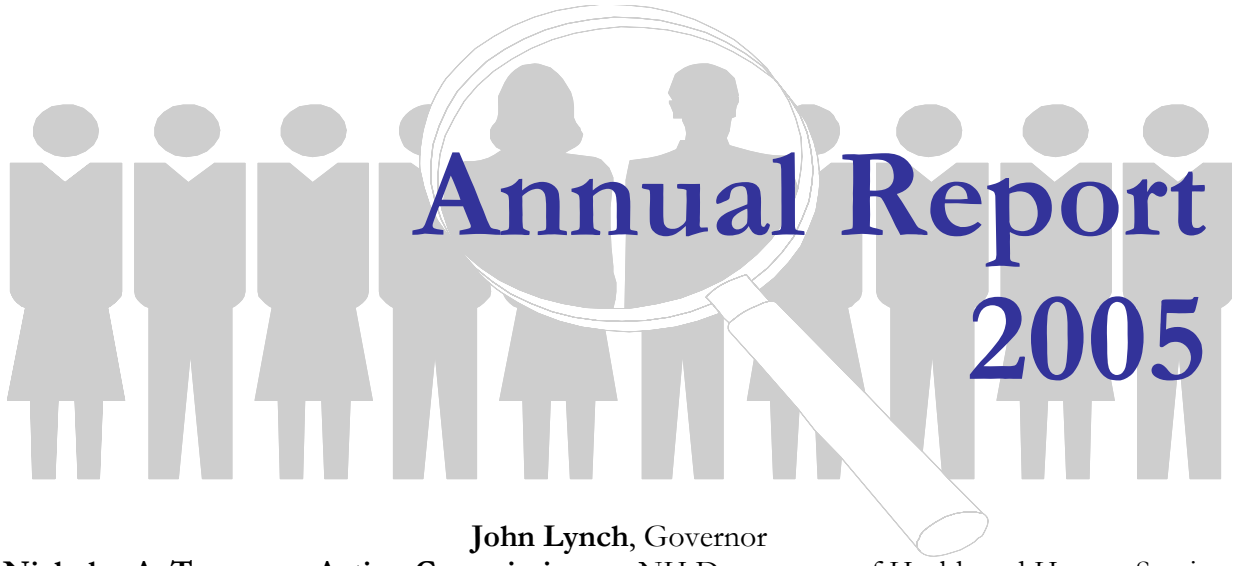
New Hampshire

Communicable Disease Surveillance



Annual Report 2005

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New Hampshire Communicable Disease Surveillance Annual Report 2005

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An electronic copy of this report is available on the NH DHHS website at: www.dhhs.state.nh.us

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EXECUTIVE SUMMARY

This report summarizes reported communicable diseases and related public health investigations in New Hampshire during 2003-2005. The report is divided into two sections. The first section includes select disease summaries, with an emphasis on 2003-2005 data. Each summary includes a brief background on the epidemiology of the disease, clinical features, and disease control methods. Tables and graphs supplement key statistical data. Whenever possible, information on disease trends in the United States are compared to those of NH trends. Specific commentaries are guided by the unique occurrence of each disease in our state. The second section includes lengthier summaries of special investigations or surveillance methods from 2003-2005.

Highlights of reported communicable disease occurrence in NH in 2003-2005 include an increase in hepatitis A cases, new requirements for the reporting of varicella (chickenpox), and a steady rise in reported lyme disease cases. During this time, NH DHHS launched several large scale public health responses including, 1) prophylactic antibiotic distribution clinic to offer prophylaxis to people exposed to a case of *Neisseria* meningitis in 2003; 2) three clinics to provide immune globulin to 2,500 patrons of a restaurant where an infectious food service worker with Hepatitis A worked; and 3) several influenza vaccine clinics in the fall of 2004 during a U.S. vaccine supply shortage. In addition to these activities, NH DHHS responded to multiple foodborne, gastrointestinal, and respiratory outbreaks. Some of these activities are described in the second section of this report along with descriptions of other special investigations of rare communicable diseases, like Congenital Rubella Syndrome and Eastern Equine Encephalitis, which affected NH citizens in 2005.

We hope that you will find this report useful as we work in partnership to keep New Hampshire healthy.

COMMUNICABLE DISEASE SURVEILLANCE OVERVIEW

The New Hampshire Department of Health and Human Services, Communicable Disease Surveillance Section (CDSS) oversees the management of communicable disease and emergency preparedness surveillance systems. Public health disease surveillance involves the systematic collection, analysis, interpretation and dissemination of population based data on adverse health conditions. Surveillance data are obtained from many sources including health care providers, laboratories, schools, pharmacies, and hospitals. All public health data collected are maintained under strict confidentiality and security procedures.

The majority of this report provides surveillance data from our reportable disease surveillance system, a system that captures the occurrence of specific diseases in the population. NH public health law RSA 141-C authorizes the reporting of certain communicable diseases and organisms to the CDSS. Administrative rules He-P 301, which implement RSA 141-C, require the reporting of diseases by healthcare providers and laboratories. The list is revised periodically based on the need for public health response or data collection to identify trends. The current list of reportable diseases was revised in January 2005 and included the addition of several diseases, for example, varicella (chickenpox).

Communicable disease surveillance is conducted so that public health measures can be implemented to control disease transmission. Timely and complete reporting by healthcare providers and other reporters is a vital component of the public health surveillance system. Examples of public health interventions include:

- Identification and treatment of people exposed to diseases like meningitis, rabies, and pertussis
- Removal of contagious persons with diseases like tuberculosis from the community
- Removal of a contagious food service worker from a restaurant
- Obtaining a food history to determine the source of contaminated food

Information reported is collected and analyzed, published in reports, and used for program planning and evaluation. The Centers for Disease Control and Prevention (CDC) compiles state reported disease surveillance data at the national level and publishes disease trends in the *Morbidity and Mortality Weekly Report* (*MMWR*).

Besides traditional reportable disease surveillance, the CDSS is involved in the use and monitoring of several other surveillance systems. Both traditional and syndromic surveillance approaches are used. Syndromic surveillance uses health information to detect or anticipate disease outbreaks based on symptoms of illness. Information about non-specific illnesses such as fever, gastrointestinal illness, respiratory illness, and rashes is collected. This type of surveillance is called "syndromic" because it tracks symptoms that are associated with infectious diseases rather than tracking the actual diagnosis of an infectious disease. Because a specific diagnosis has not yet been made, this allows for the early recognition of possible outbreaks of disease. The surveillance systems maintained by CDSS are intended to monitor the population health through all stages of disease from exposure, to prodrome and illness, and possible death.

Exposure. To detect potential human health threats, CDSS participates in BioWatch. Biowatch is a program initiative organized and operated by the U.S. Department of Homeland Security to conduct air sampling for particles containing materials weaponized for biological warfare purposes. Examples of particles identified from air sampling in other parts of the country include tularemia and brucellosis.

Prodrome. To monitor prodrome, which is the expression of symptoms prior to the development of full illness, over-the-counter pharmaceutical sales information is collected. Two different systems are used to track these medications: Real Time Outbreak and Disease Surveillance National Retail Data Monitor and Syndrome Tracking and Encounter Management Over-the-Counter Sales module. A total of 135 NH pharmacies provide aggregate sales information by medication category. This information has provided three to six days notice of the presence of respiratory and gastrointestinal illness in a community prior to patients seeking medical care.

Illness. Several systems monitor acute illness in the community. Collection of reportable diseases through the NH Electronic Disease Surveillance System allows for tracking of illnesses when a patient is diagnosed with a reportable disease. Additionally, there are several syndromic systems used to monitor acute illness.

The Automated Hospital Emergency Department Data **(**AHEDD**)** project provides access to real-time emergency department data and organizes these patient encounters into syndromes. These syndromes, or categories of symptoms related to a condition, are monitored for statistically significant deviations from the expected number of encounters for a particular syndrome. Chief complaint data can be searched to identify reportable diseases that were not previously reported.

BioSense is similar to AHEDD and receives data from the Veterans Affairs (VA) Medical System and Department of Defense facilities. This includes the VA hospitals in Manchester, NH and White River Junction, VT, a VA clinic in Portsmouth, NH/Kittery, ME, and an Air Force Station in New Boston, NH. BioSense also monitors laboratory test orders placed to a private reference lab. All data is organized into syndromes and statistically significant activity is identified and investigated.

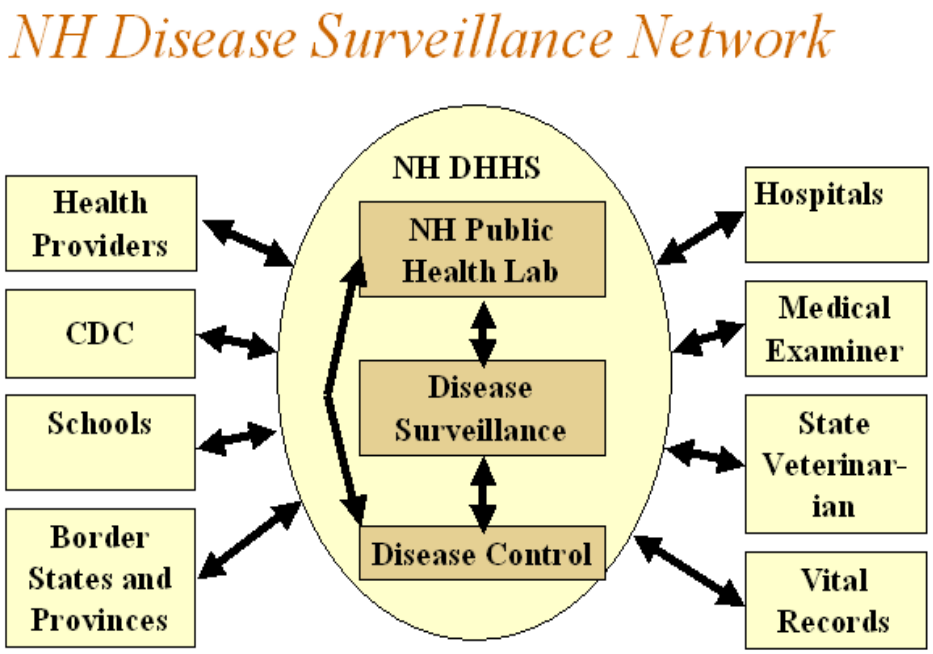
The Syndrome Tracking and Encounter Management System school component allows syndromic monitoring of school nurse visits within the Manchester public school system. This represents 8% of all school-aged children in NH. Each school nurse encounter is assigned to a syndrome. When syndrome activity falls outside of an expected range, preliminary investigations are initiated. Historically, school surveillance has detected respiratory and gastrointestinal illness, as well as increased rash activity accompanying poison ivy bloom.

Consumer food complaint monitoring, in conjunction with traditional reportable disease surveillance and syndromic surveillance, allow for identification of foodborne illness and possible outbreaks in the community. Monitoring of consumer complaints involves tracking calls from citizens reporting gastrointestinal illness after consumption of a food product from a NH restaurant or grocery store.

Influenza Sentinel Surveillance is used to monitor the extent and spread of influenza across the state. Medical providers are invited yearly to participate in the system, which involves submitting weekly counts of patients seen, the number with influenza-like illness, and the number of specimens sent to the NH Public Health Laboratories for influenza testing. In partnership with the CDC, this information is used to measure influenza activity at a national level.

Death. Death certificate surveillance is used to measure deaths attributed to communicable disease. This approach is similar to syndromic surveillance in that deaths are organized into categories. Statistical tests are performed to determine whether the prevalence of deaths by disease rises to a statistically significant level. This approach has identified a cluster of 11 related deaths within 12 days at one location, and has also detected encephalitis deaths in West Nile virus and eastern equine encephalitis endemic areas, *E. coli* O157:H7 related deaths, and non-variant Creutzfeldt-Jacob disease deaths in NH. Additionally, CDSS works closely with the NH Office of the Chief Medical Examiner to ensure that autopsies and laboratory tests are performed for deaths that may have been due to a communicable disease.

Communicable disease surveillance systems are critical to monitoring the health of NH citizens and to identify and control disease threats in NH.



FREQUENTLY ASKED QUESTIONS

What are reportable diseases?
Reportable diseases are conditions that, due to their infectious nature and the risks they pose in being spread to others, are mandated under NH law to be reported to NH DHHS. Reporting of suspected or confirmed communicable diseases is mandatory.

What is a communicable disease?
A communicable disease is an illness caused by an infectious agent, or its products that can be transmitted between humans or animals. The transmission can be direct or indirect, through a plant, animal or inanimate object.

Where and how can I report a communicable disease?
Fax reports to: (603) 271-0545
Call reports to: (603) 271-4496 (Office)
(800) 852-3345 ext 4496 (Toll free office)
(888) 836-4971 (Hotline)
Mail reports to: Communicable Disease Control and Surveillance
29 Hazen Drive
Concord, NH 03301

What is disease surveillance?
Disease surveillance is the systematic collection, analysis and interpretation of health data in order to implement effective illness control measures.

What are the uses of disease surveillance data?
Surveillance data are used to monitor disease trends, identify populations at risk and to detect and respond to outbreaks. Additionally, surveillance data are used to estimate the burden of disease in the population, target and evaluate effectiveness of prevention strategies, allocate funds for health and social services, and facilitate access to health, social, and prevention services.

What is disease control?
Disease control is the process or ongoing system of preventing or minimizing the occurrence of illness. Disease control may involve the investigation of individual cases as well as epidemics.

What if I would like to get additional data beyond what is presented in this report?
There are several updated data reports on our website. If you can't find what you're looking for, please contact our office at 603-271-0279. You will be asked to complete a data request form detailing exactly what data you would like. Your form will be reviewed to determine whether we can accommodate your request.

Where can I find more information about NH Department of Health and Human Services Communicable Disease Control and Surveillance?
You may visit us at our web site:
http://www.dhhs.state.nh.us/DHHS/CDCS/default.htm

TECHNICAL NOTES

1. The data in this report are based upon information provided to the New Hampshire Department of Health and Human Services under specific legislative authority. The data reported represent the best estimate number or rate of events in the state.

2. All communicable disease surveillance data may reflect healthcare provider or laboratory underreporting.

3. County/city is based upon residence of the case at the time of disease diagnosis and does not necessarily reflect exposure location.

4. All population calculations and rates are based on population data provided by New Hampshire Department of Health and Human Services (NH DHHS), Division of Public Health Services (DPHS), Bureau of Disease Control and Health Statistics (BDCHS), Health Statistics and Data Management Section (HSDM). Population data is based on US Census data apportioned to towns using New Hampshire Office of Economic Planning (OEP) estimates and projections, and further apportioned to age groups and gender using Claritas Corporation estimates and projections to the town, age group, and gender levels. Data adds to US Census data at the county level between 1990 and 2005 but does not add to OEP or Claritas data at smaller geographic levels. Please contact HSDM at 603-271-4988 for more information on methodology. Rates are age-adjusted to the U.S. standard population.

5. HIV surveillance data is limited due to changes in methods of data collection over time. HIV reports prior to January 1st, 2005 may or may not include a name; therefore there may be duplicate or incomplete reports.

6. All data in this report are compiled based on case morbidity date. Morbidity date for each case is the closest date to onset of illness available. This date may be date of onset, date of diagnosis, or date of report, whichever is available. Data in this report may not exactly agree with published *MMWR* totals due to differences in timing of reports, data sources or surveillance methodologies.

7. Definition of Common Epidemiology Terms:

Case: A countable incident in the population of a particular disease, health disorder, or condition under investigation.

Case Definition: A set of standard criteria for deciding whether a person has a particular disease or health-related condition by specifying clinical criteria and limitations on time, place, and person.

Cluster: An aggregation of cases of a disease or other health-related condition that are closely grouped in time and place but with no known common exposure. The number of cases may or may not exceed the expected number; frequently the expected number is not known.

Contact: Exposure to a source of infection, or a person exposed.

Outbreak: An increased number of cases of a disease or other health-related condition that are known to have a common exposure.

Rate: An expression of frequency with which an event occurs within a defined population over a specific period of time.

Incubation period: A period following exposure during which patient has no symptoms and ending with the onset of symptoms of an infectious disease.

ACKNOWLEDGEMENTS

We gratefully acknowledge all of the health care providers and laboratories in New Hampshire who contribute to the reporting of communicable disease surveillance data. We would also like to recognize all stakeholders who participated in the planning and development of this report.

The CDSS staff would like to recognize the following colleagues and programs for their time and expertise in the preparation of this report:

Jose T. Montero, MD, MPH, State Epidemiologist

Elizabeth A. Talbot, MD, Deputy State Epidemiologist

Immunization Program

Communicable Disease Control Section

Health Statistics and Data Management

Public Health Laboratories

NEW HAMPSHIRE REPORTABLE DISEASE LIST 2005

Diseases labeled with an asterisk (*) should be reported within 24 hours. All others should be reported within 72 hours.

