Epidemiology Report

NORTH DAKOTA DEPARTMENT of HEALTH

November – December 2004

In this Issue:

2004 Year in Review

Summer of 2004 Pertussis Outbreak

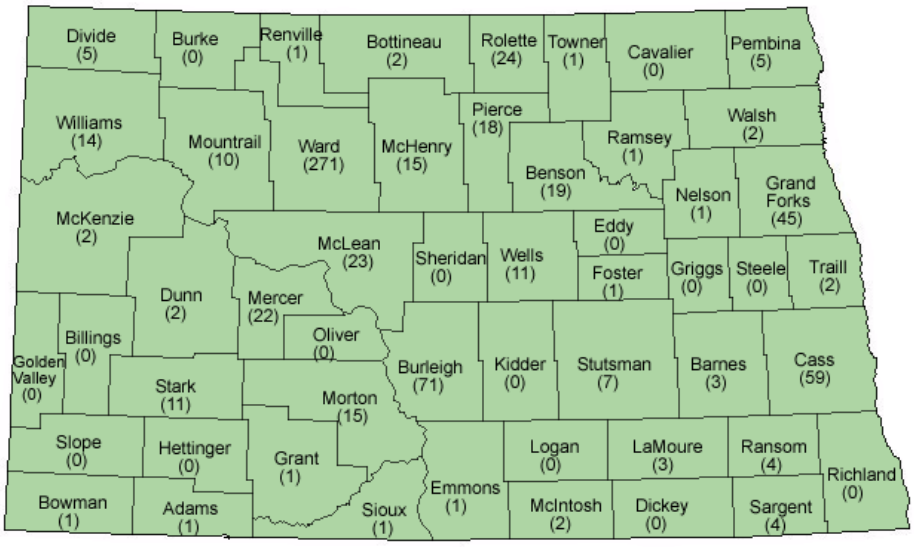
An unprecedented pertussis outbreak occurred during the summer of 2004. Because of the number of cases, local public health units assisted the North Dakota Department of Health (NDDoH) in conducting case investigations on pertussis cases and individuals potentially exposed to pertussis. The first clusters of pertussis cases were reported from Ward and McHenry counties in mid-June 2004. Pertussis transmission occurred across the state, resulting in 681 reported cases in 38 counties from June 22 to Oct. 4, 2004. **(Figure 1)** More than 6,000 potential pertussis contacts and cases were investigated by the NDDoH and local public health personnel during this time frame.

Pertussis infection, caused by the bacteria *Bordetella pertussis*, can be identified by testing for the presence of bacterial DNA in nasopharyngeal samples by polymerase chain reaction (PCR) or by culturing the bacteria from a nasopharyngeal sample onto the appropriate culture media. Pertussis testing kits are available from the NDDoH Division of Microbiology. Free pertussis testing was provided by the Division of Microbiology during the outbreak. More than 6,000 pertussis specimens were tested by the Division of Microbiology during the outbreak. Typically, fewer than 200 pertussis tests are conducted per year.

Of the 681 cases, 591 were PCR-positive and 90 cases were epidemiologically linked to laboratory-positive, symptomatic pertussis cases. Fifty-seven percent of the cases were female. The majority of cases were between ages 10 and 19. **(Figure 2)**

Information regarding pertussis is available by calling Molly Sander, immunization surveillance coordinator, at 701.328.4556 or by e-mail at msander@state.nd.us.

Figure 1. Pertussis Cases Reported in North Dakota by County, June 22 to October 8, 2004.



