Epidemiology Report

NORTH DAKOTA DEPARTMENT of HEALTH

Oct – Nov – Dec 2007

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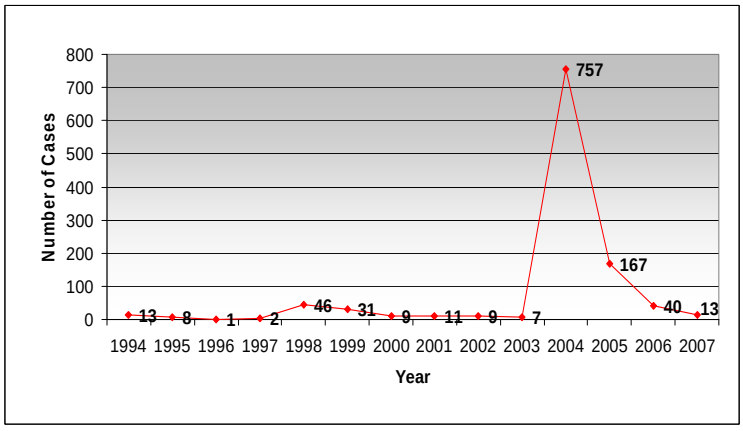
2007 Year in Review

Selected Vaccine-Preventable Disease Surveillance 2007

Pertussis

Preliminary data indicates that 13 cases of pertussis were reported from eight counties in 2007, two of which were hospitalized. In comparison, 40 cases of pertussis were reported in 2006 and 167 cases in 2005. **(Figure 1)**

Figure 1. Pertussis Cases by Year, North Dakota, 1995-2007.*



*Preliminary data. Data may change pending investigation.

Mumps

In 2007, three cases of mumps were reported in North Dakota in two counties, compared to 14 cases reported in 2006. The cases were not epidemiologically linked.

Chickenpox

Preliminary data for 2007 estimates 141 cases of chickenpox were reported in North Dakota, compared to 115 reported in 2006. Although health-care providers, schools, day cares and local pubic health units are mandated to report all cases of chickenpox to the North Dakota Department of Health (NDDoH), chickenpox continues to be under-reported in North Dakota.

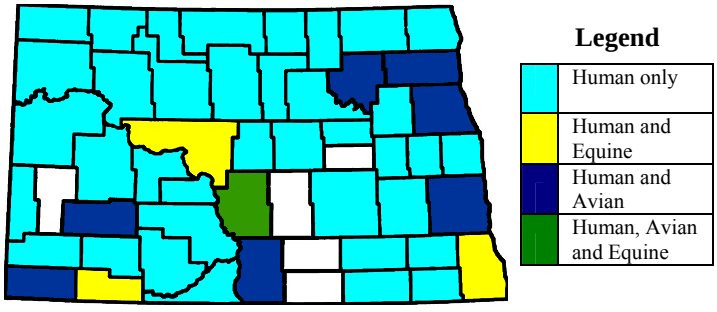
Neisseria meningitidis

In 2007, two cases of meningococcal disease were reported and laboratory confirmed in North Dakota, compared to four cases reported in 2006.

West Nile Virus Summary

On June 1, 2007, the NDDoH West Nile virus (WNV) surveillance program initiated its sixth season of human arboviral surveillance. In 2007, the Division of Laboratory Services conducted WNV testing on 2,220 human samples. Three-hundred sixty-nine positive human cases from 48 counties were reported. **(Figure 2)**

Figure 2. WNV Positive Human, Avian (sentinel and dead bird) and Equine Cases by County, North Dakota, 2007.



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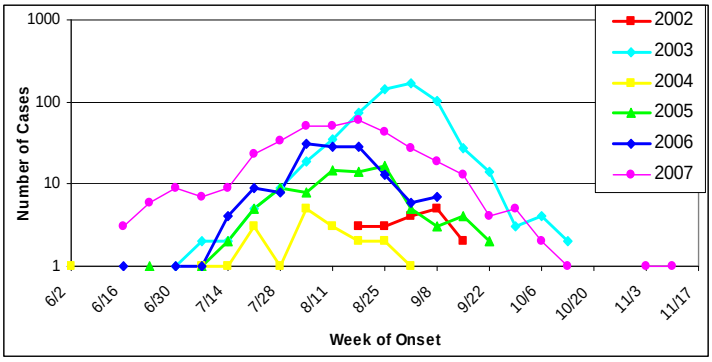
EQUAL OPPORTUNITY EMPLOYER.