- Acquired Immune Deficiency Syndrome (AIDS)
- Anthrax [*Bacillus anthracis*]*
- Babesiosis [*Babesia microti*]*
- Botulism [*Clostridium botulinum*]*
- Brucellosis [*Brucella abortus*]*
- Campylobacteriosis [*Campylobacter species*]
- CD4+ lymphocyte counts
- Chlamydial infection [*Chlamydia trachomatis*]
- Cholera [*Vibrio cholerae*]*
- Coccidioidomycosis [*Coccidioides immitis*]
- Creutzfeldt-Jakob Disease*
- Cryptosporidiosis [*Cryptosporidium parvum*]
- Cyclospora infection [*Cyclospora cayetanensis*]
- Diphtheria [*Corynebacterium diphtheriae*]*
- Ehrlichiosis [*Ehrlichia species*]
- Encephalitis, arboviral only*
- *Escherichia coli* O157 infection and other shiga toxin producing *E. coli*
- Food poisoning*
- Giardiasis [*Giardia lamblia*]
- Gonorrhea [*Neisseria gonorrhoeae*]
- *Haemophilus influenzae*, invasive disease, sterile site*
- Hantavirus Pulmonary Syndrome [Hantavirus]*
- Hemolytic Uremic Syndrome (HUS)
- Hepatitis, viral: A*, B, E, G
- Hepatitis, viral: positive B surface antigen in a pregnant woman
- Human Immunodeficiency Virus (HIV)
- Legionellosis [*Legionella pneumophila*]
- Leprosy, Hansen's disease [*Mycobacterium leprae*]
- Listeriosis [*Listeria monocytogenes*]
- Lyme disease [*Borrelia burgdorferi*]
- Malaria [*Plasmodium species*]
- Measles [Rubeola]*
- Mumps*
- *Neisseria meningitidis*, invasive disease, sterile site*
- Pertussis [*Bordetella pertussis*]*
- Plague [*Yersinia pestis*]*
- Pneumococcal disease, invasive [*Streptococcus pneumoniae*]*
- Pneumocystis pneumonia [*Pneumocystis jiroveci* formerly *carinii*]
- Poliomyelitis [Polio]*
- Psittacosis [*Chlamydophila psittaci*]*
- Rabies in humans or animals *
- Rocky Mountain Spotted Fever [*Rickettsia rickettsii*]
- Rubella, including Congenital Rubella Syndrome*
- Salmonellosis [*Salmonella species*] (report *S.* Typhi* within 24 hours)
- Shigellosis [*Shigella species*]
- Streptococcus Group A/B, invasive disease [*Streptococcus pyogenes/agalactiae*], sterile site
- Syphilis, including Congenital Syphilis Syndrome [*Treponema pallidum*]
- Tetanus [*Clostridium tetani*]
- Toxic-Shock Syndrome (TSS) [streptococcal or staphylococcal]
- Trichinosis [*Trichinella spiralis*]
- Tuberculosis disease [*Mycobacterium tuberculosis*]*
- Tuberculosis infection, latent
- Tularemia [*Francisella tularensis*]*
- Typhoid fever [*Salmonella* Typhi]*
- Typhus [*Rickettsia prowazekii*]*
- Varicella*
- Vibrio infection [*V. cholerae, V. parahaemolyticus, V. vulnificus*]*
- Vancomycin Resistant Enterococci (VRE)
- Vancomycin Resistant *Staphylococcus aureus* (VRSA)*
- Yersiniosis [*Yersinia enterocolitica*]
- Any unusual occurrence or cluster of illness which may pose a threat to the public's health*

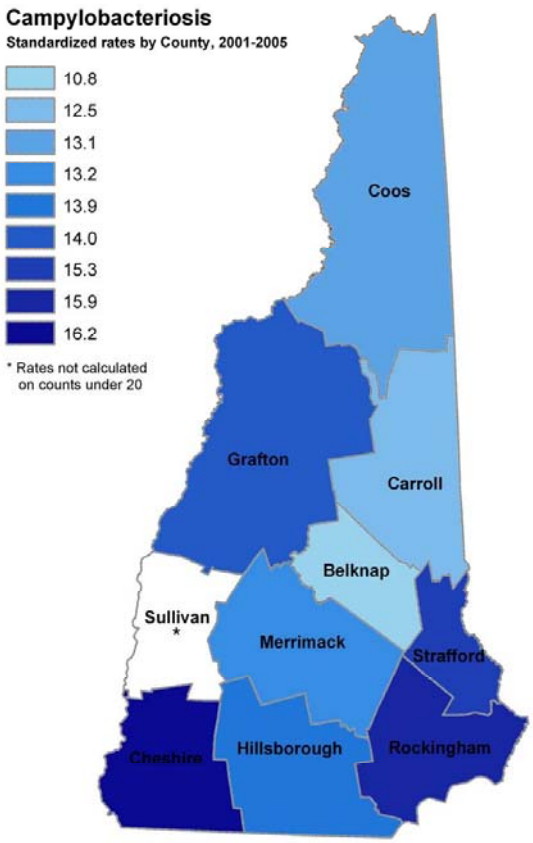
REPORTED CASES IN NEW HAMPSHIRE, 1996-2005

DISEASE / CONDITION	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Acquired Immune Deficiency Syndrome (AIDS)	93	55	42	46	31	34	63	39	38	19
Anthrax	0	0	0	0	0	0	0	0	0	0
Babesiosis	nr	nr	nr	nr	nr	nr	nr	nr	nr	2
Botulism	1	0	0	1	0	0	0	1	1	1
Brucellosis	0	0	0	0	1	0	0	0	0	1
Campylobacteriosis	258	214	170	176	153	154	175	189	209	184
Chlamydial infection	733	815	962	981	1134	1396	1554	1611	1752	1831
Cholera	0	0	0	0	0	1	0	0	0	0
Coccidioidomycosis	0	0	0	0	2	3	0	0	0	0
Creutzfeldt-Jakob Disease (CJD)	nr	nr	nr	nr	nr	nr	nr	nr	nr	0
Cryptosporidiosis	40	7	17	20	25	17	31	26	30	40
Cyclospora infection	0	0	0	0	0	0	1	0	0	0
Diphtheria	0	0	0	0	0	0	0	0	0	0
Ehrlichiosis*	nr	0	0	2	0	0	4	2	2	3
Encephalitis, arboviral Eastern Equine (EEE)	0	0	0	0	0	0	0	0	0	7
Encephalitis, arboviral West Nile Virus (WNV)	0	0	0	0	0	0	0	3	0	0
Escherichia coli infection, Shiga toxin-producing ¶	39	17	47	37	45	38	35	24	29	19
Giardiasis§	318	324	79	67	53	39	46	44	48	66
Gonorrhea	159	90	90	115	111	179	120	123	134	179
Haemophilus influenzae , invasive disease	11	14	9	20	13	8	13	19	22	9
Hantavirus Pulmonary Syndrome	0	0	0	0	0	0	0	0	0	0
Hemolytic Uremic Syndrome (HUS)	nr	0	0	0	3	0	2	0	1	1
Hepatitis A	22	36	17	19	18	18	12	19	27	82
Hepatitis B	22	17	22	18	18	17	25	24	44	30
Human Immunodeficiency Virus (HIV)	19	27	29	26	26	22	25	33	39	24
Invasive Group A Streptococcus (GAS)	4	3	9	16	16	19	38	33	22	18
Invasive Group B Streptococcus (GBS)	nr	0	7	17	8	12	20	13	17	32
Legionellosis	4	7	7	10	4	12	8	9	15	8
Leprosy, Hansen's disease	0	0	0	0	0	0	0	0	1	0
Listeriosis	2	4	3	5	4	4	4	4	4	9
Lyme disease	47	39	45	55	95	129	263	190	229	270
Malaria	4	11	5	2	1	2	8	7	5	6
Measles	0	3	0	1	3	0	0	1	0	1
Mumps	1	1	0	2	0	0	5	2	1	1
Neisseria meningitidis, invasive disease	13	17	13	13	12	15	14	12	7	12
Pertussis	217	135	148	137	131	31	80	120	134	186
Plague	0	0	0	0	0	0	0	0	0	0
Polio	0	0	0	0	0	0	0	0	0	0
Psittacosis	0	0	1	0	0	0	0	1	0	0
Rabies in Humans or Animals +	55	49	83	47	23	23	49	29	32	11
Rocky Mountain Spotted Fever	0	0	0	0	0	0	0	0	0	1
Rubella, including Congenital Rubella Syndrome	0	0	0	0	2	0	0	0	0	3
Salmonellosis	144	149	184	148	143	168	142	152	145	176
Shigellosis	19	55	17	20	6	7	15	10	10	19
Streptococcus pneumoniae, invasive disease	nr	nr	nr	nr	nr	nr	nr	nr	nr	87
Syphilis ‡	24	23	15	12	17	17	26	34	26	33
Tetanus	0	0	0	0	0	0	0	0	0	0
Toxic-Shock Syndrome (TSS)	4	3	0	2	1	1	0	2	4	2
Trichinosis	0	0	0	0	0	0	0	1	0	0
Tuberculosis disease	21	17	14	19	22	20	19	15	24	5
Tularemia	nr	nr	nr	nr	nr	nr	nr	nr	nr	0
Typhoid fever	2	0	1	0	0	2	0	4	0	0
Typhus	nr	0	0	0	0	0	0	0	0	0
Vancomycin Resistant Enterococci (VRE)	28	60	35	37	56	66	92	105	147	182
Vancomycin Resistant *Staphylococcus aureus* (VRSA)	0	0	0	0	0	0	0	0	0	0
Varicella (Chickenpox)	nr	nr	nr	nr	nr	nr	nr	nr	nr	337
Vibrio infection	nr	nr	nr	nr	nr	nr	nr	nr	nr	2
Yersiniosis	13	9	3	6	6	5	4	2	2	3

* Includes human monocytic and human granulocytic ehrlichiosis
¶ Includes O157:H7
§ Since 8/97, only cases in persons 5 years of age and younger are reported
\+ One case of human rabies reported in 1996
‡ Includes all stages of Syphilis infection
nr= not reportable

Epidemiology:

Species of *Campylobacter* are the most common bacterial cause of diarrheal illness in the United States. It is estimated that about 1% of the population is affected by campylobacteriosis each year. The majority of cases are isolated events associated with poultry handling or eating inadequately cooked meat. Some people acquire infection through contact with infected pets, especially puppies and kittens. The organism is not generally spread from person to person. When outbreaks occur, it is often due to drinking un-pasteurized milk or contaminated water.



Clinical features:

The incubation period is between 1 to 10 days and disease generally lasts for about 1 week.

Symptoms include abdominal pain, diarrhea, malaise, fever, nausea and vomiting. Some infected people have no symptoms at all.

About 1 in every 1,000 reported *Campylobacter* infections leads to Guillain Barré Syndrome, which lasts several weeks and usually requires intensive care. Most people recover completely.

Disease control methods:

The majority of infected individuals recover without any specific treatment. Antibiotics are recommended only for severe infections and to attempt eradication of a carrier state.

Prevention includes meticulous hand washing with soap after handling raw foods of animal origin or after contact with pet feces. Thorough cooking of poultry, milk pasteurization and water chlorination are also effective preventive measures.

Campylobacteriosis by County & Gender 2001-2005

	Male				Female				Total			
	Cases	Rates*	95% CI		Cases	Rates*	95% CI		Cases	Rates*	95% CI	
Belknap	22	14.7	8.5	20.9	11	-	-	-	33	10.8	7.0	14.5
Carroll	17	-	-	-	13	-	-	-	30	12.5	7.8	17.2
Cheshire	40	21.7	14.9	28.5	22	11.2	6.5	16.0	62	16.2	12.1	20.2
Coos	12	-	-	-	11	-	-	-	23	13.1	7.5	18.6
Grafton	33	16.3	10.7	22.0	25	11.7	7.0	16.3	58	14.0	10.3	17.6
Hillsborough	138	14.2	11.8	16.6	138	13.7	11.4	16.0	276	13.9	12.3	15.6
Merrimack	54	15.4	11.2	19.5	40	11.2	7.7	14.6	94	13.2	10.5	15.9
Rockingham	115	15.7	12.7	18.6	118	16.0	13.1	18.9	233	15.9	13.8	17.9
Strafford	44	16.0	11.2	20.8	45	14.9	10.6	19.3	89	15.3	12.1	18.5
Sullivan	7	-	-	-	6	-	-	-	13	-	-	-
Total	482	15.2	13.8	16.5	429	13.0	11.8	14.3	911	14.1	13.1	15.0

** : Standardized rates per 100,000 persons*

- : rates not calculated on counts <20

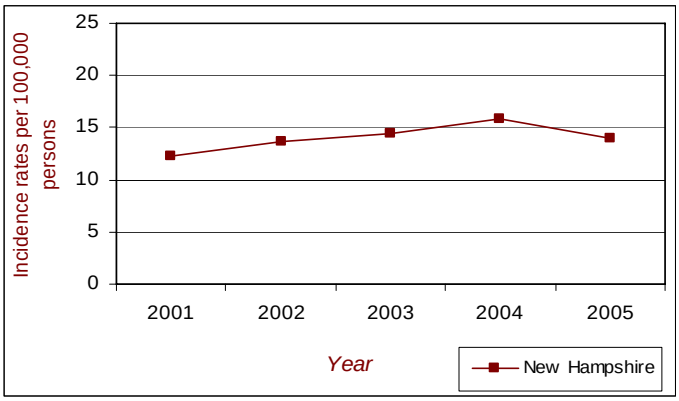
Campylobacteriosis

	New Hampshire			United States	
	Cases	Rates*	95% CI	Cases	Rates*
2001	154	12.2	10.3-14.1	*nr*	*nr*
2002	175	13.7	11.7-15.8	*nr*	*nr*
2003	189	14.5	12.4-16.6	*nr*	*nr*
2004	209	15.8	13.7-18.0	*nr*	*nr*
2005	184	13.9	11.9-16.0	*nr*	*nr*

* : Standardized rates per 100,000 persons

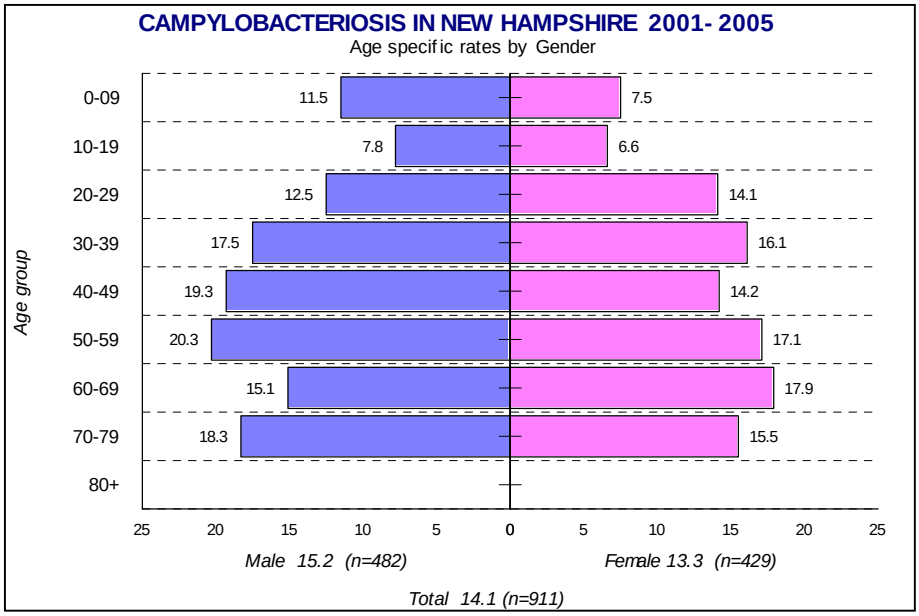
nr : Not reportable

Campylobacteriosis Incidence Rates New Hampshire: 2001 - 2005



Campylobacteriosis by City

	2001	2002	2003	2004	2005
Manchester	13	18	21	21	15
Nashua	12	17	14	13	18



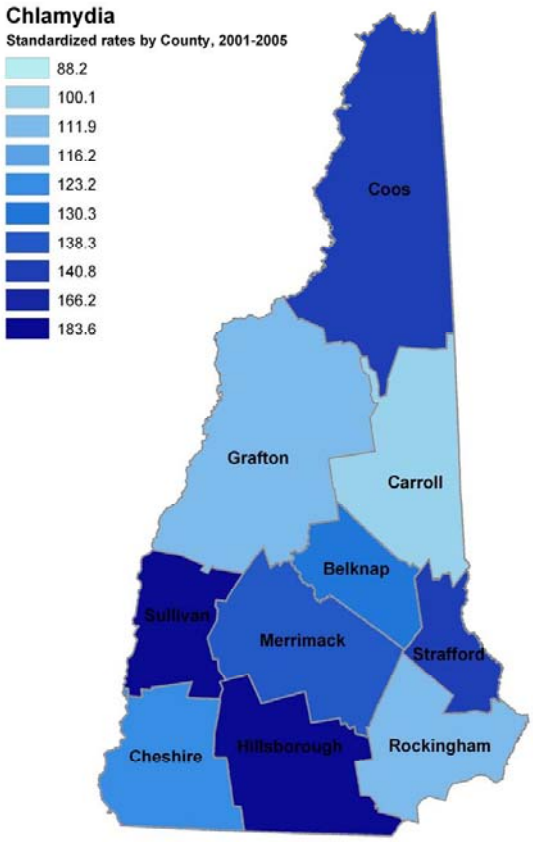
Comments:

- The incidence rate of campylobacteriosis has remained steady during the last 5 years although a slight increase was noted in 2004, which was also noted nationally. Overall, campylobacteriosis has decreased over the last 15 years.
- Campylobacteriosis is not a nationally reportable disease; therefore comparison between NH and US incidence rates is not possible.
- Campylobacteriosis often occurs sporadically, and no outbreaks were recognized in NH between 2003-2005

For additional information regarding this disease, please call the New Hampshire Department of Health and Human Services, Communicable Disease Surveillance Section at 1-800-852-3345 ext 0279.

Epidemiology:

Chlamydia, caused by the bacteria *Chlamydia trachomatis*, is the most common reported infectious disease in the United States and NH, with the highest rates among sexually active adolescents and young adults. Chlamydia is spread person-to-person, most efficiently by vaginal or anal intercourse, and generally less efficiently by oral sexual activity. Untreated chlamydial infection in women can lead to serious complications such as pelvic inflammatory disease, infertility and ectopic pregnancy.



Clinical features:

The average time from exposure to symptom onset is 7 to 14 days. Asymptomatic infections are common in both men and women. However, if symptoms are present, persons may experience abnormal genital discharge or burning with urination.