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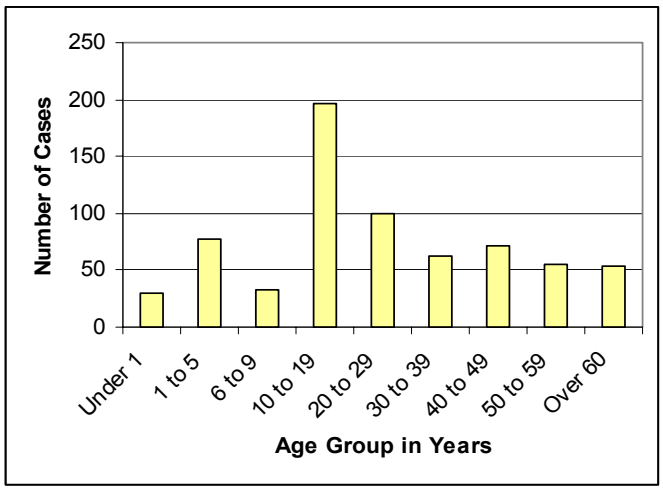
EQUAL OPPORTUNITY EMPLOYER.

Figure 2. Pertussis Cases Reported in North Dakota by Age Group, June 22 to Oct. 8, 2004



West Nile Virus

On June 1, 2004, the NDDoH West Nile virus (WNV) surveillance program initiated its third season of human arboviral encephalitis surveillance. In 2004, the Division of Microbiology conducted WNV testing on 1,224 human samples. Twenty positive human cases were identified, compared to 620 human cases identified in 2003.

In 2004, follow-up interviews were conducted only with hospitalized patients. Of the 20 reported cases, two (10%) met the case definition of West Nile encephalititis, with the remainder (18 cases or 90%) classified as West Nile fever. Two cases, one associated with West Nile encephalitis and the other with West Nile fever, were fatal.

The peak of illness onset occurred during the week ending Aug. 6, 2004. **(Figure 3)** This peak was about three weeks earlier than in 2003 when the peak illness occurred during the week ending August 31. **(Figure 4)**

Figure 3. West Nile Cases by Date of Onset, June 2004 to September 2004, North Dakota

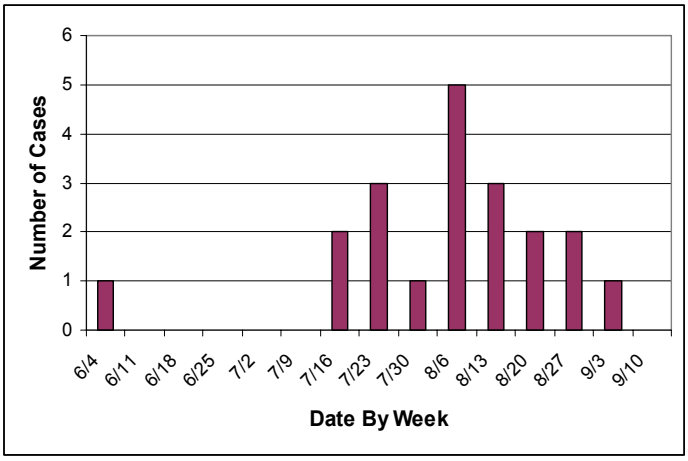
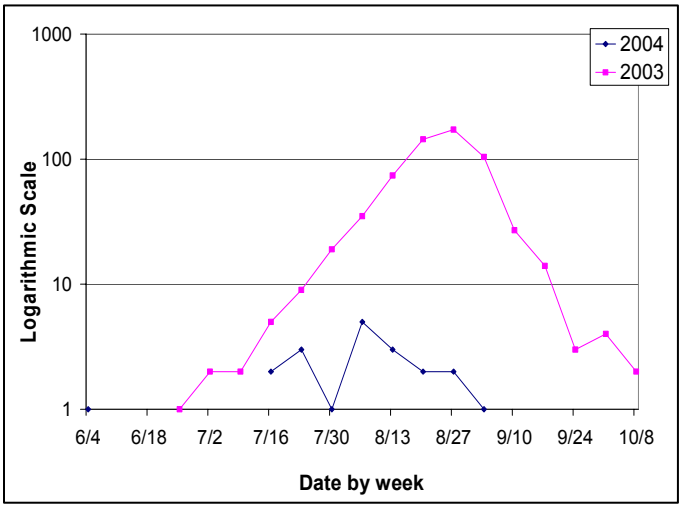


Figure 4. West Nile Cases by Date of Onset, 2004 Compared to 2003 (logarithmic scale), North Dakota



In 2004, one asymptomatic blood donor was identified with WNV, compared to 50 blood donors identified in 2003.

