Hypotension	Low blood pressure.
Invasive	Disease that spreads to surrounding tissues in the body.
Immune Globulin	Made from human blood plasma to provide specific antibodies for person exposed to infectious agent.
Immunocompromised	Having an immune system that is not able to fight disease normally.
Impetigo	Skin infection.
Incidence	The number of new cases of a specific disease occurring in a population during a specified time period.
Incubation period	The interval of time between the infection and the onset of symptoms of disease.
Infectious	Organism (e.g., bacterium, virus) capable of producing infection or disease.
Intrapartum	Occurring during labor or delivery.
Invasive	Disease that spreads to surrounding body tissues.
Jaundice	Yellowing of skin, eyes, and mucous membranes often associated with disease.
Latent	A disease, not presently causing symptoms, which can emerge and cause illness.
Latency	Time between exposure and when symptoms present.
Lethargy	Mental or physical tiredness.
Lymphadenopathy	Disease of the lymph nodes.

Maculopapular	Both macular (characterized by the presence of macules (discolored spots on the skin that are not elevated above the surface) and papular (small, circumscribed, superficial, spots elevated above the skin surface).
Maculopapulovesicular	Macular (see above), papular (see above), and vesicular (vesicles (blisters) on the skin).
Malaise	A vague feeling of discomfort perceived by a person.
Meningitis	Inflammation of the meninges (the three membranes that envelope the brain and spinal cord: the dura mater, pia mater, and arachnoid).
Morbidity	The incidence or prevalence of a disease or of all diseases in a population.
Mortality	The incidence or prevalence of fatal disease or all disease fatalities in a population.
Mutation	Permanent change in gene DNA sequence.
Myalgia	Muscle pain.
Necrotizing fasciitis	Bacterial infection destroying skin, muscles, and underlying tissues.
Non-productive	Dry type of cough not producing phlegm.
Opportunistic infection	Organisms that do not typically cause disease except under specific circumstances (e.g., impaired immune response).
Osteomyelitis	Acute or chronic bone infection, usually caused by bacteria.
Otitis media	Middle ear infection.
Pandemic	A widespread epidemic of a disease.
Paralysis	Loss of muscle function sometimes accompanied by loss of sensation in affected area of body.
Paralytic	Loss of muscle function sometimes accompanied by sensory loss.
Parotitis	Salivary gland infection.
Pathogen	Any disease producing microorganism.
Pericarditis	Inflammation of pericardium (the two layers of the thin, sac-like membrane that surrounds the heart).
Pharynx	The part of the throat behind the mouth and nasal cavity.
Pneumonia	Lung infection.
Pneumonic	Disease in which there is extensive involvement of the lungs, and the pathogenic organisms are found in the sputum.
Prevalence	Existing number of cases in a population at a given time.
Prophylaxis	Measures taken to prevent disease.
Prosthesis	Artificial device replacing a missing body part.
Pruritis	Itching.
Rectum	Part of the bowel leading to the anus.

Reservoir	An alternate or passive host that is infected with pathogenic organisms but is not sick and serves as a source from which other individuals can be infected.
Rhinitis	Inflammation of the mucous membrane of the nose.
Risk factor	Anything that increases a person's chance of developing a disease.
Sepsis	Pathogenic microorganisms or their toxins in the blood or other body tissues.
Septic/Septicemia	Bacteria in blood.
Serologic testing	Testing of blood or other body fluids.
Serogroup	Group of bacteria containing a common antigen.
Serotype	Variation within a subspecies of bacteria or virus.
Sequelae	Pathologic condition resulting from disease or injury
Spores	Reproductive cell produced by fungi.
Stillbirth	Death of fetus while in the uterus.
Surveillance	On-going, systematic collection, analysis, and interpretation of heatlh data.
Symptomatic	Showing symptoms of disease or injury.
Transmission	The mechanism that infectious disease or pathogens spread from person-to-person.
Urethra	Tube leading from the bladder to excrete urine outside the body
Vector	Living carrier (often an insect) transferring an infective agent from one host to another.
Zoonoses	Animal diseases that may be transmitted to humans.