Of the 369 reported cases, 49 (13 percent) met the case definition of West Nile encephalitis/meningitis, with the remaining 320 (87 percent) cases classified as West Nile fever. Eighty-six of the 369 cases were hospitalized, of which three were fatal. Two symptomatic and 22 asymptomatic North Dakota blood donors were identified with WNV in 2007. The peak of illness onset occurred during the week ending Aug. 18, 2007. This peak was about two weeks later than in 2006, when the peak illness occurred during the week ending Aug. 5, 2006. **(Figure 3)**

The North Dakota Veterinary Diagnostic Laboratory (NDVDL) tested 18 horses for WNV infection. Of the 18 samples submitted, four (22 percent) tested positive from four counties. **(Figure 2)** In 2007, 18 dead birds were collected and sent to the NDVDL for WNV testing. Of those, 10 tested positive from five counties. In addition to dead bird testing, 314 sentinel chicken serums were sent to the NDVDL for WNV testing. Five chicken serums from three counties tested positive for WNV. **(Figure 2)**

Figure 3. WNV Cases by Date of Onset, North Dakota, 2002-2007.



Statewide mosquito monitoring was conducted weekly from June through August using 100 New Jersey light traps stationed around the state. Female *Culex tarsalis* counts peaked the third week in July, one month prior to the peak of human WNV illness onset. In addition, 73 mosquito pools were tested for WNV by Grand Forks Public Health and the Division of Laboratory Services, with seven pools testing positive (Burleigh County, 4; Grand Forks County, 3).

For more information about WNV and surveillance, visit the NDDoH website at Hwww.ndhealth.gov/wnv.

Rabies

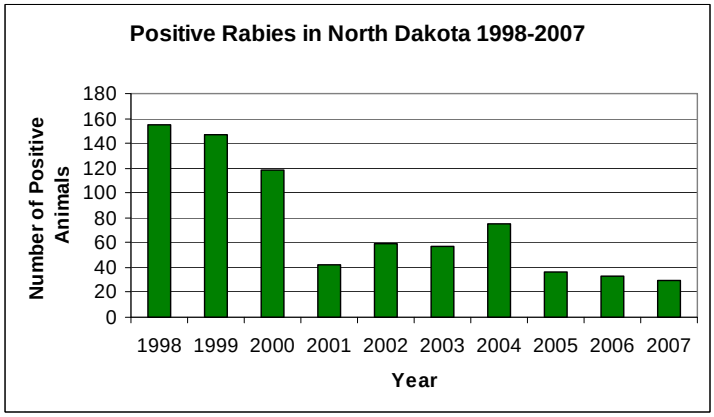
In 2007, 347 animals were tested for rabies in North Dakota. Thirty (9.5 percent) tested positive. This is a slight decrease in both testing and positive animals from 2006. (**Table 1)** The skunk rabies virus is the major variant seen in North Dakota. The number of animals that tested positive for rabies in North Dakota in 2007 was the lowest in 10 years. (**Figure 4**) This does not necessarily indicate a decrease in incidence of animal rabies. The NDDoH only reports laboratory-confirmed cases of rabies. Many cases of rabies may occur and be unobserved and therefore untested, particularly in wild populations.

Table 1. Positive Rabies Cases by Animal, North Dakota, 2006-2007.

Animal Type	Number Positive	
	2007	2006
Bat	2	1
Cat	4	5
Cow	2	5
Dog	7	4
Goat	1	0
Horse	2	0
Raccoon	1	0
Skunk	11	18
Total	30	33

The NDDoH Division of Laboratory Services provides free animal rabies testing if human exposure to the animal has occurred. If more than one animal is involved, there may be charges. An exposure is defined as a bite that breaks the skin or saliva that comes in contact with an open cut, sore or wound, or to a mucous membrane such as the mouth, nose or eyes. Call the NDDoH at 701.328.2378 or 800.472.2180 for consultation about animal exposure.