In 2004, the North Dakota State University Veterinary Diagnostic Laboratory (ND-VDL) tested 75 horses for WNV infection. Of the 75 samples submitted, no horses tested positive for WNV. In 2003, 169 samples were submitted, with 41 horses testing positive for West Nile virus.

In 2004, 532 birds were collected and sent to the ND-VDL for WNV testing. Of those, 67 specimens tested positive, compared to 165 positive birds identified in 2003. An additional 617 live bird serums were sent to the ND-VDL for WNV testing in 2004. Of those, 36 birds were identified as positive for WNV. Birds also were collected during the 2004 hunting season and tested for WNV. Fifty-five hunter-harvested birds were sent to the ND-VDL for testing, with two identified as WNV-positive.

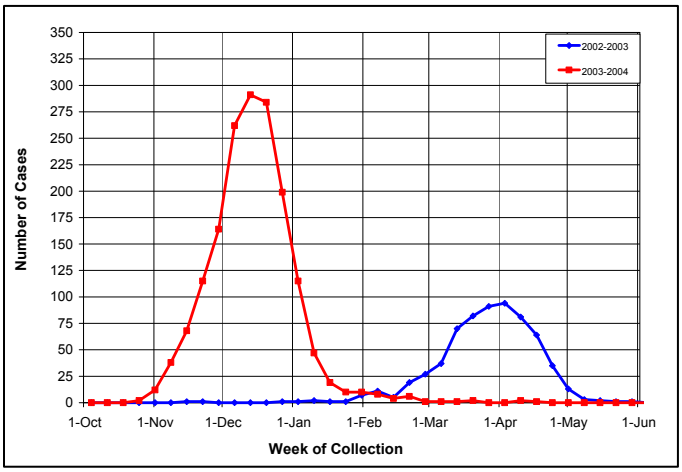
Statewide mosquito monitoring was enhanced during the 2004 summer with the New Jersey Trap Network expanding to 100 trapping sites. Live trapping of mosquitoes was established at 30 separate sites throughout the state and was conducted weekly from July 1, 2004, until Sept. 30, 2004. During this time, 139 mosquito pools were tested for WNV, with no pools yielding positive results. Additional mosquito testing was conducted by the Minot Air Force Base, where two positive *Culex tarsalis* pools were identified. In 2003, 96 mosquito pools were tested for WNV, with 11 pools yielding positive results.

Additional information about WNV and other arboviruses, the mosquito trapping network, case numbers and program partners are provided on the North Dakota WNV website at www.ndwnv.com.

2003-2004 Influenza Season

During the 2003-2004 influenza season, the first influenza cases were reported to the NDDoH in September. The season peaked in mid-December with 291 cases identified **(Figure 5)**. The last influenza cases for the season were reported in mid-April, resulting in a total of 1,663 cases reported. A summary of the reported 2003-2004 influenza cases by age group and influenza type are provided. **(Tables 1 and 2)** North Dakota-specific information about influenza surveillance is available at www.ndflu.com.

Figure 5. Laboratory Identified* Influenza Cases Reported to the NDDoH, 2002-2003 and 2003-2004 Influenza Seasons



*Positive culture, DFA, IFA or other rapid tests.

Table 1. Number of Influenza Cases Reported in North Dakota during the 2003-2004 Influenza Season, by Age Group.

Age Group (Years)	Number of cases reported
< 1	125
1 – 5	450
6 – 10	137
11 – 19	312
20 – 24	121
25 – 34	131
35 – 44	82
45 – 54	53
55 – 64	55
65 +	197

New Strain of Influenza Identified

A drifted A (H3N2) influenza subtype denoted as the Fujian strain was identified in the Southern Hemisphere during the previous influenza season. However, this strain was not included in the 2003-2004 vaccine. The H3N2 Panama component in the vaccine did have some cross reactivity against the Fujian strain, and the vaccine remained the primary method for preventing influenza and its severe complications. Isolates sent to the CDC by the NDDoH were subtyped, and all were found to be the Fujian strain.