APPENDIX C: ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
CDC	Centers for Disease Control and Prevention
CRS	Congenital Rubella Syndrome
CSTE	Council of State and Territorial Epidemiologists
DTaP	Childhood vaccine for diphtheria, tetanus, and Pertussis
EIP	Emerging Infections Program
GAS	Group A streptococcus
GBS	Group B streptococcus
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HIV	Human Immunodeficiency Virus
HPS	Hantavirus Pulmonary Syndrome
HUS	Hemolytic uremic syndrome
ICP	Infection Control Practitioner
IGRA	Interferon Gamma Release Assay
ILI	Influenza-like illness
MMR	Measles, mumps and rubella vaccine
MMRV	Measles, mumps, rubella and varicella vaccine
NM	New Mexico
NMEDSS	New Mexico Electronic Data Surveillance System
NMDOH	New Mexico Department of Health
PHN	Public Health Nurse
P&S	Primary and secondary syphilis
RMSF	Rocky Mountain Spotted Fever
STEC	Shiga toxin-producing *E. coli*
STI	Sexually transmitted infection
STSS	Streptococcal toxic shock syndrome
TB	Tuberculosis
Tdap	Booster vaccine for Tetanus, Diphtheria, and Pertussis
US	United States
VZV	Varicella Zoster virus
WNV	West Nile Virus

APPENDIX D: NEW MEXICO NOTIFIABLE DISEASES

7.4.3.12 NEW MEXICO ADMINISTRATIVE CODE

ALL REPORTS MUST INCLUDE:

1. The disease or condition being reported;
2. Patient's name, date of birth/age, gender, race/ethnicity, address, telephone number, and occupation;
3. Physician or licensed healthcare professional (or laboratory) name and telephone number.

Laboratory or clinical samples for conditions marked with [*] are required to be sent to the Scientific Laboratory Division.

EMERGENCY REPORTING OF DISEASES OR CONDITIONS

The following diseases, confirmed or suspected, require **immediate reporting** by telephone to Epidemiology and Response Division at (505) 827-0006. If no answer, call 1-866-885-6485.

Infectious Diseases

Anthrax*	Measles	Rubella (including congenital)
Avian or novel influenza*	Meningococcal infections, invasive*	Severe Acute Respiratory Syndrome (SARS)*
Botulism (any type)*	Pertussis	Smallpox*
Cholera*	Plague*	Tularemia*
Diphtheria*	Poliomyelitis, paralytic and non-paralytic	Typhoid fever*
Haemophilus influenzae invasive infections*	Rabies	Yellow fever

Other Conditions

Suspected foodborne illness or conditions in two or more unrelated persons*	Illnesses or conditions suspected to be caused by the intentional or accidental release of biologic or chemical agents*	Severe smallpox vaccine reaction
Suspected waterborne illness or conditions in two or more unrelated persons*	Acute illnesses or conditions of any type involving large numbers of persons in the same geographic area	Other illnesses or conditions of public health significance

Infectious Diseases in Animals

Anthrax	Rabies
Plague	Tularemia

ROUTINE REPORTING OF DISEASES OR CONDITIONS

Infectious Diseases (Report case within 24 hours to Epidemiology and Response Division at 1-800-432-4404 or 505-827-0006; or contact the local health office)

Brucellosis	Hepatitis A, acute	Salmonellosis*
Campylobacter infections*	Hepatitis B, acute or chronic	Shigellosis*
Coccidioidomycosis	Hepatitis C, acute or chronic	St. Louis encephalitis infections
Colorado tick fever	Hepatitis E, acute	*Streptococcus pneumoniae* invasive infections*
Cryptosporidiosis	Influenza, laboratory confirmed hospitalization only	Tetanus
Cysticercosis	Legionnaires' disease	Trichinellosis
Cyclosporiasis	Leptospirosis	Toxic shock syndrome
E. coli 0157:H7 infections*	Listeriosis*	Varicella
E. coli , shiga-toxin producing (STEC) infections*	Lyme disease	*Vibrio* infections*
Encephalitis, other	Malaria	West Nile Virus infections
Giardiasis	Mumps	Western equine encephalitis infections
Group A streptococcal invasive infections*	Psittacosis	*Yersinia* infections*
Group B streptococcal invasive infections*	Q fever	
Hantavirus pulmonary syndrome	Relapsing fever	
Hemolytic uremic syndrome	Rocky Mountain spotted fever	

Infectious Diseases in Animals (Report case within 24 hours to Epidemiology and Response Division at 1-800-432-4404 or 505-827-0006; or contact the local health office).