Disease control methods:

The most effective methods of disease control are through education and prevention with an emphasis on protected sexual activity through the use of condoms. In general , persons who have had sexual contact with an infected person during the 60 days preceding the diagnosis or onset of symptoms should be evaluated for infection. Antibiotic therapy treats infection. Prophylactic treatment of sexual contacts is also recommended and persons infected should abstain from sexual activity until they and their sex partners have been treated

Chlamydia by County & Gender 2001-2005

	Male				Female				Total			
	Cases	Rates*	95% CI		Cases	Rates*	95% CI		Cases	Rates*	95% CI	
Belknap	63	48.5	36.5	60.5	262	200.1	175.9	224.4	325	123.2	109.8	136.7
Carroll	30	33.9	21.6	46.2	132	143.5	118.8	168.2	162	88.2	74.4	101.9
Cheshire	139	72.4	60.3	84.5	311	160.5	142.7	178.4	450	116.2	105.4	126.9
Coos	54	81.8	59.9	103.8	138	196.7	163.7	229.7	192	138.3	118.6	158.0
Grafton	111	50.0	40.6	59.4	388	177.1	159.5	194.8	499	111.9	102.1	121.8
Hillsborough	867	94.9	88.6	101.3	2182	239.7	229.6	249.8	3049	166.2	160.3	172.1
Merrimack	267	80.6	70.9	90.3	712	182.7	168.1	197.2	979	130.3	121.7	139.0
Rockingham	317	51.9	46.1	57.7	926	149.7	140.0	159.5	1243	100.1	94.5	105.7
Strafford	223	70.7	61.4	80.0	695	207.1	191.7	222.6	918	140.8	131.7	150.0
Sullivan	52	58.9	42.8	75.0	275	313.6	276.4	350.8	327	183.6	163.6	203.6
Total	2123	71.8	68.7	74.8	6021	201.2	196.1	206.3	8144	135.7	132.8	138.7

** : Standardized rates per 100,000 persons*

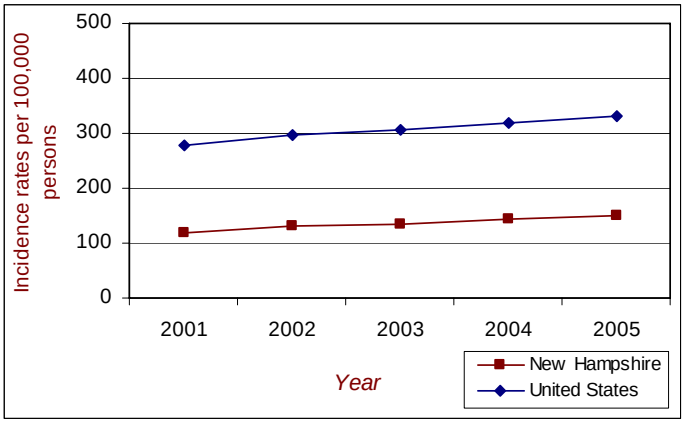
- : rates not calculated on counts <20

Chlamydia

	New Hampshire			United States	
	Cases	Rates*	95% CI	Cases	Rates*
2001	1396	118.7	112.5-125.0	783,242	278.3
2002	1554	130.7	124.2-137.2	834,555	296.6
2003	1611	134.1	127.5-140.7	877,478	304.7
2004	1752	144.4	137.7-151.2	929,462	319.6
2005	1831	149.5	142.6-156.4	976,445	332.5

* : Standardized rates per 100,000 persons

Chlamydia Incidence Rates
New Hampshire and the United States: 2001-2005

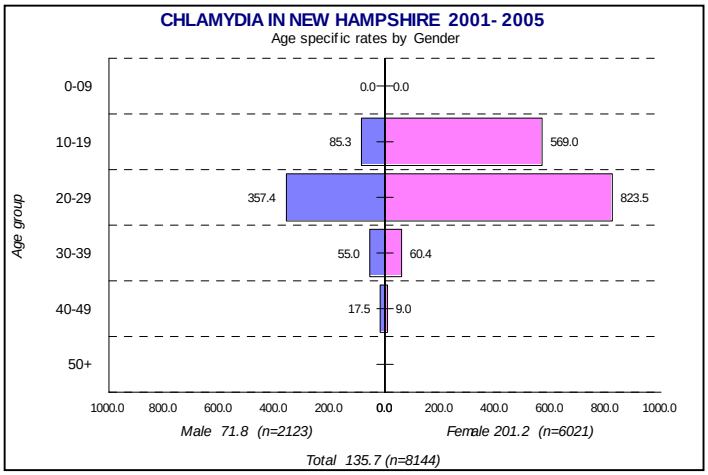


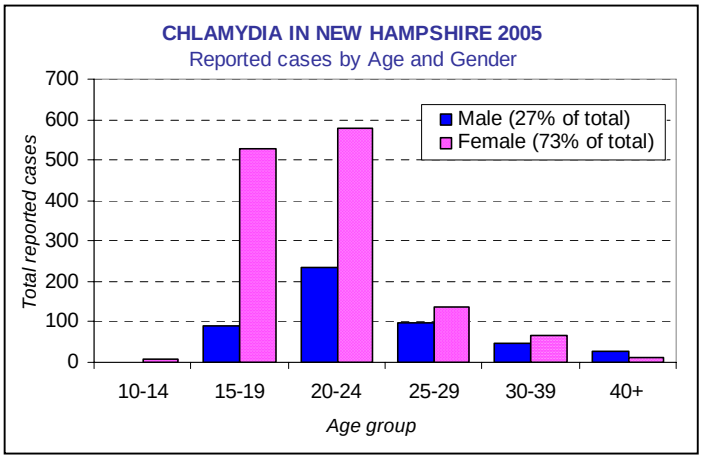
Chlamydia by City

	2001	2002	2003	2004	2005
Manchester	297	291	308	314	337
Nashua	119	183	141	136	170

Comments:

- The incidence of chlamydia has increased in recent years. The increase is due, in part, to increased screening efforts among sexually active adolescents and young adults
- From 2001 to 2005, an average of 4.8% of persons reported with a chlamydia infection tested positive more than once in the same year. The majority of these re-infections occur because the patient resumes sex with untreated partners or has new partners that are infected.
- Chlamydia is most prevalent among persons younger than 25 years of age regardless of gender. In 2005, 84% of females and 65% of males were in this age group.
- In 2005, 73% of the infections were in females.





NH Baseline 1999	512.7
NH Target 2010	513.0
NH 2005	603.8

Objective: Reduce the incidence of chlamydia infection among adolescents and young adults (per 100,000 population 15-24 years of age)

For additional information regarding this disease, please call the New Hampshire Department of Health and Human Services, STD-HIV Prevention Section at **1-800-852-3345 ext 4502**.

Epidemiology:

Shiga toxin-producing *Escherichia coli* (STEC), which includes *Escherichia coli* O157:H7, is a group of organisms that are enteric pathogens with the ability to produce potent toxin and cause severe illness.

The organisms live in the intestines of healthy cattle and meat can get contaminated during slaughter. Additionally, bacteria present on a cow's udders can contaminate raw milk. Water or vegetables contaminated with sewage or cattle feces can also cause infection.

Clinical features:

The incubation period is between 2 to 8 days, and the disease lasts for 5 to 10 days. Symptoms include abdominal pain, vomiting and diarrhea, which is often bloody. Fever is rare. One percent of affected individuals develop life-threatening hemolytic-uremic syndrome (HUS). HUS is a condition when the red blood cells are destroyed and the kidneys fail to function.

Disease control methods:

Fluid and electrolyte replacement is the only recommended therapy. Antibiotic therapy is generally not recommended as it may precipitate HUS. Anti-diarrheal agents should be avoided as well because they slow the elimination of pathogen from the body.

Prevention includes thorough cooking of ground beef to 160° with the use of a meat thermometer. Un-pasteurized milk, juice or cider should be avoided and fresh vegetables should be washed thoroughly or cooked before consumption. Meticulous hand washing prevents person-to-person transmission.

Shiga Toxin-Producing *Escherichia coli* by County & Gender 2001-2005

	Male				Female				Total			
	Cases	Rates*	95% CI		Cases	Rates*	95% CI		Cases	Rates*	95% CI	
Belknap	3	-	-	-	3	-	-	-	6	-	-	-
Carroll	4	-	-	-	7	-	-	-	11	-	-	-
Cheshire	11	-	-	-	11	-	-	-	22	5.9	3.4	8.4
Coos	2	-	-	-	3	-	-	-	5	-	-	-
Grafton	4	-	-	-	3	-	-	-	7	-	-	-
Hillsborough	16	-	-	-	25	2.6	1.6	3.7	41	2.1	1.5	2.8
Merrimack	6	-	-	-	8	-	-	-	14	-	-	-
Rockingham	10	-	-	-	7	-	-	-	17	-	-	-
Strafford	6	-	-	-	9	-	-	-	15	-	-	-
Sullivan	2	-	-	-	5	-	-	-	7	-	-	-
Total	64	2.1	1.6	2.6	81	2.5	2.0	3.1	145	2.3	1.9	2.7

** : Standardized rates per 100,000 persons*

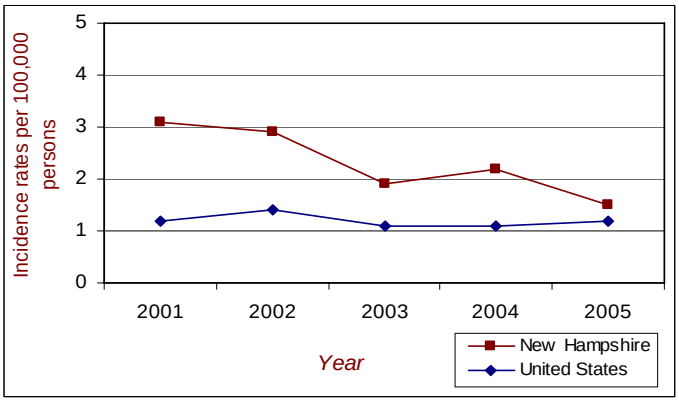
- : rates not calculated on counts <20

Shiga Toxin-Producing *Escherichia coli*

	New Hampshire			United States	
	Cases	Rates*	95% CI	Cases	Rates*
2001	38	3.1	2.1-4.0	3,477	1.2
2002	35	2.9	1.9-3.9	4,094	1.4
2003	24	1.9	1.1-2.7	3,079	1.1
2004	29	2.2	1.4-3.1	3,168	1.1
2005	19	1.5	0.8-2.1	3,502	1.2

* : Standardized rates per 100,000 persons

Shiga Toxin-Producing *Escherichia coli* Incidence Rates New Hampshire and the United States: 2001-2005



Shiga Toxin-Producing *Escherichia coli* by City

	2001	2002	2003	2004	2005
Manchester	1	1	0	1	2
Nashua	6	1	0	1	0

Comments:

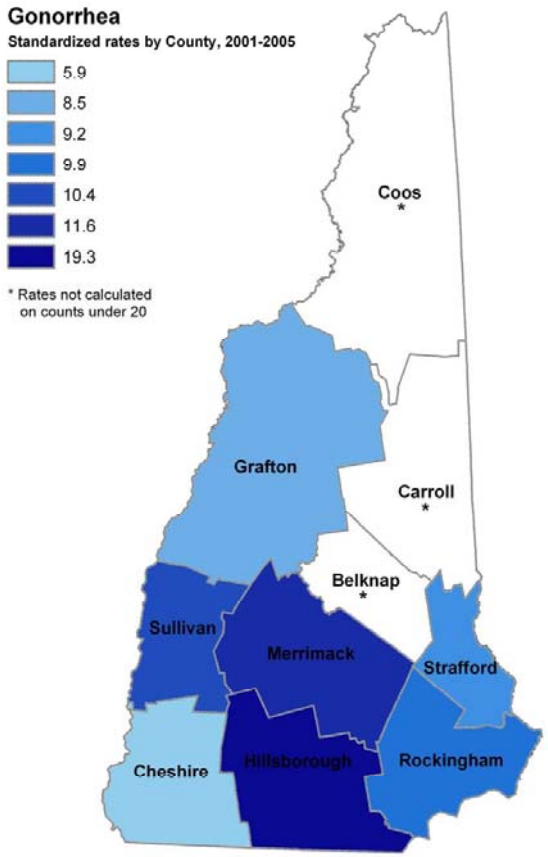
- The incidence of STEC has steadily decreased nationally and in NH in recent years. This decrease is attributed to improved sanitary conditions and practices in U.S. slaughter plants and during ground beef production.
- The incidence of STEC in NH is higher than the incidence in the U.S., although more recently it appears that the NH rate is more closely aligning with the national rate. The reason for this difference is not known.
- No outbreaks of STEC occurred in NH between 2003-2005. The last outbreak of STEC in NH occurred in 2000 and was a large multistate outbreak associated with contaminated ground beef from a meat production facility in NH.

For additional information regarding this disease, please call the New Hampshire Department of Health and Human Services, Communicable Disease Surveillance Section at 1-800-852-3345 ext 0279.

Epidemiology:

Gonococcal infection of the genitourinary tract, or gonorrhea, is a sexually transmitted disease common worldwide. The infectious agent, *Neisseria gonorrhoeae*, is a bacterium transmitted person-to-person through sexual activity. Some strains of the bacteria have become resistant to certain antibiotics.

The disease affects males and females of all ages but more commonly young adults. In the United States, an estimated 650,000 new infections occur each year.



Clinical features:

The incubation period is usually 2 to 7 days but may be longer. Gonorrhea may be asymptomatic and the period of communicability may extend for months in the untreated individual. Asymptomatic infections are common among females and less common among males. Symptoms in males may present as purulent urethral discharge or dysuria. Untreated infection in women may lead to pelvic inflammatory disease.

Disease control methods:

Antibiotic therapy treats infection. Disease control methods are accomplished by investigation of sexual contacts and identifying the source of infection. Persons diagnosed should abstain from sexual activity until antibiotic therapy is completed. Sexual contacts within 30 days preceding the diagnosis should be tested and treated presumptively for infection.

Gonorrhea by County & Gender 2001-2005

	Male				Female				Total			
	Cases	Rates*	95% CI		Cases	Rates*	95% CI		Cases	Rates*	95% CI	
Belknap	3	-	-	-	9	-	-	-	12	-	-	-
Carroll	4	-	-	-	5	-	-	-	9	-	-	-
Cheshire	13	-	-	-	10	-	-	-	23	5.9	3.5	8.3
Coos	3	-	-	-	7	-	-	-	10	-	-	-
Grafton	21	9.6	5.5	13.7	16	-	-	-	37	8.5	5.8	11.3
Hillsborough	195	20.4	17.5	23.3	166	18.3	15.5	21.1	361	19.3	17.3	21.3
Merrimack	31	9.4	6.1	12.7	46	14.0	9.9	18.0	77	11.6	9.0	14.2
Rockingham	68	10.1	7.7	12.6	61	9.8	7.3	12.3	129	9.9	8.2	11.6
Strafford	32	10.9	7.1	14.7	25	7.5	4.6	10.5	57	9.2	6.8	11.5
Sullivan	7	-	-	-	13	-	-	-	20	10.4	5.8	15.1
Total	377	12.4	11.1	13.6	358	11.9	10.7	13.2	735	12.1	11.2	13.0

** : Standardized rates per 100,000 persons*

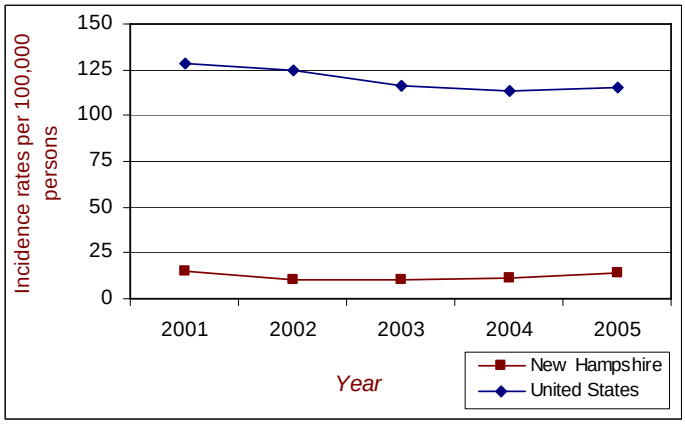
- : rates not calculated on counts <20

Gonorrhea

	New Hampshire			United States	
	Cases	Rates*	95% CI	Cases	Rates*
2001	179	15.2	13.0 -17.4	361,705	128.5
2002	120	10.1	8.3-11.9	351,852	125.0
2003	123	9.9	8.2-11.7	335,104	116.4
2004	134	10.9	9.0-12.7	330,132	113.5
2005	179	14.3	12.2-16.4	339,593	115.6

* : Standardized rates per 100,000 persons

Gonorrhea Incidence Rates
New Hampshire and the United States: 2001-2005

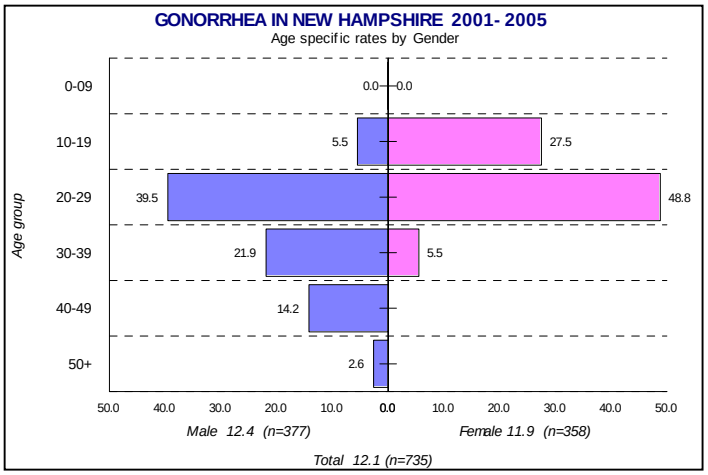


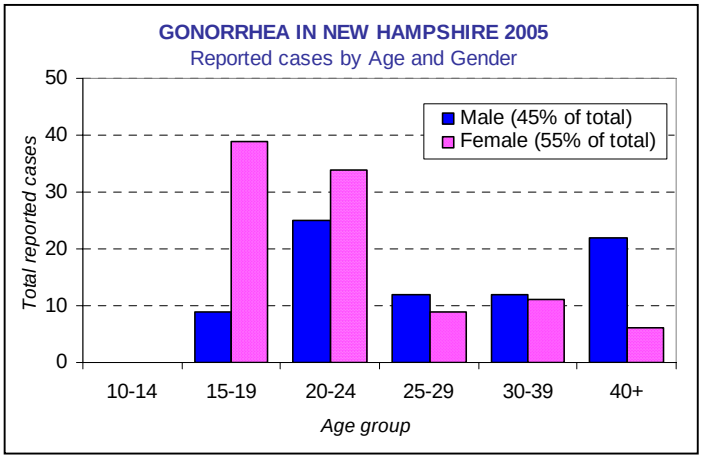
Gonorrhea by City

	2001	2002	2003	2004	2005
Manchester	81	30	26	26	49
Nashua	8	14	25	17	18

Comments:

- Gonorrhea incidence decreased 32% in 2002 followed by a significant increase in 2005 (60%). This increase was primarily due to a cluster of cases in Hillsborough County.
- Incident cases of gonorrhea occur most often among younger females (under 25) and slightly older males (over 30).
- Nationally, quinolone-resistant gonorrhea (QRNG) has increased in recent years. In NH, 14 QRNG isolates were reported between 2003 and 2005.
- The gender distribution shifted to higher incidence in females than males in 2005 as it did in 2001, corresponding to the increased infections for those years.
- NH has seen an increase in gonorrhea cases in the heterosexual population. This accounts for the higher rate of female infections.
- In 2003, 17% of the male gonorrhea cases identified heterosexual contact as a risk factor as compared to 45% of the males infected in 2005.