Nationally during the 2003-2004 influenza season, 130,577 specimens were tested for influenza viruses, of which 24,649 (18.9%) were positive. Of these, 24,400 (99.0%) were influenza A viruses, and 249 (1.0%) were influenza B viruses. CDC antigenically characterized 1,024 influenza viruses collected during the 03-04 seaon: three influenza A (H1) viruses, 949 influenza A (H3N2) viruses, one influenza A (H7N2) and 71 influenza B viruses. The hemagglutinin proteins of the influenza A (H1) viruses were similar to the vaccine strain A/New Caledonia/20/99. Of the 949 influenza A (H3N2) isolates, 106 (11.2%) were similar to the vaccine strain A/Panama/2007/99 (H3N2) and 843 (88.8%) were similar to the drift variant, A/Fujian/411/2002 (H3N2).

Table 2. Number of Influenza Cases Reported in North Dakota during the 2003-2004 Influenza Season, by Influenza Type.

Type of Influenza	Number of cases reported
Influenza A, H1N1	0
Influenza A, H3N2	74
Influenza A, unspecified	944
Influenza B	15
Influenza, unknown type	630
Total	1663

Active Influenza Surveillance

In 2004, early outbreaks of influenza were associated with several deaths among children in Texas and Colorado. In response, the Centers for Disease Control and Prevention (CDC) requested that states report influenza-associated pediatric deaths. To increase reporting, the NDDoH implemented active surveillance for influenza-associated pediatric deaths and cases of encephalopathy among children younger than 18 in all North Dakota hospital intensive care units.

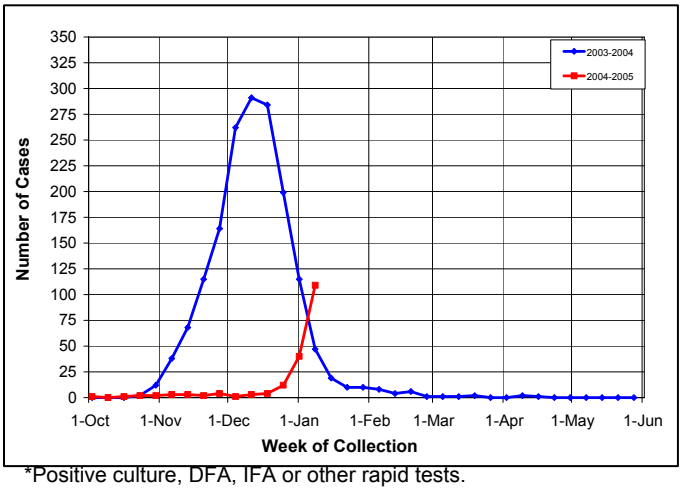
At the end of the 2003-2004 influenza season, 152 influenza-associated deaths in U.S. residents younger than 18 were reported from 40 states, with no cases reported from North Dakota. The average number of influenza-associated deaths of children per year is unknown, since influenza-associated deaths are not a reportable condition in all states.

2004-2005 Influenza Season

As of Feb. 2, 2005, 889 laboratory-identified cases of influenza for the 2004-2004 influenza season were reported to the NDDoH. During last year's influenza

season, nearly 1,600 cases had been reported during this same time period. (**Figure 6)**

Figure 6. Laboratory Identified Influenza Cases Reported to the NDDoH, 2003-2004 and 2004-2005 Influenza Seasons

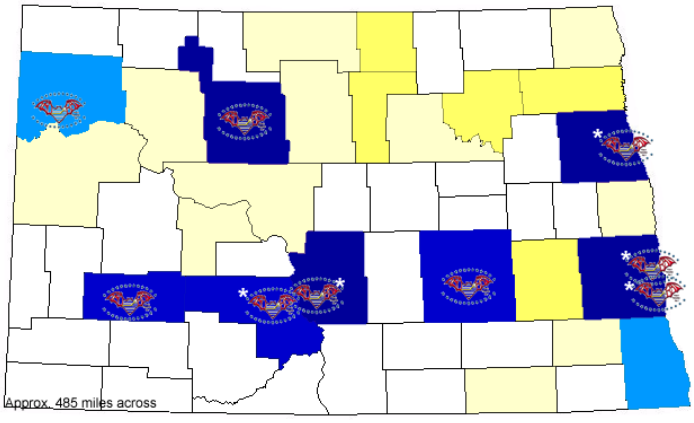


*Positive culture, DFA, IFA or other rapid tests.