Arboviral, other	Psittacosis
Brucellosis	West Nile Virus infections

Tuberculosis* or Other Nontuberculous Mycobacterial Infections (including *Mycobacterium avium* complex or leprosy)

Report suspect or confirmed cases within 24 hours to Tuberculosis Program, NM Department of Health, P.O. Box 26110, Santa Fe,

NM 87502-6110; or call 505-827-2474 or 505-827-2473.

Sexually Transmitted Diseases
Report to Infectious Disease Bureau - STD Program, NM Department of Health, P.O. Box 26110, Santa Fe, NM 87502-6110, Fax 505-476- 3638; or call 505-476-3636.

Chancroid
Chlamydia trachomatis infections
Gonorrhea
Syphilis

HIV (Human Immunodeficiency Virus) and AIDS (Acquired Immunodeficiency Syndrome).
Report to HIV and Hepatitis Epidemiology Program, 1190 St Francis Dr., N1350, Santa Fe, NM 87502, fax 505-476-3544 or call 505-476-3515.

HIV: (1) confirmed positive HIV antibody test (screening test plus confirmatory test), or (2) any test for HIV RNA or HIV cDNA ('viral load'), or (3) any test to detect HIV proteins, or (4) any positive HIV culture, or (5) any other test or condition indicative of HIV infection as defined by the United States Centers for Disease Control and Prevention.

AIDS: Opportunistic infections, cancers, CD4 lymphocyte count (<200 per μL or <14% of total lymphocytes), or any condition indicative of AIDS.

Occupational Illness and Injury
Report to Epidemiology and Response Division, NM Department of Health, P.O. Box 26110, Santa Fe, NM 87502-6110; or call 1-800-432-4404 or 505-827-0006.

Asbestosis
Chronic beryllium lung disease
Coal worker's pneumoconiosis
Heavy metal poisoning
Hypersensitivity pneumonitis
Mesothelioma
Noise induced hearing loss
Occupational asthma
Occupational pesticide poisoning
Silicosis
Other illnesses related to occupational exposure

Health Conditions Related to Environmental Exposures and Certain Injuries
Report to Epidemiology and Response Division, NM Department of Health, P.O. Box 26110, Santa Fe, NM 87502-6110; or call 1-800-432-4404 or 505-827-0006.

Environmental Exposures
Acetylcholinesterase (all blood levels)
All pesticide poisoning
Arsenic in urine greater than 50 micrograms/liter
Infant methemoglobinemia
Lead (all blood levels)
Mercury in urine greater than 3 micrograms/liter and/or
Mercury in blood greater than 5 micrograms/liter
Uranium in urine greater than 0.08ug/L

Other suspected environmentally-induced health conditions

Injuries
Drug overdose
Firearm injuries
Traumatic brain injuries

Adverse Vaccine Reactions
Report to Vaccine Adverse Events Reporting System, http://www.vaers.hhs.org. Send copy of report to Immunization Program Vaccine Manager, NM Department of Health, P.0. Box 26110, Santa Fe, NM 87502-6110; fax 505-827-1741.

Cancer
Report to NM DOH designee: New Mexico Tumor Registry, University of New Mexico School of Medicine, Albuquerque, NM 87131. Report all malignant and in situ neoplasms and all intracranial neoplasms, regardless of the tissue of origin.

Human Papillomavirus (HPV)
Report to NM DOH designee: Laboratories report the following tests to the New Mexico HPV Pap Registry, 1816 Sigma Chi Rd NE, Albuquerque, NM 87106, phone (505) 272-5785 or (505) 277-0266.

Papanicolaou test results (all results)
Cervical, vulvar and vaginal pathology results (all results)
HPV test results (all results)

Birth Defects and Congenital Hearing Loss
Report to Children's Medical Services, 2040 S. Pacheco, Santa Fe, NM 87505; or call 505-476-8868.

All birth defects diagnosed by age 4 years, including:
Defects diagnosed during pregnancy
Defects diagnosed on fetal deaths
Defects found in chromosome testing on amniotic fluid, chorionic villus sampling and products of conception for Trisomy 13, Trisomy 18 and Trisomy 21

Suspected or confirmed congenital hearing loss in one or both ears
All conditions identified through statewide newborn genetic screening

List of Notifiable Diseases/Conditions in New Mexico revised April 30, 2009

For details of 7.4.3.12 NMAC, see: http:www.nmcpr.state.nm.us/nmac/parts/title07/07.004.0003.htm