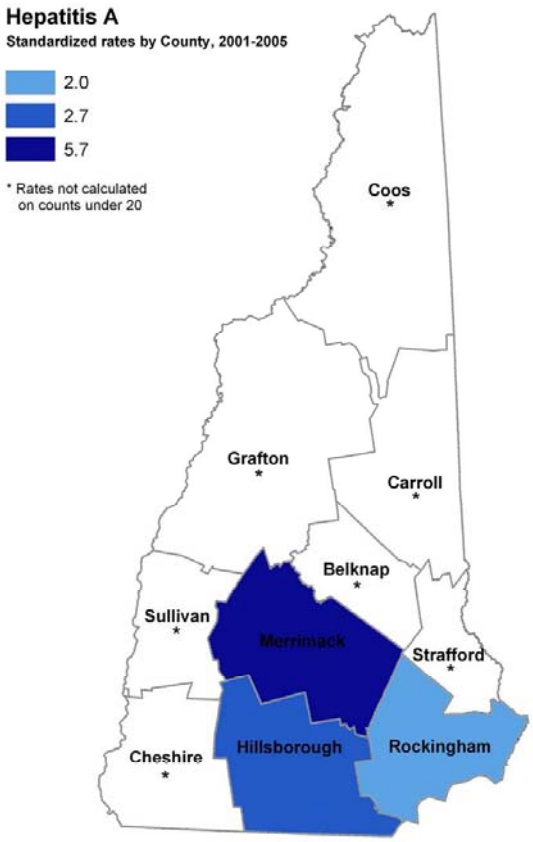




For additional information regarding this disease, please call the New Hampshire Department of Health and Human Services, STD-HIV Prevention Section at **1-800-852-3345 ext 4502**.

Epidemiology:

Hepatitis A is a liver disease caused by hepatitis A virus (HAV). It is transmitted by the fecal-oral route either through person-to-person contact or the ingestion of contaminated food or water. Most infections result from contact with a household member or sex partner who has HAV. However, common source outbreaks have been linked to contaminated water, food contaminated by infected food service workers, raw or undercooked mollusks harvested from contaminated waters, and contaminated produce such as lettuce and strawberries.



Clinical features:

The incubation period for hepatitis A is 15 to 50 days, with an average of 28 to 30 days. Individuals are most capable of transmitting the virus during the two-week period prior to and one week after the onset of symptoms.

Symptoms initially include fever, fatigue, loss of appetite, nausea, abdominal discomfort and diarrhea, followed within a few days by jaundice. Onset of illness is usually abrupt and duration may be 1 to 2 weeks to several months. Asymptomatic infections can occur and are more likely in children, while approximately 70% of adults with acute hepatitis A are symptomatic.

Disease control methods:

There is no specific treatment for hepatitis A beyond supportive care. Once recovered, a person cannot spread the disease further and cannot be infected with hepatitis A again.

Good sanitation and personal hygiene, with special emphasis on careful hand washing, is important to preventing the spread of HAV.

Close personal contacts to individuals infected with HAV should receive post exposure prophylaxis with immune globulin (IG). This must be given before exposure or within 2 weeks of the last exposure, and may provide protection for up to 3 months. Long-term protection can be achieved by receiving the hepatitis A vaccine. This vaccine was licensed in the U. S. in June 1995 and is safe and effective for the prevention of hepatitis A. In 2006, Hepatitis A vaccine was added to the routine childhood vaccination schedule.

Hepatitis A by County & Gender 2001-2005

	Male				Female				Total			
	Cases	Rates*	95% CI		Cases	Rates*	95% CI		Cases	Rates*	95% CI	
Belknap	6	-	-	-	4	-	-	-	10	-	-	-
Carroll	1	-	-	-	3	-	-	-	4	-	-	-
Cheshire	10	-	-	-	1	-	-	-	11	-	-	-
Coos	0	-	-	-	2	-	-	-	2	-	-	-
Grafton	4	-	-	-	3	-	-	-	7	-	-	-
Hillsborough	30	3.1	2.0	4.2	24	2.4	1.4	3.4	54	2.7	2.0	3.4
Merrimack	25	7.2	4.3	10.0	14	-	-	-	39	5.7	3.9	7.5
Rockingham	14	-	-	-	14	-	-	-	28	2.0	1.3	2.8
Strafford	1	-	-	-	2	-	-	-	3	-	-	-
Sullivan	0	-	-	-	0	-	-	-	0	-	-	-
Total	91	2.9	2.3	3.5	67	2.1	1.6	2.6	158	2.5	2.1	2.9

** : Standardized rates per 100,000 persons*

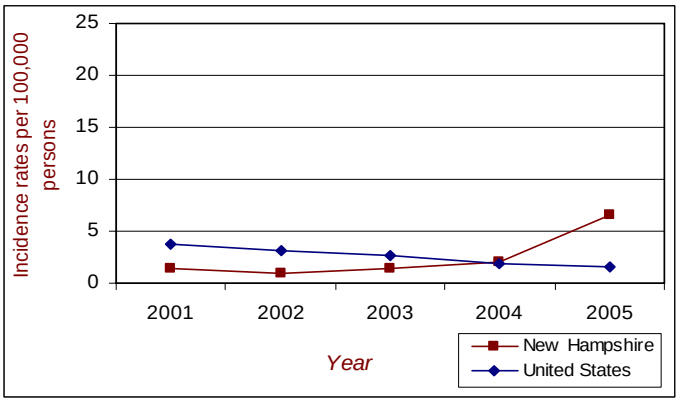
- : rates not calculated on counts <20

Hepatitis A

	New Hampshire			United States	
	Cases	Rates*	95% CI	Cases	Rates*
2001	18	1.4	0.8-2.1	10,609	3.8
2002	12	0.9	0.4-1.4	8,795	3.1
2003	19	1.4	0.8-2.0	7,653	2.7
2004	27	2.1	1.3-2.9	5,683	1.9
2005	82	6.5	5.1-7.9	4,591	1.6

* : Standardized rates per 100,000 persons

Hepatitis A Incidence Rates New Hampshire: 2001 - 2005



Hepatitis A by City

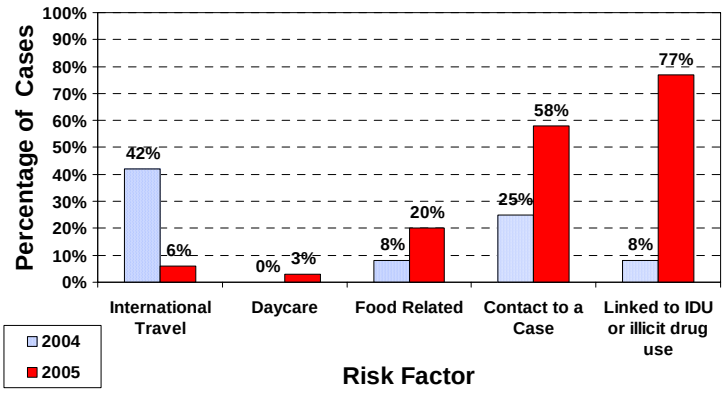
	2001	2002	2003	2004	2005
Manchester	6	1	0	2	8
Nashua	2	2	4	8	4

Comments:

Hepatitis A in NH significantly increased in 2005. From 2003 to 2004, there was a 42% increase in hepatitis A cases reported to the state. This continued in 2005 with 82 cases reported, a greater than 200% increase from 2004. This increase in cases resulted in comprehensive epidemiological investigations, which revealed a shift in the primary risk factor among NH cases.

Prior to 2005, the risk factors identified in NH cases mirrored national statistics, and international travel was the greatest known risk factor. However, in 2005 the risk factor most commonly associated with reported NH cases was illicit drug use. In 2004, the percentage of reported hepatitis A cases with illicit drug use as a known risk factor was 8%, which rose in 2005 to 77% of cases. Of that 77%, approximately 80% were identified as intravenous drug users (IDU), which is 61% of the total number of cases. Due to this change in risk factor, NH modified its prevention strategies and outbreak response to target the illicit drug use population. A comparison of risk factors by year is illustrated below.

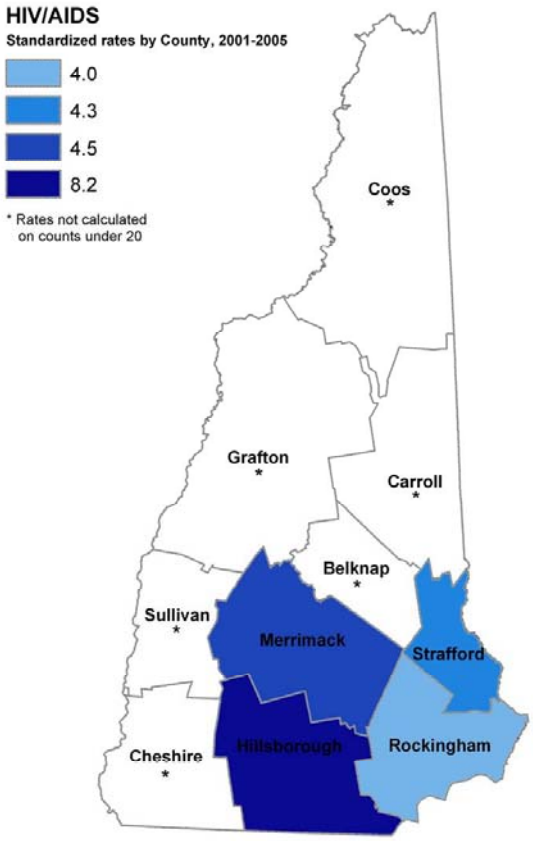
Reported Risk Factors for Hepatitis A New Hampshire, 2004-2005



For additional information regarding this disease, please call the New Hampshire Department of Health and Human Services, Communicable Disease Surveillance Section at 1-800-852-3345 ext 0279.

Epidemiology:

Human Immunodeficiency Virus (HIV) is a virus that spreads through the body attacking the CD4 (or t-helper) cells. HIV is the virus that leads to Acquired Immunodeficiency Syndrome (AIDS). HIV is spread person-to-person through sexual contact, sharing needles and/or syringes with an infected individual, and less commonly through transfusions of infected blood (this is rare where blood is screened for HIV at donation centers). Infected women can pass HIV to he baby during pregnancy, birth or through breastfeeding. After becoming infected, a person can transmit the virus at anytime. Individuals most at risk include men who have sex with men (MSM), injection drug users (IDU), and persons who have unprotected sex with an HIV-infected partner.



Clinical features:

Symptoms of HIV infection may not appear for years after infection. If untreated, it may take a person an average of 10 years to develop AIDS. People with AIDS have compromised immune function and may get sick from infections, called opportunistic infections, that don't usually affect persons with normal immune function. A person may be diagnosed with AIDS by either a low CD4 count or an opportunistic infection such as pneumocystis pneumonia.

Disease control methods:

The best way to prevent being exposed or becoming infected with HIV is to avoid high-risk behaviors such as sharing needles and having unprotected sex. HIV and AIDS are not curable conditions though many advances in medications can improve the quality of life for an infected person. The CDC recommends that voluntary HIV testing become part of regular medical care. CDC also recommends that all pregnant women get an HIV test as part of regular prenatal care and that additional third trimester testing be offered in areas where rates are increased for HIV.

HIV / AIDS by County & Gender 2001-2005

	Male				Female				Total			
	Cases	Rates*	95% CI		Cases	Rates*	95% CI		Cases	Rates*	95% CI	
Belknap	10	-	-	-	2	-	-	-	12	-	-	-
Carroll	3	-	-	-	1	-	-	-	4	-	-	-
Cheshire	11	-	-	-	2	-	-	-	13	-	-	-
Coos	5	-	-	-	2	-	-	-	7	-	-	-
Grafton	7	-	-	-	1	-	-	-	8	-	-	-
Hillsborough	119	11.9	9.8	14.1	43	4.4	3.1	5.8	162	8.2	6.9	9.5
Merrimack	21	6.1	3.5	8.7	10	-	-	-	31	4.5	2.9	6.0
Rockingham	47	6.5	4.6	8.4	12	-	-	-	59	4.0	2.9	5.0
Strafford	20	6.7	3.7	9.6	6	-	-	-	26	4.3	2.6	5.9
Sullivan	4	-	-	-	0	-	-	-	4	-	-	-
Total	247	7.9	6.9	8.9	79	2.5	2.0	3.1	326	5.2	4.6	5.7

** : Standardized rates per 100,000 persons*

- : rates not calculated on counts <20

AIDS

	New Hampshire			United States	
	Cases	Rates*	95% CI	Cases	Rates*
2001	31	2.4	1.6-3.3	41,868	14.9
2002	38	3.0	2.0-4.0	42,745	15.3
2003	40	3.1	2.1-4.0	44,232	15.4
2004	44	3.5	2.5-4.6	44,108	15.3
2005	30	2.5	1.6-3.4	41,120	14.0

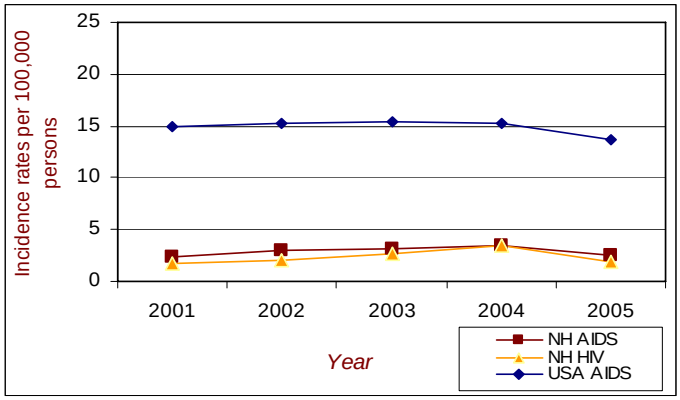
HIV

	New Hampshire			United States	
	Cases	Rates*	95% CI	Cases	Rates*
2001	22	1.8	1.0-2.5	+	+
2002	25	2.0	1.2-2.7	+	+
2003	33	2.6	1.7-3.5	+	+
2004	39	3.4	2.2-4.1	+	+
2005	24	1.9	1.1-2.7	+	+

* : Standardized rates per 100,000 persons

\+ :Data limited - See Technical Notes

HIV / AIDS Incidence Rates
New Hampshire and the United States: 2001-2005



HIV / AIDS by City

	2001	2002	2003	2004	2005
Manchester	22	16	20	13	8
Nashua	9	16	12	11	10

Comments:

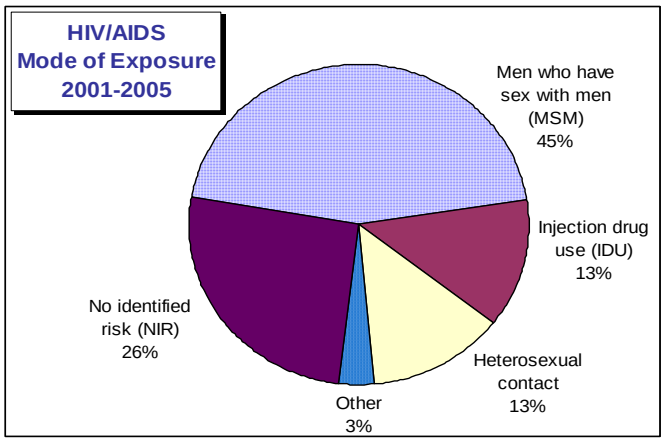
- HIV has been a reportable disease in NH since 1990, though reports of HIV were not required to list the name of the infected individual. On December 29th 2004, name-based HIV reporting became mandated under RSA 141-C. Requiring name-based reporting in NH assists with tracking of cases and ensures quality and accuracy of data.
- Of the total HIV/AIDS cases reported in 2001-2005, MSM was the predominant mode of exposure reported (45%), followed by heterosexual contact (13%), and IDU (13%).
- In 2004, there was an increase in HIV and AIDS cases reported compared to 2001-2003 data. This is likely attributed to an increase in refugee settlement in NH since these individuals often come from areas of high HIV incidence. Most often, refugees become infected in their home country and are later diagnosed in NH. In 2004, 28% of the total HIV/AIDS cases reported were from non-US born individuals.
- The term "concurrent diagnosis" in reference to HIV is defined as receiving an AIDS diagnosis within twelve months of an HIV diagnosis. The number of individuals concurrently diagnosed with AIDS in NH from 1999 to 2004, was 136 cases (41%). From 1994-1999, the national average was 41%.
- Hillsborough County accounted for half (50%) of the total HIV/AIDS cases reported.