Syndromic Surveillance

Syndromic surveillance is a system developed to improve early detection of outbreaks, both naturally occurring and attributable to biologic terrorism. The North Dakota Department of Health (NDDoH) began receiving syndromic surveillance data in February 2004 from five North Dakota hospital emergency departments. The hospitals currently participating include MedCenter One Health Systems and St. Alexius Medical Center in Bismarck, N.D.; Meritcare Health System and Innovis Health in Fargo, N.D.; and Altru Health Systems in Grand Forks, N.D. Data also is being received daily from the MeritCare Ask-A-Nurse calling center in Fargo, N.D. **(Figure 7)** Four more hospital emergency departments have signed contracts to begin submitting data in 2005. They include Jamestown Hospital in Jamestown, ND, Trinity Health in Minot, N.D.; Mercy Medical Center in Williston, N.D.; and St. Joseph's Hospital and Health Center in Dickinson, N.D. **(Figure 7)**

Figure 7. North Dakota Syndromic Surveillance Sites (click on the map to view a larger version)



*Denotes RedBat sites that are actively sending data.

The NDDoH receives daily electronic files and analyzes the data utilizing the commercial software RedBat™ (ICPA, Austin, Texas). The software categorizes patients by their chief complaint into 11 syndromes: encephalitis, flu-like, gastrointestinal, hepatitis, neuro-toxic, pulmonary, radiation, rash-like, severe acute respiratory syndrome (SARS), sepsis and systemic. An "alert" is provided when the frequency of a syndrome has reached or exceeded the calculated threshold. Thresholds are calculated for each participating hospital using baseline data. The information received is posted daily on a secure website for the participating facilities and local public health units.

Evaluation of the RedBat™ syndromic surveillance system has revealed detectable outbreaks by retrospective study, as well as evidence for potential use in year-round influenza surveillance, as a tool in bioterrorism preparedness and SARS planning and for analysis of injury data and asthma trends. The RedBat™ system will be most effective when augmented with other surveillance activities being implemented by the NDDoH. These include electronic laboratory reporting, geographical information systems (GIS), the health alert network, animal health, ambulance run, poison control data, ask-a-nurse and over-the-counter drug surveillance systems.

Additional information regarding the NDDoH syndromic surveillance program is available by contacting Julie Goplin at 701.328.2375 (e-mail: jgoplin@state.nd.us) or via the web at: www.health.state.nd.us/disease/surveillance/default.htm.

Viral Hepatitis Program

The North Dakota Department of Health (NDDoH) initiated a viral hepatitis program in 2004. A primary focus of the program is to integrate hepatitis C prevention efforts into existing public health programs.

Hepatitis C virus (HCV) infection is the most common, long-term, blood-borne viral infection in the United States. According to the CDC, nearly four million Americans (about 12,000 North Dakotans) are infected with HCV, of whom approximately 2.7 million (8,400 North Dakotans) are infected for life. Many of these people are not aware of their infection and have no symptoms of HCV infection. However, the virus may cause serious liver damage that may not be recognized for 10 to 20 years. HCV-associated liver disease is the most common reason for liver transplants.

Hepatitis C infection is a mandated reportable condition in North Dakota. Since 1991, about 2,550 individuals who have tested positive for HCV (based on at least one positive laboratory report) have been reported to the NDDoH. This means that many North Dakotans may not yet know they are infected. With funding from the Centers

for Disease Control and Prevention, efforts are underway to develop prevention and control activities both to reduce incidence of new HCV infections (primary prevention) and to identify individuals already infected (secondary prevention), thus reducing the risk of chronic liver disease through appropriate medical care and counseling.