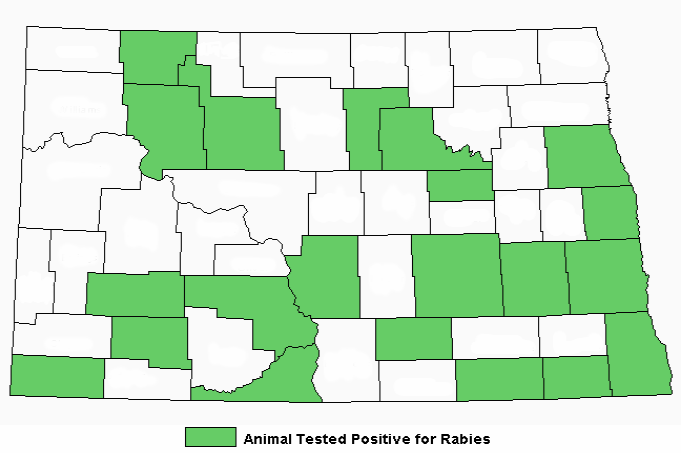
Figure 4. Positive Animals Rabies Cases by Year, North Dakota, 1998-2007.



If the animal has not caused a potential human exposure and testing is desired, the animal must be submitted to the North Dakota State University Veterinary Diagnostic Laboratory for testing. A fee will be charged.

Animals tested positive for rabies from the following counties; Barnes, Benson, Bowman, Burke, Burleigh, Cass, Dickey, Eddy, Grand Forks, Hettinger, Logan, Morton, Mountrail, Pierce, Richland, Sargent, Sioux, Stark, Stutsman, Traill and Ward. **(Figure 5)** Animals were submitted for rabies testing from all counties except Billings, Divide, LaMoure, Slope and Steele.

Figure 5. Positive Animals Rabies Cases by County, North Dakota, 2007.

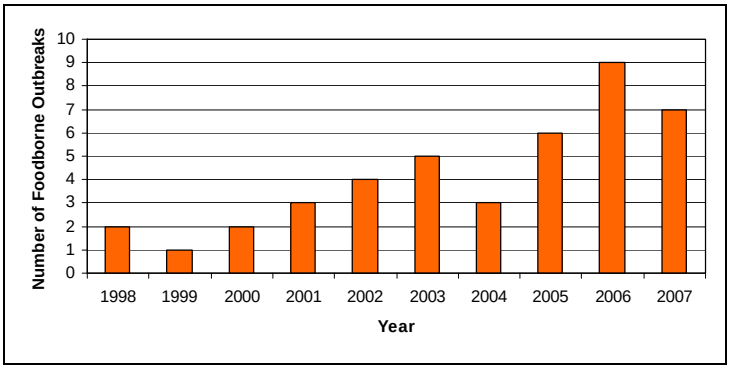


Foodborne Gastroenteritis Outbreaks

In 2007, the NDDoH investigated seven foodborne gastroenteritis outbreaks. Six of the seven outbreaks were laboratory-confirmed (three norovirus, two *Salmonella*, one shiga-toxin *E. coli*). **Table 2**

The number of foodborne gastroenteritis investigated by the NDDoH each year of the past 10 years range from one to nine (5-year median = 5). **(Figure 6)** More than 50 percent of laboratory-confirmed outbreaks in North Dakota are caused by norovirus, most often associated with cross contamination by sick food handlers.

Figure 6. Number of Foodborne Gastroenteritis Outbreaks, North Dakota, 1998-2007.



Collecting stool specimens and timely reporting to public health authorities are important in identifying and preventing further spread of illness. To report gastroenteritis outbreaks, call the NDDoH at 701.328.2378 or toll free at 800.472.2180.

STD UPDATE NEW!

Change in Health Department-Assisted Partner Notification for Chlamydial Infections

Effective clinical management of patients with treatable sexually transmitted diseases (STDs) requires treatment of the patients' current sexual partners to prevent reinfection. The standard approach to partner treatment in North Dakota has included clinical evaluation in a health-care setting, with partner notification accomplished by the provider or by NDDoH field epidemiologists. Although this is considered the optimal strategy for partner treatment, resource limitations within the NDDoH will no longer allow for the health department-assisted approach in North Dakota, especially given the nearly 2,000 STDs reported to the NDDoH each year. As a result, beginning Jan. 1, 2008, the STD Program implemented changes to **chlamydia** follow-up and partner notification. Please note that current investigation and partner notification practices will remain unchanged for complicated chlamydia cases and all cases of gonorrhea and syphilis.