HIV/AIDS by Mode of Exposure, 2001-2005

Mode of Exposure	HIV	AIDS	TOTAL
Men who have sex with men (MSM)	67	79	146
Injection drug use (IDU)	12	30	42
Heterosexual contact	18	25	43
Other*	2	9	11
No identified risk (NIR)**	44	40	84
Total	143	183	326

*Other may indicate; MSM/IDU, mother with/at risk for HIV, or transfusion recepient of blood/blood components.

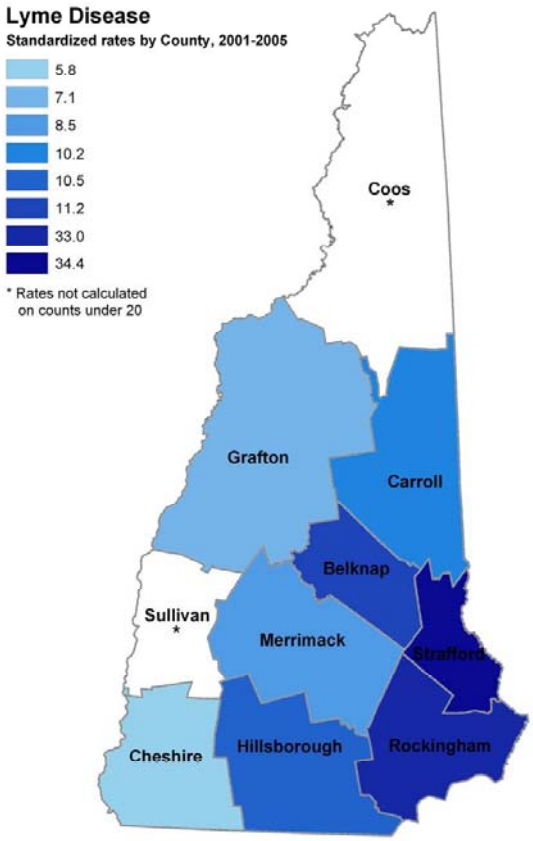
**NIR cases are investigated continually to update mode of exposure information



For additional information regarding this disease, please call the New Hampshire Department of Health and Human Services, STD-HIV Prevention Section at 1-800-852-3345 ext 4502.

Epidemiology:

Lyme disease was first discovered in the late 1970s when a cluster of children in and around Lyme, Connecticut developed arthritis-like symptoms. The bacteria that cause Lyme disease, *Borrelia burgdorferi*, are transmitted to humans through the bite of an infected deer tick (*Ixodes scapularis*). In the United States, most cases occur in the northeast and mid-Atlantic states.



Clinical features:

Lyme Disease usually presents with a characteristic "bull's eye" rash and is accompanied by fever, fatigue, headache, and muscle and joint aches. The incubation period from tick bite to development of the rash can be 3 to 32 days (average is 7 to 14 days). Some individuals can develop symptoms at a later stage without having any rash. If left untreated, chronic neurological and cardiac abnormalities can develop. There is no evidence that Lyme disease can be transmitted person-to-person. Lyme disease acquired during pregnancy may lead to infection of the placenta and stillbirth. However, no negative effects on the fetus have been found when the mother receives appropriate antibiotic treatment.

Disease control methods:

Up to 4 weeks of oral antibiotics are prescribed for the early stages of Lyme disease. For later stages, intravenous antibiotics may be recommended. Treatment failure can occur and retreatment may be necessary. Several actions can be taken to reduce the risk of tick bites: 1) avoid tick infested areas; 2) wear long sleeves/pants and tuck pants into socks when walking in areas where there are ticks; 3) wear light colored clothing so ticks can be easily spotted and removed; 4) apply insect repellent containing DEET to clothes and exposed skin; 5) check for ticks on body surfaces after being outdoors; if a tick is attached for less than 24 hours the risk of getting Lyme disease is extremely small.

Lyme Disease by County & Gender 2001-2005

	Male				Female				Total			
	Cases	Rates*	95% CI		Cases	Rates*	95% CI		Cases	Rates*	95% CI	
Belknap	18	-	-	-	16	-	-	-	34	11.2	7.3	15.0
Carroll	11	-	-	-	14	-	-	-	25	10.2	6.1	14.3
Cheshire	15	-	-	-	6	-	-	-	21	5.8	3.3	8.2
Coos	6	-	-	-	5	-	-	-	11	-	-	-
Grafton	18	-	-	-	11	-	-	-	29	7.1	4.4	9.7
Hillsborough	123	12.4	10.2	14.6	85	8.5	6.7	10.4	208	10.5	9.0	11.9
Merrimack	36	10.5	7.0	14.0	23	6.7	3.9	9.5	59	8.5	6.3	10.7
Rockingham	268	36.8	32.4	41.3	220	29.3	25.4	33.2	488	33.0	30.0	36.0
Strafford	112	39.3	32.0	46.7	87	29.9	23.6	36.2	199	34.4	29.6	39.2
Sullivan	2	-	-	-	5	-	-	-	7	-	-	-
Total	609	19.0	17.5	20.5	472	14.5	13.1	15.8	1081	16.7	15.7	17.7

** : Standardized rates per 100,000 persons*

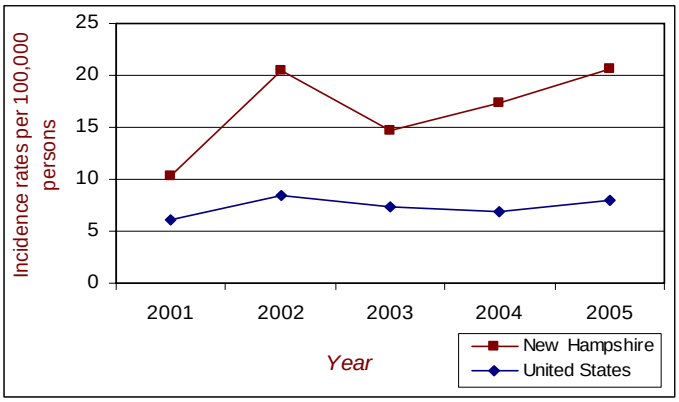
- : rates not calculated on counts <20

Lyme Disease

	New Hampshire			United States	
	Cases	Rates*	95% CI	Cases	Rates*
2001	129	10.2	8.4-11.9	17,029	6.1
2002	263	20.4	17.9-22.9	23,763	8.4
2003	190	14.7	12.6-16.8	21,273	7.4
2004	229	17.3	15.1-19.6	19,804	6.8
2005	270	20.7	18.2-23.2	23,364	8.0

* : Standardized rates per 100,000 persons

Lyme Disease Incidence Rates New Hampshire: 2001 - 2005

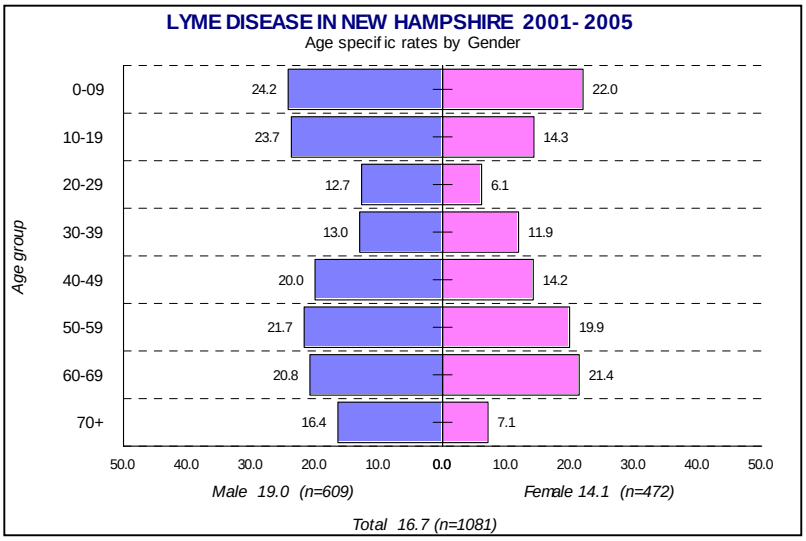


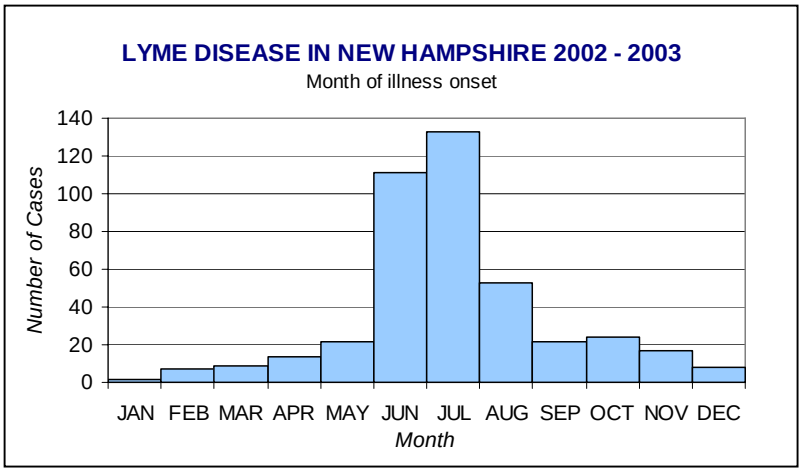
Lyme Disease by City

	2001	2002	2003	2004	2005
Manchester	3	7	4	5	12
Nashua	4	11	16	7	16

Comments:

- During recent years, NH has observed an increase in the incidence of Lyme disease. Several New England states have reported similar increases.
- Although persons of all ages and gender are susceptible to Lyme disease, it is most common among children aged 5-14 (especially boys) and persons aged 40 or older.
- In NH, incidence of Lyme disease is highest in the southeast region of the state.
- Prevention methods to reduce tick bites and duration of time ticks are attached, should be used by all individuals who spend time in wooded or grassy areas in NH. Special attention is required between May and August when the small nymphal ticks are likely to bite and transmit Lyme disease and when people spend more time outdoors.





For additional information regarding this disease, please call the New Hampshire Department of Health and Human Services, Communicable Disease Surveillance Section at 1-800-852-3345 ext 0279.

Epidemiology:

Meningococcal disease is an acute, potentially severe illness caused by the bacterium *Neisseria meningitidis*. At least 13 serogroups of *N. meningitidis* have been identified, and the relative importance of serogroups depends on geographic location and other factors, such as age. Asymptomatic colonization of the upper respiratory tract provides the source for spread of the organism. In a small percent of colonized persons, meningitis results when the organism enters the cerebrospinal fluid. Transmission occurs from person-to-person through respiratory droplets, or by direct contact. Communicability is generally limited. However, close contacts of persons with meningococcal disease are at increased risk for infection. College freshman living in dormitories for the first time are at increased risk of invasive meningococcal disease. Outbreaks have occurred in institutions, including childcare centers, schools, colleges, and military recruitment camps

Clinical features:

Invasive infection usually results in meningococcemia, meningitis, or both. Onset of meningococcemia (blood stream infection) is often abrupt, with fever, chills, malaise, prostration and a rash; death can result despite appropriate therapy. Signs and symptoms of meningococcal meningitis are indistinguishable from those of acute meningitis caused by other organisms and include sudden onset of fever, headache, and stiff neck, often with nausea, vomiting, light sensitivity and altered mental status. The incubation period is 1 to10 days and usually less than 4 days. Invasive meningococcal disease is diagnosed by isolation of *N. meningitidis* from a normally sterile site.

Disease control methods:

Early diagnosis of *N. meningitidis* and prompt administration of appropriate antibiotics greatly reduces the risk of serious complications. Refraining from activities that involve contact with another person's saliva (i.e., sharing water bottles, cigarettes, etc.) reduces the risk of contracting the disease. Routine childhood vaccination with meningococcal polysaccharide vaccine is not recommended for the general population, but is recommended for children ≥ 2 years of age in high-risk groups. Meningococcal conjugate vaccine is recommended for unvaccinated adolescents and college freshmen living in dormatories.

***Neisseria meningitidis* by County & Gender 2001-2005**

	Male				Female				Total			
	Cases	Rates*	95% CI		Cases	Rates*	95% CI		Cases	Rates*	95% CI	
Belknap	1	-	-	-	2	-	-	-	3	-	-	-
Carroll	2	-	-	-	1	-	-	-	3	-	-	-
Cheshire	4	-	-	-	7	-	-	-	11	-	-	-
Coos	1	-	-	-	0	-	-	-	1	-	-	-
Grafton	0	-	-	-	1	-	-	-	1	-	-	-
Hillsborough	8	-	-	-	8	-	-	-	16	-	-	-
Merrimack	3	-	-	-	4	-	-	-	7	-	-	-
Rockingham	5	-	-	-	5	-	-	-	10	-	-	-
Strafford	3	-	-	-	4	-	-	-	7	-	-	-
Sullivan	1	-	-	-	0	-	-	-	1	-	-	-
Total	28	0.9	0.5	1.2	32	1.0	0.7	1.4	60	1.0	0.7	1.2

** : Standardized rates per 100,000 persons*

- : rates not calculated on counts <20

Neisseria meningitidis

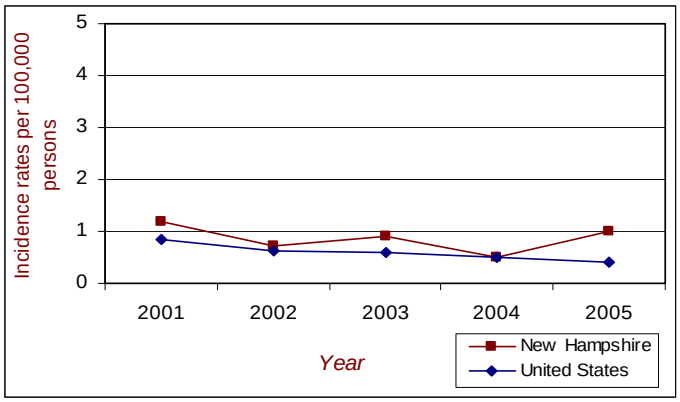
	New Hampshire			United States	
	Cases	Rates*	95% CI	Cases	Rates*
2001	15	1.2	0.6-1.8	2,333	0.8
2002	14	0.7	0.5-1.7	1,814	0.6
2003	12	0.9	0.4-1.4	1756	0.6
2004	7	0.5	0.1-0.9	1361	0.5
2005	12	1.0	0.4-1.5	1264	0.4

* : Standardized rates per 100,000 persons

Neisseria meningitidis by City

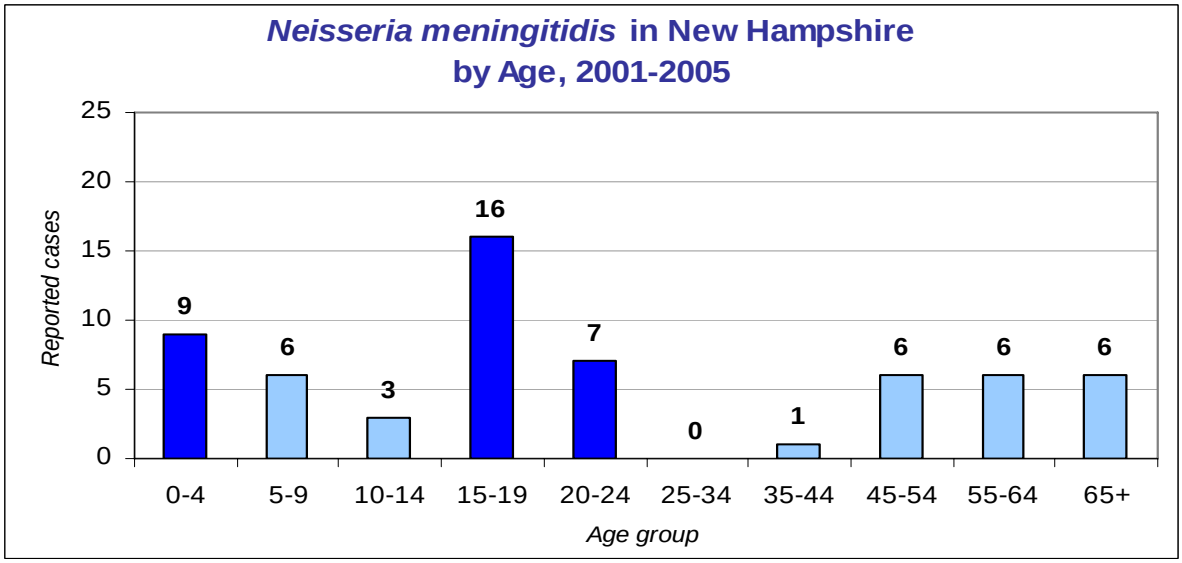
	2001	2002	2003	2004	2005
Manchester	3	1	1	0	3
Nashua	0	2	1	0	0

Neisseria meningitidis Incidence Rates New Hampshire and the United States: 2001-2005



Comments:

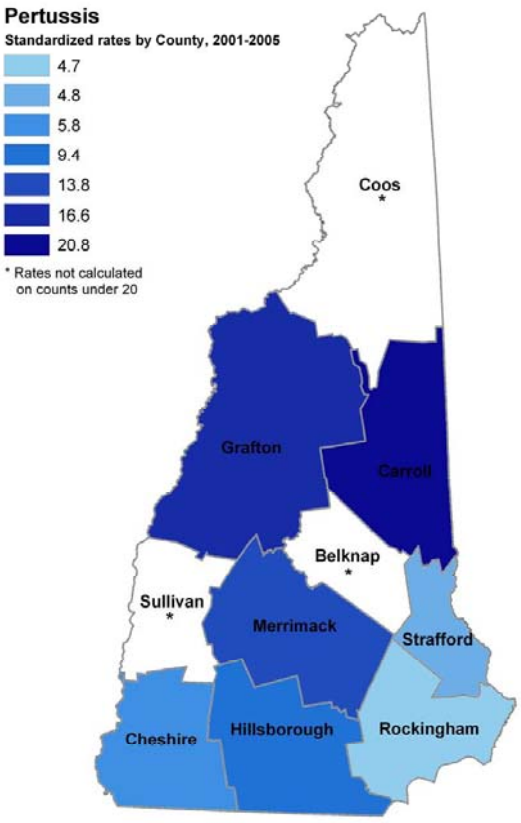
- The incidence rates in NH for 2001-2003 and 2005 are slightly higher than U.S. incidence rates for the same years, but the same as the U.S. rate in 2004.
- Reported NH cases were from all but one county, with the highest number of cases seen in the most populated counties. There were too few cases in all counties to calculate rates by county.
- There does not appear to be a gender difference, as rates were similar for both male and female.
- In NH, the age groups most affected are 0-4 years, 15-19 years, and 20-24 years.