In an effort to achieve these goals, the NDDoH recently distributed two viral hepatitis surveys — one to more than 600 North Dakota medical providers and one to more than 100 North Dakota residents recently identified as having a positive hepatitis C laboratory test. The information collected from the surveys will help assess current hepatitis C-related practices, evaluate the current system of disease reporting, provide a better understanding of community needs, develop future hepatitis services and determine direction for future funding.

As of Jan. 26, 2005, 37 of 134 (27.6 percent) patient surveys have been completed and retuned to the NDDoH, and 295 of 632 (46.7 percent) provider surveys have been completed and returned. In mid-Jan., 2005, a reminder was sent to recipients of both surveys encouraging them to complete the surveys online. The NDDoH plans to provide a summary of the findings from the surveys this spring.

Patient online survey

health.state.nd.us/disease/hepatitis/PatientCSurvey.htm

Provider online survey

health.state.nd.us/disease/hepatitis/viralsurvey.htm

For more information about the NDDoH hepatitis C program and the public health needs assessment, contact Kim Weis, NDDoH hepatitis coordinator, at 800.472.2180 or kweis@state.nd.us.

2004 Foodborne Outbreaks

In 2004, the North Dakota Department of Health (NDDoH) investigated two foodborne outbreaks; both occurred during the holiday season. The first was reported on Nov. 29, 2004. On the evening of Nov. 27, 2004, 30 people attended an anniversary party hosted by a hotel restaurant where a buffet meal was served. The party guests traveled from three counties in North Dakota and from Minnesota, Montana and Wisconsin. Thirteen restaurant employees also ate from the same buffet. Three restaurant employees and 12 party guests reported diarrhea and/or vomiting after eating from the buffet served at the anniversary party. One person was hospitalized.

Two food samples and two stool specimens sent for testing to the Division of Microbiology were negative for bacterial pathogens. The two stool samples also tested negative for norovirus. The median incubation period was 5.5 hours which is indicative of a possible bacterial intoxication. Statistical analysis of menu items showed that no significant food item was epidemiologically linked to the outbreak. One restaurant employee reported being ill the morning of the anniversary party and reported to work the same day. Fecal contamination of food from the ill food handler may be a possible cause of this outbreak.

The second outbreak was reported to the NDDoH Dec. 2, 2004. Eleven of 30 individuals became ill after attending their company Christmas party served at a restaurant Nov. 29, 2004. The majority of party attendees reported having diarrhea and/or vomiting approximately 32 hours after eating at the holiday party. No food and stool samples were available for testing, and the causative agent of this outbreak remains unknown.

Although laboratory testing is not required to confirm a foodborne outbreak, it is extremely helpful in the course of the epidemiological investigation. It is important that samples of stool and/or vomitus, along with possible food items, are collected and available for testing to determine the causative agent. Health-care workers should be aware of the signs and symptoms typical of the many agents that cause foodborne illness, since they are often the first to learn about the commonalities of symptoms among patients seeking treatment. If a foodborne outbreak (two or more people ill with similar symptoms after consuming a common food) is suspected, it is important that the provider notify the state or local health department as soon as possible so that exposed individuals, as well as the source and the cause of the illness, can be identified rapidly.

Table 3 on page 6 describes foodborne outbreaks investigated by the NDDoH from 2000 to 2004. Improper cooking and possible cross contamination by ill food handlers were the contributors most commonly identified.

An excellent resource, “Diagnosis and Management of Foodborne Illnesses: A Primer for Physicians," is available at cdc.gov/mmwr/PDF/RR/RR5002.pdf. Additional information can be found at cdc.gov/ncidod/diseases/food/index.htm.