In cases of uncomplicated* chlamydia infections, the **NDDoH will no longer interview the patient nor conduct partner notification**. However, the NDDoH will follow-up with the diagnosing health-care provider to verify the following information:

- Current demographics and contact information
- Appropriate treatment (i.e., drug, dosage, duration) of the patient
- Pregnancy status of the patient
- Complications (i.e., pelvic inflammatory disease), if present

Since the NDDoH will no longer interview the patient nor conduct partner notification, **health-care providers** should do one of the following:

- Conduct partner notification or
- Counsel the patient to refer his/her recent partners (within the last three months) for clinical evaluation

In all cases of chlamydia, educational materials regarding chlamydia should be made available to the patient, and the patient should be instructed to abstain from sexual intercourse for seven days after single-dose therapy or until completion of a seven-day regimen **and** until all recent partners have been treated. In addition, providers should advise all females with chlamydial infection to be retested approximately **three months** after treatment.

*Uncomplicated chlamydial infections are defined as infections occurring in individuals who (1) are ≥14 years of age, (2) are not pregnant, **and** (3) have no complications such as pelvic inflammatory disease, ectopic pregnancy, etc.

Significant Disease Control Investigations

Ciprofloxacin-Resistant *Neisseria meningitidis* in North Dakota – First Ever Reported in the United States

In January 2007, a case of *Neisseria meningitidis* group B occurred in a Cass County resident. The case presented with high fever and petechial rash, was hospitalized and treated with intravenous rocephin. The case recovered.

The North Dakota Department of Health's Division of Laboratory Services found the case to be resistant to ciprofloxacin. The Centers for Disease Control and Prevention (CDC) confirmed these laboratory results. Close contacts to this case who were originally prescribed ciprofloxacin were notified and placed on other appropriate antibiotics. Rifampicin is commonly used as chemoprophylaxis to eradicate meningococcal carriage. However, there is a tendancy to replace rifampicin by ciprofloxacin in adults, because rifampicin requires twice-daily administration for two days in comparison to a single dose of ciprofloxacin.[1] The following link contains information regarding chemoprophylaxis for meningococcal disease and updated recommendations for eastern North Dakota and western Minnesota: www.ndhealth.gov/Immunize/Documents/Disease/Chemoprophylaxis_of_Meningococcal.pdf.

This is the first case of ciprofloxacin-resistant *N. meningitidis* in the United States and the third case in the western hemisphere. DNA sequencing indicates that the isolate is similar to isolates sequenced in other countries. The first documented resistance to ciprofloxacin in *N. meningitidis* was reported in 1992 from Greece.[2] Five reports of sporadic instances of decreased susceptibility to ciprofloxacin have occurred recently: serogroup B from France in 1999 and Spain in 2002; serogroup C from Australia in 1998; serogroup Y from Argentina in 2002; and serogroup A from India in 2005.[3] The NDDoH is working with CDC to further investigate this case to determine its origin.

Meningococcal meningitis is spread by direct contact with respiratory droplets from the nose and mouth of infected people. The incubation period for meningococcal disease may range from one to 10 days, but usually occurs less than four days after exposure. Some people carry the bacteria in their nasal passages but do not get sick, yet they can still spread the bacteria to others. Prophylactic antibiotics will clear this carrier state. Meningococcal conjugate vaccine (Menactra®) is routinely recommended for adolescents ages 11 through 18 and others at high-risk, including college freshmen living in dormitories. The Food and Drug Administration recently approved the use of Menactra® in people as young as 2, so the vaccine is now licensed for people ages 2 through 55. The vaccine doesn't protect against Group B meningococcal disease. Beginning with the 2008-2009 school year, meningococcal vaccine will be required for middle school entry into North Dakota schools.

For more information about meningococcal disease, vaccination, or chemoprophylaxis, visit: www.cdc.gov/mmwr/preview/mmwrhtml/rr5407a1.htm.