For additional information regarding this disease, please call the New Hampshire Department of Health and Human Services, Communicable Disease Surveillance Section at 1-800-852-3345 ext 0279.

Epidemiology:

Pertussis, or whooping cough, is an acute infectious disease of the respiratory tract caused by the bacterium *Bordetalla pertussis*. It is transmitted from person-to-person through contact with respiratory secretions of an infected person. Pertussis occurs worldwide and outbreaks were first described in the 1500's. Since widespread use of pertussis vaccine, developed in the 1940's, incidence of pertussis has decreased dramatically. However, cases have been increasing in people >10 years of age due to waning immunity. Young infants are at highest risk of acquiring pertussis and pertussis-related complications.



Clinical features:

The clinical course of pertussis is divided into three stages. The catarrhal stage is characterized by mild upper respiratory tract symptoms, similar to the common cold and lasts 1-2 weeks. Mild symptoms progress to severe paroxysms of coughing (paroxysmal stage), often with a characteristic high-pitched whoop, followed by vomiting and exhaustion. The paroxysmal stage lasts 1-6 weeks. Symptoms subside gradually and may last weeks to months.

The incubation period is 5 to 21 days, usually 7 to 10 days. Pertussis is highly contagious, and persons are most infectious during the catarrhal stage and the first 2 weeks after cough onset (approximately 21 days).

Disease control methods:

Immunizing children at or less than 7 years of age against pertussis, along with diphtheria and tetanus, is recommended to prevent disease. Booster doses are now recommended for persons 11-18 years of age and for healthcare personnel. Along with supportive care for symptoms, antibiotic treatment is the method of choice. Hospitalization may be required, especially for infants less than 6 months of age. All close contacts of a person diagnosed with Pertussis should be treated with an appropriate course of antibiotics.

Pertussis by County & Gender 2001-2005

	Male				Female				Total			
	Cases	Rates*	95% CI		Cases	Rates*	95% CI		Cases	Rates*	95% CI	
Belknap	5	-	-	-	3	-	-	-	8	-	-	-
Carroll	27	26.1	16.1	36.0	15	-	-	-	42	20.8	14.4	27.2
Cheshire	9	-	-	-	11	-	-	-	20	5.8	3.2	8.4
Coos	4	-	-	-	7	-	-	-	11	-	-	-
Grafton	40	18.9	13.0	24.9	31	14.3	9.3	19.4	71	16.6	12.7	20.5
Hillsborough	77	7.6	5.9	9.3	110	11.2	9.1	13.3	187	9.4	8.0	10.7
Merrimack	43	11.7	8.2	15.2	57	15.9	11.8	20.1	100	13.8	11.1	16.6
Rockingham	33	4.4	2.9	5.8	37	5.0	3.4	6.7	70	4.7	3.6	5.8
Strafford	12	-	-	-	16	-	-	-	28	4.8	3.0	6.6
Sullivan	7	-	-	-	7	-	-	-	14	-	-	-
Total	257	7.9	7.0	8.9	294	9.3	8.2	10.3	551	8.6	7.9	9.3

** : Standardized rates per 100,000 persons*

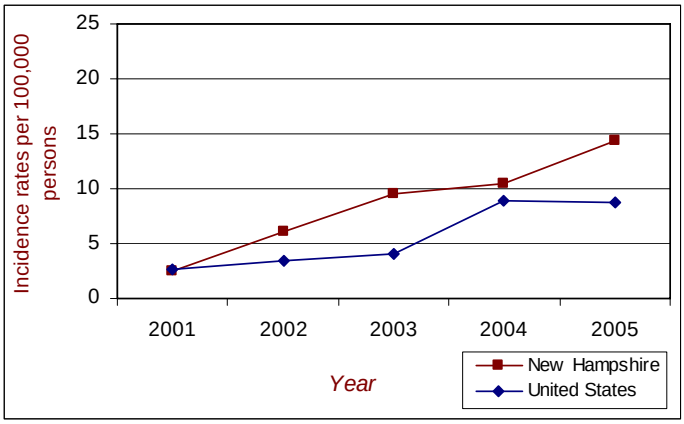
- : rates not calculated on counts <20

Pertussis

	New Hampshire			United States	
	Cases	Rates*	95% CI	Cases	Rates*
2001	31	2.5	1.6-3.3	7,580	2.7
2002	80	6.1	4.8-7.5	9,771	3.5
2003	120	9.5	7.8-11.2	11,647	4.0
2004	134	10.4	8.6-12.1	25,827	8.9
2005	186	14.4	12.3-16.5	25,616	8.7

* : Standardized rates per 100,000 persons

Pertussis Incidence Rates
New Hampshire and the United States: 2001-2005

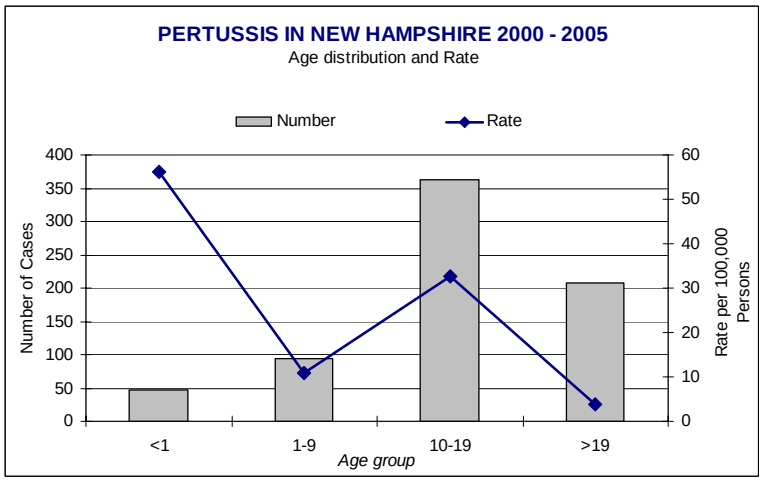


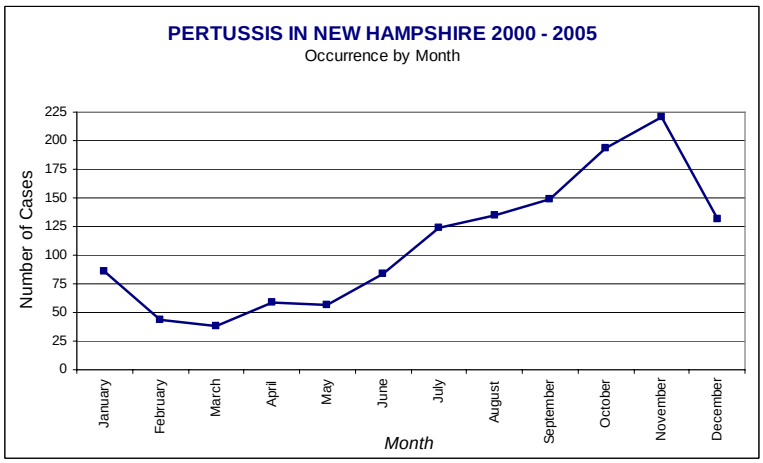
Pertussis by City

	2001	2002	2003	2004	2005
Manchester	0	16	5	3	30
Nashua	3	1	11	5	4

Comments:

- Except for 2001, incidence rates in NH are higher than rates seen in the U.S. This may be a result of thorough case investigations in NH, resulting in more cases identified.
- Although pertussis typically has no seasonality, cases may increase in the summer or fall, as demonstrated by NH cases reported in 2000-2005.
- Overall incidence of pertussis in NH is highest in infants <6 months of age, followed by persons 10-14 years of age, consistent with US data.
- There is no standard diagnostic test, which may lead to under reporting or over reporting of cases.

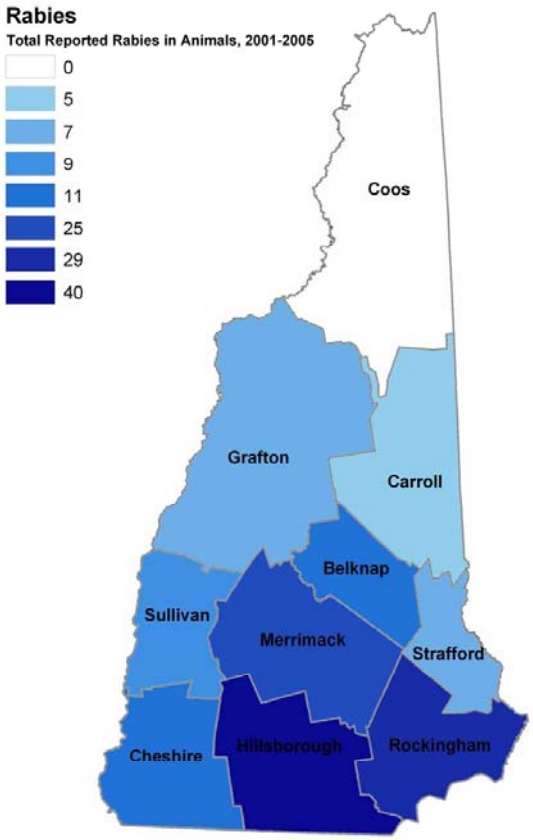




For additional information regarding this disease, please call the New Hampshire Department of Health and Human Services, Communicable Disease Surveillance Section at 1-800-852-3345 ext 0279.

Epidemiology:

Rabies is a viral disease that attacks the central nervous system. It can be transmitted to people through contact with the saliva, brain, or spinal cord tissue of a rabid animal. The rabid animal's infectious saliva gets through a person's flesh as it bites (bite exposure), or infectious saliva, brain, or spinal cord tissue from a rabid animal comes into contact with the lining of a person's eye, nose or mouth or with a recent cut, abrasion or other break in the person's skin (non-bite exposure).



Clinical features:

The first signs and symptoms of rabies infection may include pain at the site of injury, fever, and headache. Symptoms rapidly progress to cerebral dysfunction, muscle spasm in the throat leading to fear of water, anxiety, confusion, agitation, followed by abnormal behavior, hallucinations, and insomnia. In almost all cases, once an infected person becomes ill, death will occur. However, rabies can be effectively prevented if vaccination is given shortly after exposure and before the onset of illness.

Disease control methods:

If a person is bitten or has a non-bite exposure, wash the wound thoroughly with soap and water for 10 minutes. (Note: flush an exposed eye, nose or mouth with water or saline for 10 minutes.) This is extremely important as it may effectively wash away the rabies virus and prevent infection. The person should then be seen immediately by a physician or go to an emergency department for examination and any needed treatment. People whose work or hobbies bring them into frequent contact with potentially rabid animals should have a series of three rabies vaccine shots before they are exposed. They would then require only two vaccine shots after exposure.

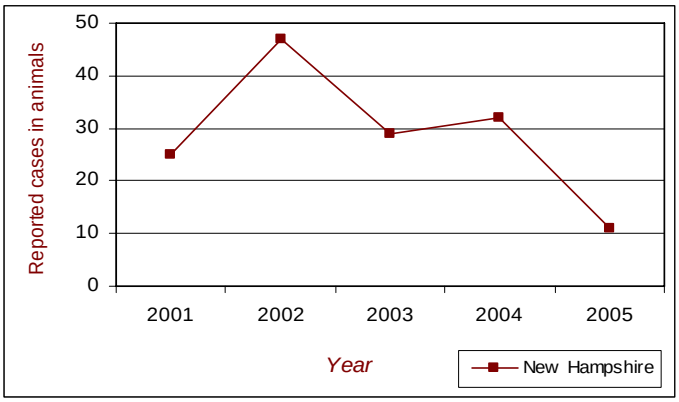
Rabies in Animals by County 2001-2005

COUNTY	TOTAL	BAT	CAT	CATTLE	FOX	RACCOON	SKUNK	WOODCHUCK
BELKNAP	**11**	0	0	0	0	7	3	1
CARROLL	**5**	1	1	0	0	2	1	0
CHESHIRE	**11**	1	0	1	0	4	5	0
COOS	**0**	0	0	0	0	0	0	0
GRAFTON	**7**	2	1	0	0	2	2	0
HILLSBOROUGH	**40**	7	0	1	3	14	11	4
MERRIMACK	**25**	5	0	1	3	5	10	1
ROCKINGHAM	**29**	2	0	0	1	18	8	0
STRAFFORD	**7**	0	0	0	2	3	2	0
SULLIVAN	**9**	2	0	1	0	4	2	0
TOTAL	**144**	**20**	**2**	**4**	**9**	**59**	**44**	**6**

Rabies

	New Hampshire		United States	
	animal	human	animal	human
2001	25	0	7,150	1
2002	47	0	7,609	3
2003	29	0	6,846	2
2004	32	0	6,345	7
2005	11	0	5,915	2

Rabies in Animals
New Hampshire: 2001-2005



Rabies in Animals by City

	2001	2002	2003	2004	2005
Manchester	1	6	1	5	0
Nashua	0	0	4	1	0

Comments:

Rabies in animals has been reported in both domestic and wild animals throughout NH. The number of rabid animals reported each year is in part a function of animal submissions, human-animal and animal-animal interactions, and fluctuations in animal populations. Between 2003 and 2005, 5% of the animals tested by the NH Public Health Laboratories had rabies. This is consistent with previous years. During the 3-year period, bats, skunks, foxes, and raccoons were the species in which rabies was most frequently detected; two cattle were diagnosed with rabies. Since 1990, one human rabies case has been documented in NH. This case occurred in 1996 and originated from a dog bite in Nepal.

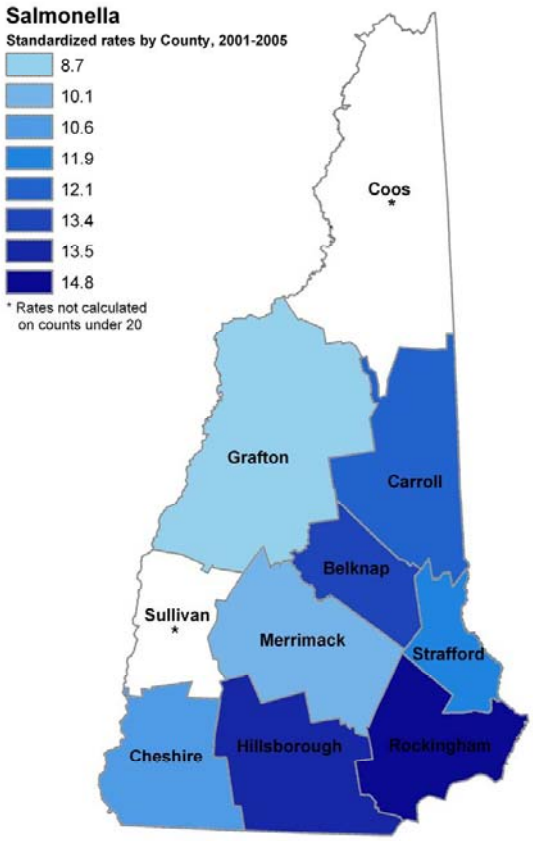
Rabies in Animals by Year and County, 2001-2005

	2001	2002	2003	2004	2005	TOTAL
BELKNAP	2	4	1	3	1	11
CARROLL	1	2	1	1	0	5
CHESHIRE	4	3	2	2	0	11
COOS	0	0	0	0	0	0
GRAFTON	1	1	1	1	3	7
HILLSBOROUGH	5	13	11	10	1	40
MERRIMACK	4	8	3	9	1	25
ROCKINGHAM	4	11	6	5	3	29
STRAFFORD	2	2	2	0	1	7
SULLIVAN	2	3	2	1	1	9
TOTAL	25	47	29	32	11	144

For additional information regarding this disease, please call the New Hampshire Department of Health and Human Services, Communicable Disease Surveillance Section at 1-800-852-3345 ext 0279.

Epidemiology:

Salmonellosis is a bacterial diarrheal illness caused by *Salmonella*. *Salmonella* lives in the intestinal tracts of humans and other animals, including birds. The microorganism is transmitted to humans by eating contaminated food of animal origin or other foods contaminated by animal waste. The most commonly recognized vehicles are beef, poultry, eggs, and fresh produce. Another recognized source is reptiles.



Clinical features:

The incubation period for salmonellosis is between 6 to 72 hours and duration of illness is about one week. Symptoms include headache, abdominal pain, diarrhea, nausea and sometimes vomiting. The elderly, infants, and immunocompromised individuals are at risk of developing a generalized illness, which requires hospitalization and prompt treatment with antibiotics.

Disease control methods:

Treatment includes rehydration and electrolyte replacement. Antibiotic therapy is only recommended for infants, elderly, or debilitated patients with prolonged illness or complications. Antibiotic resistance has become increasingly more common among certain types of *Salmonella*. It is important for clinicians that chose to treat patients with antibiotics to determine antimicrobial susceptibility of the patient's type of *Salmonella*.

Meat and egg products should be thoroughly cooked to help prevent salmonellosis. Changes in farm practices may help to reduce the number of produce-associated outbreaks. Reptiles, including turtles, should be avoided as pets for infants and small children.