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Melissa Casteel, influenza surveillance coordinator
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Molly Sander, immunization surveillance coordinator
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Table 3. Foodborne Outbreaks in North Dakota; 2000-2004

Date	County	Facility	Number Ill	Number Exposed	Suspected Food	Suspected Agent	Contributing Factors
02/2000	Multi-state: ND, MN, MT	Tour group to the Dominican Republic	54	177	Possible eggs	*Salmonella* Enteritidis	Several meals at the resort implicated epidemiologically
09/2000	Rolette	Girls basketball team	12	36	Possible heat-and-serve burritos	Unknown	Possible psychogenic illnesses involved
3/2001	Ramsey	School	22	64	Classroom snack "moonballs"	Probable calicivirus	Unknown
4/2001	Burleigh	Hotel restaurant	101	143	Fruit cup	Probable calicivirus	Ill food handler
12/2001	Burleigh	Restaurant/ holiday party	8	54	Possible beef tenderloin	Possible *Clostridium perfringens*	Improperly prepared meat
04/2002	Ward	Restaurant/ banquet	119	280	Roast turkey and gravy	*Clostridium perfringens*	Improperly prepared and reheated turkey/gravy
12/2002	Mercer	Private business	About 100	400	Deep-fried turkey	*Clostridium perfringens*	Improper food handling procedures, including storage temperatures, possible cross contamination and inadequate or lack of hand washing
12/2002	Ward	Motel	225	465	Unknown	Calicivirus	Ill food handlers in addition to person-to-person transmission among guests
12/2002	Pembina	Public school	97	326	Unknown	Calicivirus	None identified
6/2003	Ward	Restaurant/golf course	34	~ 70	Potato salad	Calicivirus	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	None identified
10/2003	Grand Forks	Restaurant	14	Unknown	Unknown	*E.coli* O157:H7	None identified
11/2003	Stark	Wedding/ banquet	31	75 – 90	Unknown	Calicivirus	None identified
12/2003	Ward	Hotel restaurant	24	57	Unknown	Probable food intoxication	None identified
11/2004	Ward	Hotel restaurant	15	43	Unknown	Unknown	Possible sick food handler
11/2004	Bottineau	Restaurant	11	32	Unknown	Unknown	None identified

Summary of Selected Reportable Conditions					
North Dakota, 2003-2004					
Reportable Condition	**November-December 2004***	**January-December 2004***		**November-December 2003**	**January-December 2003**
Campylobacteriosis	6	109		8	80
Chlamydia	267	1,881		264	1,643
Cryptosporidiosis	0	12		2	15
E. coli, shiga toxin positive (non-O157)	0	7		0	4
E. coli O157:H7	1	15		0	14
Enterococcus, Vancomycin-resistant (VRE)	4	19		4	20
Giardiasis	2	24		8	50
Gonorrhea	13	117		19	103
Haemophilus influenzae (invasive)	1	5		3	8
Hepatitis A	0	2		0	2
Hepatitis B	0	4		0	2
HIV/AIDS	3	19		4	22
Legionellosis	0	2		0	1
Lyme Disease	0	0		0	0
Malaria	0	3		0	1
Meningitis, bacterial[1] (non meningococcal)	2	9		0	4
Meningococcal disease	0	2		0	1
Mumps	0	1		0	0
Pertussis	51	769		0	7
Q fever	0	0		0	1
Rabies (animal)	11	74		4	57
Salmonellosis	4	44		7	46
Shigellosis	0	3		3	10
Staphylococcus aureus, Methicillin-resistant (MRSA)	139	1,371		210	1,342
Streptococcal disease, Group A[2] (invasive)	5	16		2	18
Streptococcal disease, Group B[2] (infant < 3 months of age)	0	4		0	5
Streptococcal disease, Group B[2] (invasive[3])	5	42		1	31
Streptococcal disease, other[2] (invasive)	2	15		2	14
Streptococcal pneumoniae[2], (invasive, children < 5 years of age)	0	4		2	9
Streptococcal pneumoniae[2] (invasive[4])	6	53		13	69
Streptococcus pneumoniae[2], drug-resistant	0	0		1	4
Tuberculosis	0	4		0	6
West Nile Virus Infection	0	20		0	617

*Provisional data

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

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

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

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