References:
1. Corso, Alejandra, Et al. Emergence of *Neisseria meningitidis* with decreased susceptibility to ciprofloxacin in Argentina. *Journal of Antimicrobial Chemotherapy*. 2005;22:596-597.
2. Mehta, Geeta, Goyal, Renu. Emerging fluoroquinolone resistance in *Neisseria meningitidis* in India: cause for concern. *Journal of Antimicrobial Chemotherapy*. 2007;59:329-330.
3. Singhal, Smita, Et al. Ciprofloxacin-Resistant *Neisseria meningitidis*, Delhi, India. *Emerging Infectious Diseases*. 2007;13(10):1614-1616.

Salmonella Infections Associated With Baby Chickens

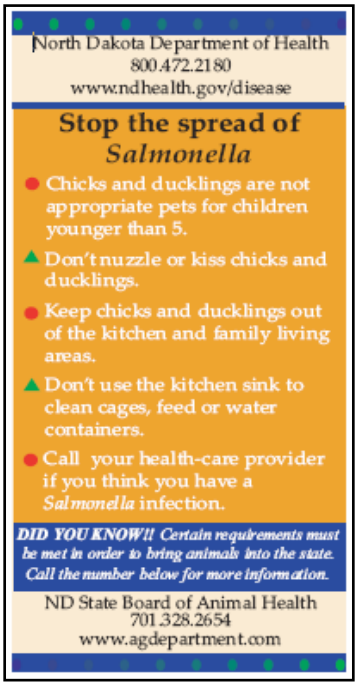
During May through September 2007, the NDDoH investigated seven cases of salmonellosis caused by *Salmonella* Montevideo. Exposures in all cases were traced to chickens purchased from mail-order chicken hatcheries, primarily two hatcheries in Iowa, and from local farm supply stores. Three cases were child siblings that were hospitalized with salmonella septicemia. Environmental isolates from a bird enclosure at the children's residence are consistent with the strain causing human illnesses.

The siblings became symptomatic with diarrhea, vomiting and abdominal cramps. No fever was noted. One child was taken to a doctor and tested approximately five days following onset and was admitted to the hospital the next day. A blood specimen was positive for *Salmonella* Montevideo. The patient was treated with ceftriaxone. Shortly following the patient's admission to the hospital, the health of the other two siblings began to deteriorate and they, too, were hospitalized. Symptoms upon admission resembled those of the first child as diarrhea, vomiting, abdominal cramps and absence of fever. One stool and one blood from these siblings tested positive for *S.* Montevideo, and they also were treated with ceftriaxone. The length of hospital stay among the three siblings ranged from eight to 10 days. The birds were purchased from a mail-order hatchery in Iowa and arrived with proper health certificate documentation. It was reported by the parents that the children were allowed to play with the baby chickens in an outdoor pen located on their property. The parents of the children stated they were

unaware that contact with baby chickens put their children at risk for salmonellosis.

Cases of salmonella related to handling baby chickens have been reported from several states and can be serious. On a national level, two ongoing multi-state outbreaks of *Salmonella* Montevideo infections associated with exposure to mail-ordered poultry are underway involving several hatcheries in multiple states. Environmental isolates from bird enclosures at a patient's residence and tested at one hatchery are consistent with the strain causing human illnesses.

Salmonella infections from live poultry contact are a public health problem. The NDDoH and the North Dakota Board of Animal Health with the Department of Agriculture have worked to develop educational materials and posters for distribution to the public and farm supply and agricultural feed stores in the state. These materials will be available in spring 2008.



For additional information about proper handling of chicks and ducklings to prevent salmonella infection, visit www.cdc.gov/healthypets/animals/birds.htm. To report a case of salmonella to the NDDoH, call 800.472.2180 or 701.328.2378.

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MRSA in Animals

Recently, the NDDoH has received several questions about the association between humans and animals, primarily pigs, and the possibility of transmission of MRSA. Although studies have shown a link between animals and humans and the transmission of MRSA, some limitations in the literature and how it may directly apply to hog farms in the U.S. should be noted.

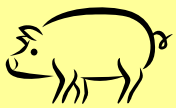
One study indicates that an animal reservoir is responsible for greater than 20 percent of all MRSA in the Netherlands[1]. The Netherlands has a no-tolerance policy for MRSA; therefore, to find any MRSA in the Netherlands is surprising and may result in what seems to be a high percentage. Another important note is the study was done on small number of isolates (35 cases and 76 controls) and may not be representative of the total population.