Salmonellosis by County & Gender 2001-2005

	Male				Female				Total			
	Cases	Rates*	95% CI		Cases	Rates*	95% CI		Cases	Rates*	95% CI	
Belknap	19	-	-	-	21	13.9	7.8	20.1	40	13.4	9.2	17.6
Carroll	13	-	-	-	14	-	-	-	27	12.1	7.3	16.9
Cheshire	23	12.9	7.6	18.2	16	-	-	-	39	10.6	7.2	14.0
Coos	8	-	-	-	9	-	-	-	17	-	-	-
Grafton	18	-	-	-	18	-	-	-	36	8.7	5.8	11.6
Hillsborough	134	13.9	11.5	16.3	125	13.1	10.8	15.4	260	13.5	11.8	15.1
Merrimack	36	10.4	7.0	13.8	35	9.5	6.3	12.7	71	10.1	7.7	12.5
Rockingham	109	15.9	12.8	18.9	98	13.5	10.8	16.3	207	14.8	12.7	16.8
Strafford	30	10.7	6.9	14.6	37	12.8	8.6	16.9	67	11.9	9.0	14.8
Sullivan	10	-	-	-	9	-	-	-	19	-	-	-
Total §	400	13.0	11.7	14.3	382	12.0	10.8	13.2	783	12.6	11.7	13.5

** : Standardized rates per 100,000 persons*

- : rates not calculated on counts <20

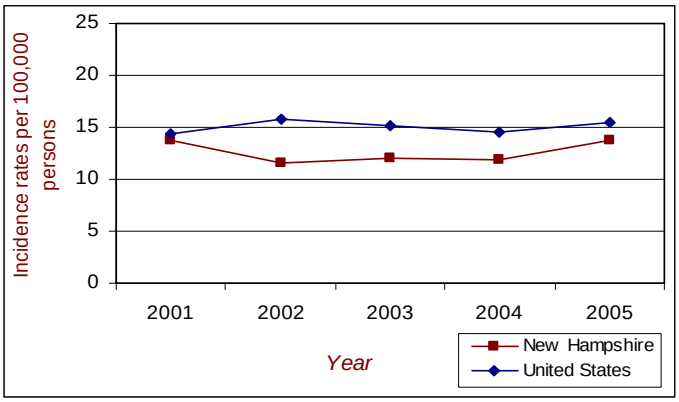
§ : 1 unknown gender in age group 0-9: included in total rate calculations : excluded from gender specific calcualtion

Salmonellosis

	New Hampshire			United States	
	Cases	Rates*	95% CI	Cases	Rates*
2001	168	13.7	11.6-15.8	40,495	14.4
2002	142	11.5	9.6-13.4	44,264	15.7
2003	152	12.1	10.2-14.1	43,657	15.2
2004	145	11.8	9.8-13.7	42,197	14.5
2005	176	13.7	11.7-15.8	45,425	15.5

* : Standardized rates per 100,000 persons

Salmonellosis Incidence Rates
New Hampshire and the United States: 2001-2005

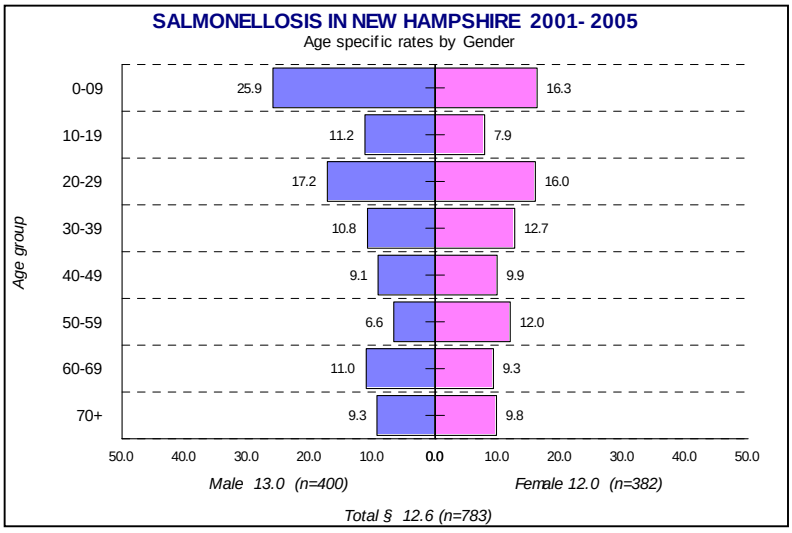


Salmonellosis by City

	2001	2002	2003	2004	2005
Manchester	15	11	14	15	14
Nashua	18	16	10	11	11

Comments:

- The incidence of salmonellosis has remained stable over recent years. The rate in NH is comparable to the rate of infections in the U.S.
- The three most common serotypes nationally and in NH are *Salmonella* Tyhpimurium, *Salmonella* Enteritidis, and *Salmonella* Newport.
- The age group most affected by salmonellosis is young children. This increase in incidence in younger years is often attributed to person-to-person transmission from parents and other children in the home or in daycare settings.
- Between 2003-2005, there were 15 outbreaks of salmonellosis affecting NH residents. Several outbreaks were large multistate outbreaks associated with produce like lettuce and tomatoes.



For additional information regarding this disease, please call the New Hampshire Department of Health and Human Services, Communicable Disease Surveillance Section at 1-800-852-3345 ext 0279.

Epidemiology:

Syphilis is a genital ulcerative disease caused by the bacterium *Treponema pallidum*. It is a sexually transmitted disease that is spread through direct person-to-person contact with a syphilis lesion (called a chancre). This lesion is painless and will heal without treatment; however, the disease will still progress to latent stages causing serious complications throughout the body. Treatment at any stage of disease will stop progression but will not correct damage done to that point. Syphilis also creates a situation where human immunodeficiency virus is more easily transmitted.

Clinical features:

Primary syphilis is an infection that is often diagnosed by a single chancre on the body. Chancres can be found primarily on the external genitals or on the lips or mouth of an infected person. They also occur on the vulva, in the rectum or on the anus and often go undetected allowing the disease to progress. Secondary syphilis is marked by a skin rash and mucous membrane lesions and will resolve without treatment as well. Latent syphilis is the final stage of syphilis and can affect the brain, nerves, eyes, heart, blood vessels, liver, bones, and joints. All stages of infection can progress to neurosyphilis at any time. This neurological involvement can cause dementia, ophthalmic and auditory symptoms, and cognitive dysfunctions.

Disease control methods:

Syphilis is treated with an intramuscular injection of penicillin. It is important to seek treatment in order to minimize the progression of disease, which can manifest years later. Partner treatment interventions are targeted during the primary and secondary stages of syphilis since these are the most infectious stage of disease. All pregnant women should be screened for syphilis. Pregnant women diagnosed with any stage of disease should be treated immediately because they can pass the disease to the baby.

Syphilis by County & Gender 2001-2005

	Male				Female				Total			
	Cases	Rates*	95% CI		Cases	Rates*	95% CI		Cases	Rates*	95% CI	
Belknap	0	-	-	-	0	-	-	-	0	-	-	-
Carroll	3	-	-	-	1	-	-	-	4	-	-	-
Cheshire	1	-	-	-	0	-	-	-	1	-	-	-
Coos	1	-	-	-	0	-	-	-	1	-	-	-
Grafton	4	-	-	-	1	-	-	-	5	-	-	-
Hillsborough	43	4.3	3.0	5.7	20	1.9	1.1	2.8	63	3.2	2.4	4.0
Merrimack	21	5.9	3.3	8.4	1	-	-	-	22	3.1	1.8	4.4
Rockingham	21	3.1	1.7	4.4	6	-	-	-	27	1.9	1.2	2.7
Strafford	7	-	-	-	4	-	-	-	11	-	-	-
Sullivan	2	-	-	-	0	-	-	-	2	-	-	-
Total	103	3.3	2.7	3.9	33	1.0	0.7	1.4	136	2.1	1.8	2.5

** : Standardized rates per 100,000 persons*

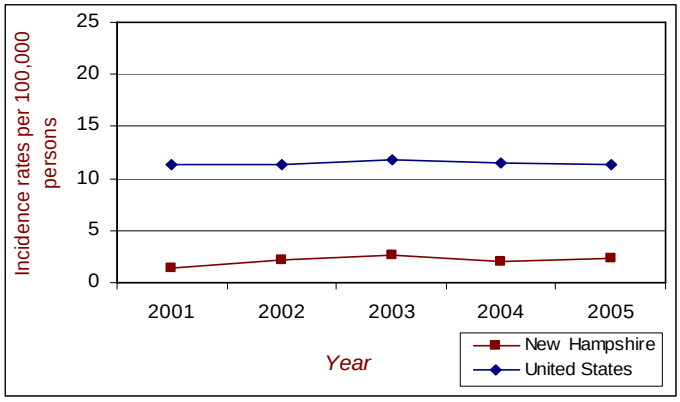
- : rates not calculated on counts <20

Syphilis

	New Hampshire			United States	
	Cases	Rates*	95% CI	Cases	Rates*
2001	17	1.4	0.7-2.1	32,221	11.5
2002	26	2.1	1.3-2.9	32,871	11.7
2003	34	2.6	1.8-3.5	34,270	11.9
2004	26	2.0	1.3-2.8	33,401	11.9
2005	33	2.4	1.6-3.3	33,278	11.3

* : Standardized rates per 100,000 persons

Syphilis Incidence Rates
New Hampshire and the United States: 2001-2005



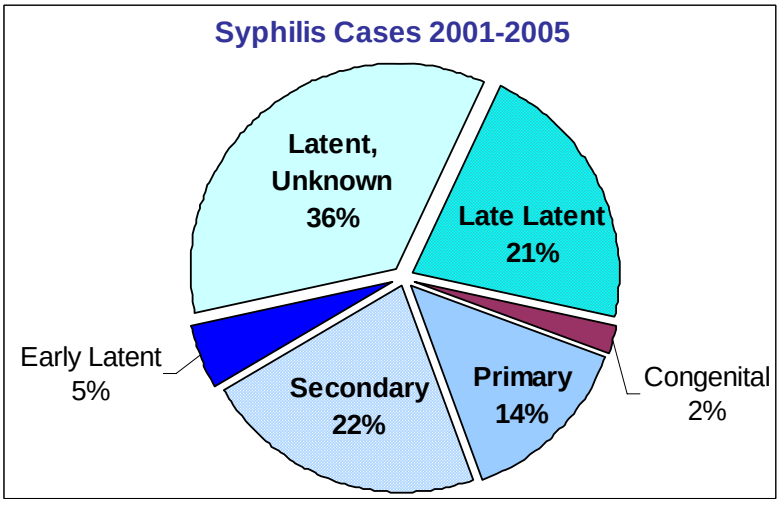
Syphilis by City

	2001	2002	2003	2004	2005
Manchester	3	7	7	5	7
Nashua	2	5	5	3	10

Comments:

- Across the US, an increased number of syphilis cases were reported in 2001 and 2002.
- NH noted an increase of primary and secondary syphilis cases in 2003 (19 cases) and again in 2005 (16 cases).
- The rate of infection is higher in males than in females.
- NH has seen an increase in co-infection of syphilis and HIV.
- The number of primary and secondary syphilis cases co-infected with HIV from 2003-2005 was 12 out of 40 reported cases (30%).
- Hillsborough County accounted for 46% of reported syphilis cases from 2001-2005.
- Congenital syphilis cases reported in 2004 were foreign-born.

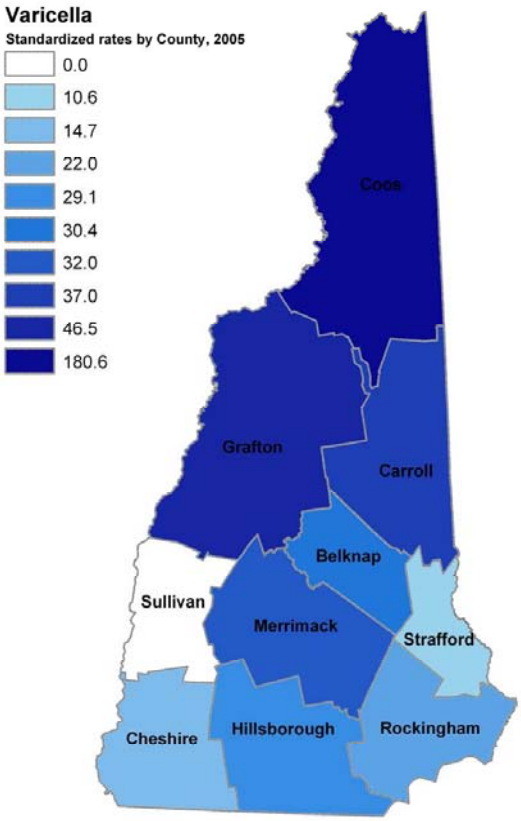
Syphilis Cases 2001-2005



For additional information regarding this disease, please call the New Hampshire Department of Health and Human Services, STD-HIV Prevention Section at 1-800-852-3345 ext 4502.

Epidemiology:

Varicella (chickenpox) is an acute infection caused by varicella zoster virus (VZV). VZV can stay in the body's nerve cells without symptoms and appear later as herpes zoster or shingles. Herpes zoster has been recognized since ancient times, while varicella was not reliably distinguished from smallpox until the late 1800's. Varicella and herpes zoster infections occur worldwide. In the United States, varicella infection peaks in winter and early spring. With licensure of varicella vaccine in 1995 and increasing vaccination rates, overall disease incidence has been greatly reduced. Varicella is highly contagious. It is transmitted person-to-person by direct contact, droplet or airborne spread of respiratory secretions or vesicle fluid from persons with varicella or herpes zoster.



Clinical features:

In children, rash appearance is generally the first sign of varicella, while adults may have 1 to 2 days of fever and malaise prior to rash onset. The rash is generalized, pruritic, and progresses rapidly from macules to papules to vesicular lesions before crusting. There may be lesions in several stages of development, as successive crops appear over several days. Lesions first appear on the scalp, progress to the trunk and then appear on the extremities. The incubation period is usually 14 to 16 days but can range from 10 to 21 days. Communicability occurs from 1 to 2 days before rash onset to 5 days following rash appearance. Varicella is generally a mild disease in otherwise healthy children, but adults may have more severe disease and complications.

Disease control methods:

Two doses of varicella vaccine are recommended for all children and for susceptible adolescents and adults to prevent or modify disease. Treatment options include anti-viral medication for select high-risk patients, but is not recommended for otherwise healthy children. Exclusion of cases or unvaccinated persons from institutional settings, such as schools and daycares, helps control outbreaks of varicella.

Varicella by County & Gender 2005

	Male				Female				Total			
	Cases	Rates*	95% CI		Cases	Rates*	95% CI		Cases	Rates*	95% CI	
Belknap	10	40.0	15.0	65.0	5	20.5	2.4	38.6	15	30.4	14.9	45.8
Carroll	3	-	-	-	10	60.8	22.7	98.9	13	37.0	16.6	57.4
Cheshire	5	15.0	1.7	28.3	4	-	-	-	9	14.7	5.0	24.4
Coos	25	195.3	118.5	272.1	20	163.2	90.5	236.0	45	180.6	127.4	233.8
Grafton	11	29.6	11.7	47.4	23	64.2	37.5	91.0	34	46.5	30.6	62.5
Hillsborough	55	28.4	20.9	36.0	55	29.8	21.9	37.6	110	29.1	23.7	34.5
Merrimack	22	34.3	19.9	48.6	18	29.4	15.8	43.1	40	32.0	22.0	41.9
Rockingham	39	28.4	19.5	37.3	20	15.3	8.6	22.1	59	22.0	16.4	27.7
Strafford	5	9.0	1.1	16.9	7	12.3	3.1	21.5	12	10.6	4.6	16.7
Sullivan	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0
Total	175	29.7	25.3	34.1	162	28.6	24.2	33.0	337	29.2	26.0	32.3

** : Standardized rates per 100,000 persons*

- : rates not calculated on counts <5

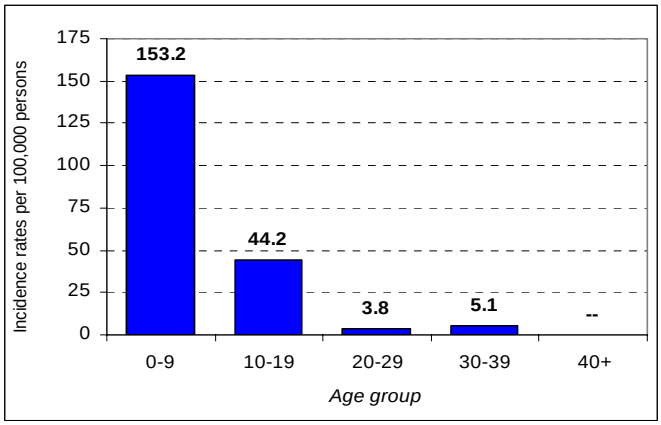
Varicella

	New Hampshire			United States	
	Cases	Rates*	95% CI	Cases	Rates*
2001	*nr*	*nr*	*nr*	22,536	19.5
2002	*nr*	*nr*	*nr*	22,841	10.3
2003	*nr*	*nr*	*nr*	20,948	7.3
2004	*nr*	*nr*	*nr*	32,931	18.4
2005	337	29.2	26.0-32.1	32,242	19.6

* : Standardized rates per 100,000 persons

nr : Not reportable

Varicella Incidence in New Hampshire Age specific rates, 2005



-- : rates not calculated on counts <5

Varicella by City

	2001	2002	2003	2004	2005
Manchester	*nr*	*nr*	*nr*	*nr*	30
Nashua	*nr*	*nr*	*nr*	*nr*	13

Comments:

- Case-based varicella reporting began in NH in 2005, and therefore rates are not available for 2001-04.
- U.S. data is limited because states differ in varicella reporting. The U.S. 2004 rate was calculated using a population data set, minus the state populations where varicella was not reportable in those states.
- NH 2005 rates are significantly higher than U.S. 2005 adjusted rates; however, more data is needed to make an accurate comparison.
- In county breakdowns, Coos County rates are significantly higher than rates seen in the rest of the State. The majority of cases in that county were related to a single outbreak in a school.
- Of the total cases reported in Coos County (n=45), 64% (29) were vaccinated, 29% (13) were not vaccinated, and 7% (3) were of unknown vaccination status.
- Diagnosis of varicella is largely based on physician, school nurse, or parental observation of the rash. Rarely are cases laboratory confirmed. The lack of laboratory confirmation may lead to an overestimate of the actual number of cases that occur in NH.