The strain of MRSA named ST398 strain has been found to originate in livestock (both pigs and cattle) and can cause colonization and sometimes infection in humans[1]. The highest risk of transmission of ST398 is direct contact between livestock and farmers. Further spread of ST398 into the community from the workers has not been established[2]. A similar study in Ontario found both hospital-acquired MRSA strains and the ST398 strain colonizing in humans and pigs[3]. This indicates that transmission of MRSA is bi-directional; from humans to animals and vise versa.

According to CDC, no reported outbreaks of MRSA in pigs and/or farmers have been reported in the U.S. Furthermore, no isolates commonly associated with pigs have been found in humans. The highest risk of MRSA exposure in the U.S. is still human-to-human contact.

1. van Loo I, et al. Emergence of methicillin-resistant *Staphylococcus aureus* of animal origin in humans. Emerg Infect Dis. 2007 Dec [*January 31, 2008*]. Available from http://www.cdc.gov/EID/content/13/12/1834.htm
2. Armand-Lefevre, et al. Colonal comparison of *Staphylococcus aureus* isolates from healthy pig farmers, human controls, and pigs. Emerg Infect Dis. 2005 May [*December 20, 2007*]. Available from http://www.cdc.gov/ncidod/EID/vol11no05/04-0866.htm
3. Khanna, T. et.al. (2007). Methicillin-resistant *Staphylococcus aureus* colonization in pigs and pig farmers. Veterinary mcirobiology, 3851, 6 p.

For more information about MRSA in animals, please see the following links:



CDC Emerging Infectious Diseases:
Hwww.cdc.gov/eid/content/13/12/1834.htm?s_cid=eid1834_e

CDC Emerging Infectious Diseases:
Hwww.cdc.gov/ncidod/EID/vol12no12/06-0231.htm

Iowa State College of Vet Medicine:
Hwww.cfsph.iastate.edu/Factsheets/pdfs/mrsa.pdf

Table 2. Foodborne Gastroenteritis Outbreaks in North Dakota, 2003 – 2007.

Date	County	Facility	Number Ill	Number Exposed	Suspected Food	Suspected Agent	Contributing Factors
6/2003	Ward	Restaurant/Golf Course	34	~ 70	Potato Salad	Norovirus	Cross contamination from food handler and/or between raw and cooked foods
7/2003	Burleigh	Processing plant	3	Unknown	Frozen ground beef patties	*E.coli* O157:H7	Unknown
10/2003	Grand Forks	Restaurant	14	Unknown	Unknown	*E.coli* O157:H7	Unknown
11/2003	Stark	Wedding	31	75 – 90	Unknown	Norovirus	Unknown
12/2003	Ward	Hotel Restaurant	24	57	Unknown	Probable food intoxication	Unknown
11/2004	Ward	Hotel Restaurant	15	43	Unknown	Unknown	Possible sick food handler
11/2004	Bottineau	Restaurant	11	32	Unknown	Unknown	Unknown
12/2004	Stark	Local meat store	2	12	Smoked turkey	Salmonella Newport	Inadequate cooking instructions/ under cooked
4/2005	Burleigh	Private Home	14	71	Unknown	Unknown	Unknown
5/2005	Stark	High School	52	249	Lettuce	Norovirus	Cross contamination from ill food handler
6/2005	Williams	Grocery Deli	15	Unknown	Rotisserie chicken/ Unknown	Salmonella Typhimurium	Unknown
6/2005	Cass	Hotel Restaurant	14	235	Unknown	Unknown	Unknown
7/2005	Ramsey	private home	5	14	Unknown	Unknown	Unknown
8/2005	Burleigh	Unknown	11	Unknown	Unknown	*E.coli* O157:H7	Unknown
1/2006	Ward	Hotel Restaurant	48	73	Unknown	Norovirus	Ill food handlers
4/2006	Cass	Golf Course Restaurant	27	62	Chicken	Norovirus	Possible environmental contamination
4/2006	Morton	Restaurant	10	25	Unknown	Unknown	Unknown
6/2006	Burleigh	Restaurant and Catering	36	Unknown	Fresh fruit	Norovirus	Ill food handlers
6/2006	Out-of-state	Hotel Restaurant	(4 ND) 25	Unknown	Unknown	Norovirus	Possible ill food handlers
8/2006	Bowman	Construction work site	11	60	Possible water	Unknown	Suspect contamination of water coolers
9//2006	Burleigh	Private picnic	21	65	Unknown	Unknown	Unknown
10/2006	Ward	private home	16	20	Unknown	Norovirus	Unknown
10//2006	Nelson	Restaurant	26	100	Unknown	Norovirus	Ill food handlers
1/2007	Multi-state	Private home	3	Unknown	Peanut butter	Salmonella Tennessee	Environmental contamination at production plant
3/2007	Grand Forks	Church	Unknown	Unknown	Suspected ground beef	Possible toxin	Temp abuse and improper reheating of ground beef
3//2007	Dickey	Restaurant	16	Unknown	Unknown	Norovirus	Unknown
6/2007	Stutsman	Picnic/Park	7	70	Unknown	Salmonella Newport	Unknown
6/2007	Ward	Private home	23	50	Suspected ground beef	STEC O111:nonmotile	Temp abuse and improper reheating of ground beef
9/2007	Cass	School	7	11	Homemade cookies	Norovirus	Cross-contamination at home from ill food handlers
9/2007	Burleigh	Restaurant/ wedding reception	29	63	Unknown	Norovirus	Unknown

Summary of Selected Reportable Conditions					
North Dakota, 2006-2007					
Reportable Condition	**Oct-Dec 2007***	**January -Dec 2007***		**Oct-Dec 2006**	**January -Dec 2006**
Campylobacteriosis	13	92		7	88
Chlamydia	526	1,801		470	1,830
Cryptosporidiosis	7	78		1	20
E. coli, shiga toxin positive (non-O157)	0	13		1	9
E. coli O157:H7	2	13		0	9
Enterococcus, Vancomycin-resistant (VRE)	54	254		44	210
Giardiasis	18	55		11	38
Gonorrhea	28	119		54	154
Haemophilus influenzae (invasive)	3	6		5	11
Hantavirus	0	0		1	2
Acute Hepatitis A	0	1		0	3
Acute Hepatitis B	1	2		0	1
Acute Hepatitis C	0	0		0	0
HIV/AIDS[1]	9	26		10	25
Legionellosis	0	3		1	1
Listeria	0	0		0	1
Lyme Disease	0	3		1	7
Malaria	3	4		1	2
Meningitis, bacterial[2] (non meningococcal)	1	2		1	2
Meningococcal disease[3]	0	2		0	4
Mumps	0	3		0	14
Pertussis	4	17		8	43
Q fever	1	1		0	0
Rabies (animal)	6	30		10	33
Salmonellosis	18	79		14	55
Shigellosis	13	20		63	235
Staphylococcus aureus, Methicillin-resisitant (MRSA)	24	385		407	1,879
Streptococcal disease, Group A[4] (invasive)	2	20		5	17
Streptococcal disease, Group B[4] (infant < 3 months of age)	0	4		1	4
Streptococcal disease, Group B[4] (invasive[5])	13	47		15	41
Streptococcal disease, other[4] (invasive)	4	18		2	15
Streptococcal pneumoniae[4], (invasive, children < 5 years of age)	0	1		2	5
Streptococcal pneumoniae[4] (invasive[6])	15	64		22	71
Streptococcus pneumoniae[4], drug-resistant	0	0		0	0
Tuberculosis	5	7		4	9
Tularemia	0	0		0	2
West Nile Virus Infection	5	369		0	137

*Provisional data

[1] Includes newly diagnosed cases and cases diagnosed previously in other states that moved to North Dakota.

[2] Meningitis caused by *Staphylococcus aureus* and *Streptococcus pneumoniae.*

[3] Includes confirmed, probable and suspect meningococcal meningitis cases.

[4] Includes invasive infections caused by streptococcal disease not including those classified as meningitis.

[5] Includes invasive infections of streptococcal, Group B, disease in persons ≥ 3 months of age.

[6] Includes invasive infections caused by *Streptococcus pneumoniae* in persons ≥ 5 years of age.