For additional information regarding this disease, please call the New Hampshire Department of Health and Human Services, Communicable Disease Surveillance Section at 1-800-852-3345 ext 0279.

Arboviral Disease
Eastern Equine Encephilitis and West Nile Virus
New Hampshire, 2003-2005

In 1999, the New Hampshire Department of Health and Human Services developed a surveillance program to detect mosquito-borne viruses (arboviruses). Surveillance data provide advanced information about where and when arboviruses are occurring in NH to assist in the planning of appropriate prevention and control measures. The two main arboviruses recognized in NH and known to cause human and animal disease are Eastern Equine Encephalitis (EEE) virus with the first recent NH human case identified in 2004, and West Nile virus (WNV) with the first NH human cases in 2003.

Eastern Equine Encephalitis

The risk of EEE virus infection in humans is a function of exposure to infectious human-biting mosquitoes. Most people infected with EEE will not have symptoms of disease, while others may report only a mild flu-like illness with fever and headache. However, for people with infection of the central nervous system, a sudden high fever, severe headache, and stiff neck can be followed quickly by seizures, coma, and death. Approximately 30% of those diagnosed with EEE will die. Human cases of EEE occur sporadically in the United States in sequential cycles lasting 2-3 years, with a hiatus of numerous years between outbreak and high-risk years. Between 1964 and 2005, 242 human cases of EEE were reported in the US, with an average of 5 cases per year.

West Nile Virus

Similar to EEE, WNV is spread to humans through the bite of mosquitoes infected with the virus. WNV causes sporadic disease in humans, and occasionally results in significant outbreaks. Up to 20% of people who become infected will display mild symptoms (WNV fever), including fever, headache, body aches, and sometimes swollen lymph glands. Symptoms can last for days to months. Approximately one in 150 people infected with WNV will develop severe illness (neuroinvasive disease). Symptoms of neuroinvasive disease can include high fever, headache, neck stiffness, disorientation, coma, convulsions, muscle weakness, and paralysis. Between 2003 and 2005, there were 5,296 human cases of WNV neuroinvasive disease and 9,706 human cases of WNV fever reported nationwide; 483 cases died.

Statewide Surveillance Activity 2003-2005

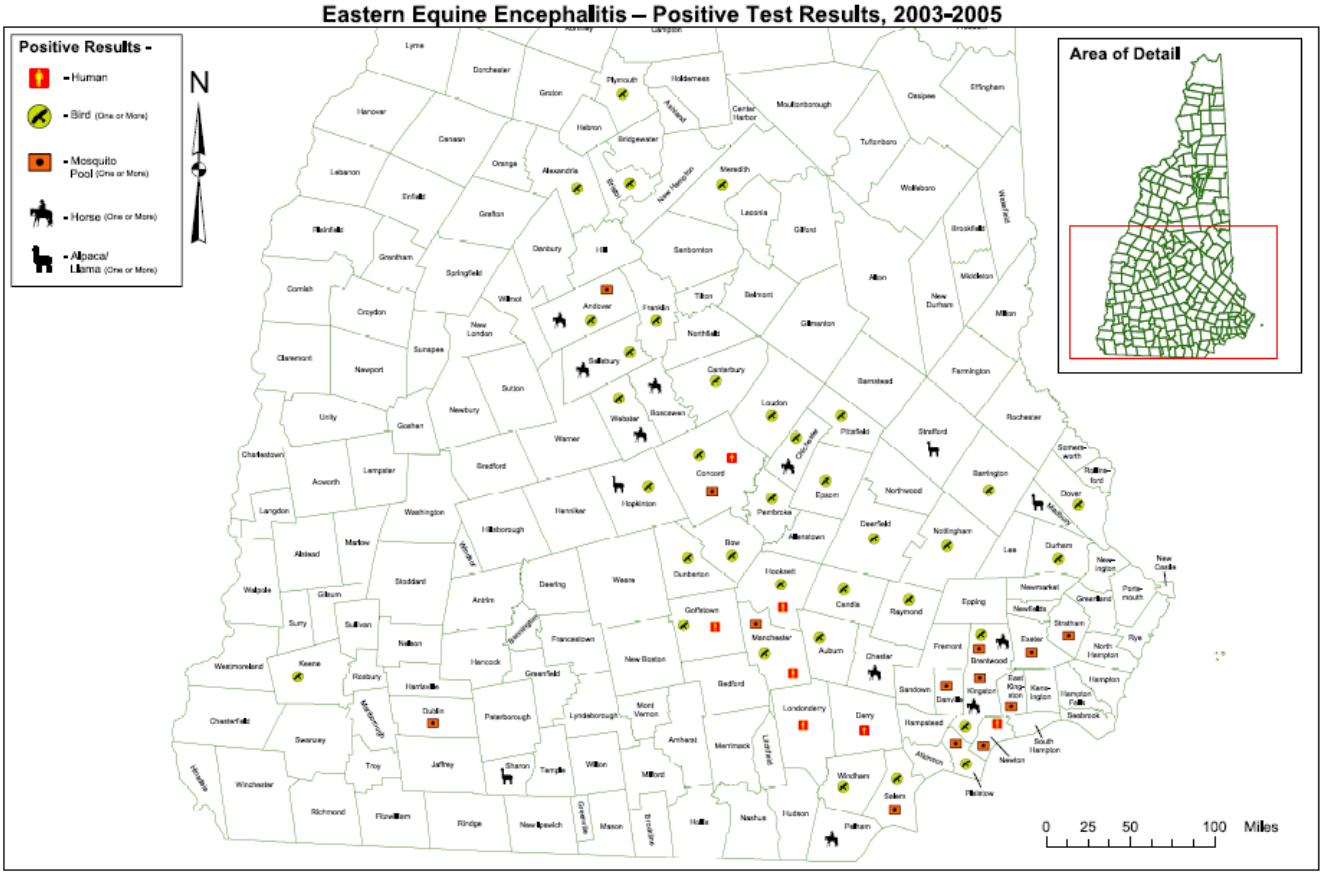
Human Surveillance: NH health care providers submitted 436 specimens from persons who were suspected of having encephalitis or aseptic meningitis. Specimens were tested at the NH Public Health Laboratories. Three WNV human cases were detected in 2003. Patients resided in Belknap, Hillsborough, and Rockingham counties. Two of the three cases were acquired outside of NH. All three patients survived. An occupationally acquired EEE infection was detected in 2004 (not included in state reporting due to nature of the illness). The individual was performing a necropsy on an infected emu (bird) out-of-state. During August-September 2005, seven cases of human EEE disease were reported. Symptom onset occurred between the week beginning August 1 through the week beginning September 12. Median age of the patients was 40 (range: 4 years to 80 years); five were male. All 7 patients were hospitalized and two died. Patients resided in three counties (Hillsborough, Merrimack, and Rockingham).

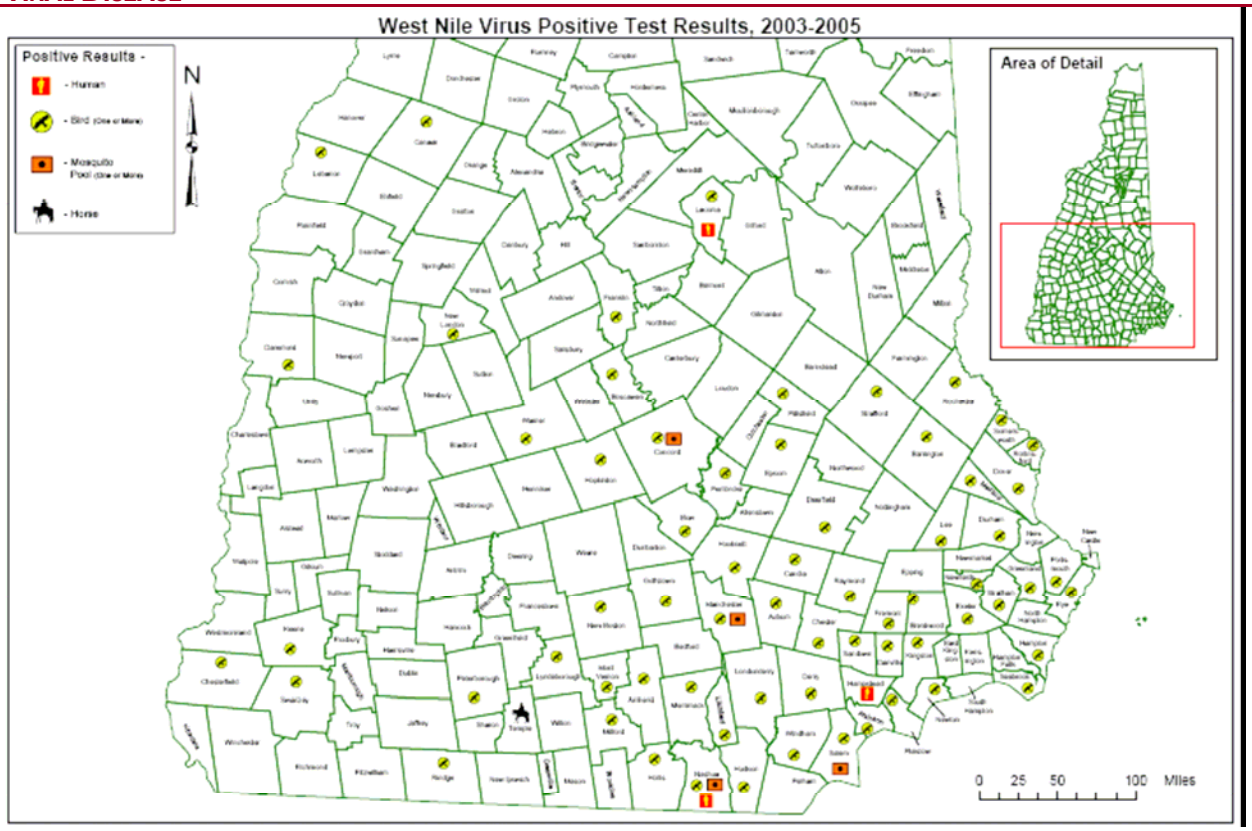
Animal Surveillance: The NH Public Health Laboratories and NH Veterinary Diagnostic Laboratory conduct testing of horses and other domestic animals (e.g., llamas, alpacas, emus) that have severe neurological disease suspected of being caused by EEE virus or WNV infection. A total of 13 equine cases (12 EEE, 1 WNV) were reported from 3 counties: Rockingham (7), Merrimack (5), and Hillsborough (1). EEE was detected in 5 emus, 4 alpacas, and 1 llama [Merrimack (4), Hillsborough (2), Rockingham (1), and Strafford (3) Counties].

Avian Surveillance: Of the 667 dead birds submitted, 273 (41%) tested positive for WNV. Corvids (crows – 180, bluejays – 79) accounted for the majority of birds testing positive for WNV. Of the 251 dead birds submitted for EEE testing, 52 (21%) tested positive; wild bird testing for EEE did not occur in 2003 and 2004. House finches (11) and bluejays (6) accounted for the majority of birds testing positive for EEE. Positive birds were submitted from Belknap, Cheshire, Grafton, Hillsborough, Merrimack, Rockingham, and Strafford counties.

Mosquito Surveillance: Mosquitoes submitted for testing are grouped by species, site, and date of collection into a "pool" of 1 to 25 individual mosquitoes of the same species. A total of 11,067 mosquito pools were submitted for testing at the NH Public Health Laboratories. Mosquitoes are typically collected and tested from June 1 through early October. Limited testing for EEE occurred in 2003 and 2004. Seven pools tested positive for WNV; 34 pools tested positive for EEE. Species testing positive for WNV included *Culex pipiens/restuans*, *Ochlerotatus canadensis*, and *Ochlerotatus triseriatus.* Species testing positive for EEE included *Aedes cinereus*, *Aedes vexans*, *Coquillettidia perturbans*, *Culex pipiens*, *Culiseta melanura*, *Culiseta morsitans*, and *Ochlerotatus canadensis.* Positive pools were collected in Cheshire, Hillsborough, Merrimack, and Rockingham counties.

Eastern Equine Encephalitis – Positive Test Results, 2003-2005





New Hampshire Arboviral Testing by Year, 2003-2005
(Not all specimens submitted were suitable for testing)

	2003			2004			2005		
	Tested	Positive		Tested	Positive		Tested	Positive	
		WNV	EEE		WNV	EEE		WNV	EEE
Humans	114	3	0	91	0	1[f]	229	0	7
Birds	341	213	NA[a]	72	14	NA[a]	243	46	52
Mosquito Pools	4375	6	0[b]	2723	0	19[c]	3969	1	15
Horses	5	1	0	12	0	3	25	0	9
Other	0	0	0	4	0	3[d]	8	0	7[e]

[a] Wild birds were not tested for EEE during 2003 and 2004;
[b] Only *Culiseta melanura* tested;
[c] Testing began in late August;
[d] Emus (3);
[e] Emus (2), alpaca (4), llama (1);
[f] Not included in state reporting due to nature of illness.

Individuals interested in finding more information about WNV and EEE, including criteria and procedures for sample submissions, may call 1-800-852-3345 x 4496, or 603-271-4496.

The NH EEE and WNV Arboviral Illnesses website is
http://www.dhhs.state.nh.us/DHHS/CDCS/West+Nile+Virus/default.htm

Congenital Rubella Syndrome
Imported Case in New Hampshire, 2004

This report provides an overview of Rubella and describes an imported case of Congenital Rubella Syndrome that occurred in New Hampshire in 2004.

Background

Clinical Features:

Rubella. Rubella is a disease caused by a virus, and, when acquired after birth, is usually a mild illness. Up to 50% of infections may be subclinical or inapparent. In children, the rash is usually the first symptom. In older children and adults, often a 1 to 5 day prodrome with low-grade fever, malaise, generalized lymphadenopathy, and upper respiratory symptoms precedes the rash. Arthralgia and arthritis occur so frequently in adults that they are considered by many to be an integral part of the illness, rather than a complication.

Congenital Rubella. Infection with rubella virus in the first trimester of pregnancy can be disastrous. Maternal rubella infection can result in miscarriage, fetal death, or an array of congenital abnormalities known as congenital rubella syndrome (CRS). The severity of effects on the fetus largely depends on when the infection occurred during pregnancy. The occurrence of congenital defects may be as high as 85% if maternal infection occurs during the first month of pregnancy. Congenital infection can affect virtually all organ systems. Deafness is the most common, and may be the only manifestation, especially if infection occurred after the 4th month of pregnancy. However, eye defects such as cataracts, cardiac defects, microcephaly, mental retardation, bone alterations, and liver and spleen damage all may occur. Manifestations of CRS can be delayed up to 2 to 4 years.

Epidemiology:

A rubella epidemic in the U.S. in 1964-65 resulted in 12.5 million cases of rubella infection and about 20,000 newborns with CRS. Since licensure of rubella vaccine in 1969, the number of reported rubella and CRS cases in the U.S. has declined dramatically. The number of reported CRS cases declined 96% from 77 cases in 1970 to 3 cases in 2001. Two of the three infants with CRS in 2001 had foreign-born mothers. Worldwide, an estimated 100,000 infants are born with CRS each year.

Postnatal rubella is transmitted primarily through direct or droplet contact from nasopharyngeal secretions. The peak incidence of infection in the U.S. is during late winter and early spring. The period of maximum communicability extends from a few days before to 7 days after onset of rash. Infants with CRS continue to shed the virus in nasopharyngeal secretions and urine for 1 year or more, and can transmit the virus to susceptible people.

The incubation period for postnatally acquired rubella is 14 to 23 days, usually 16 to 18 days. The maculopapular rash appears about 14 to 17 days after exposure and lasts about 3 days. The rash appears initially on the face, and then progresses from head to foot.

Diagnosis:

Many rash illnesses can mimic rubella infection. The only reliable evidence of acute rubella infection is the presence of rubella-specific IgM antibody, a significant rise in IgG antibody from paired acute and convalescent sera, a positive viral culture for rubella, or detection of the virus.

Imported case in New Hampshire

In 2004, a case of imported CRS was diagnosed in an infant girl aged 10 weeks born in NH to Liberian refugee parents. The infant's family resettled in the U.S. on February 17, 2004. On March 1, 2004, the family reported to a local health department for refugee health screening, which included review of vaccination history and receipt of additional recommended vaccinations. A medical record indicated that the mother had received measles vaccination during refugee encampment in Côte d'Ivoire in October 2003; no additional vaccination history was documented. Contraindications to live virus vaccination, including current or planned pregnancy, were reviewed. No contraindications were indicated, and the mother received vaccinations including measles-mumps-rubella vaccination.

On March 26, 2004, the mother reported to an emergency department (ED) with nausea and vomiting and was found to be pregnant. During her routine prenatal visit a month later, she was confirmed by blood testing to be immune to rubella. On November 4, 2004, she gave birth to a female infant weighing 5 lbs, 10oz, with estimated gestational age approximately 38 weeks. The infant was noted to have a left eye cataract; referral to an ophthalmologist resulted in the repair of the cataract 5 weeks later. The infant passed her newborn hearing test for her right ear; her left ear required further evaluation by an audiologist. During two subsequent well-baby visits, a head circumference of <5th percentile was noted. No other abnormalities were noted.

At age 10 weeks, the infant presented to the ED with fever, vomiting, irritability, and poor feeding and was hospitalized. During her hospital course, she was diagnosed with microcephaly, patent ductus arteriosus, bilateral hearing impairment, hepatosplenomegaly, and failure to thrive. On the basis of these findings, CRS was suspected. Diagnosis was confirmed by positive rubella IgM and positive cultures from urine and nasopharyngeal specimens. The genetic sequence was determined by laboratories at the Centers for Disease Control and Prevention (CDC) to be the wild-type rubella virus, similar to a sequence found in Uganda in 2001.

The state and local health department staff who conducted the contact investigation targeted community and medical settings where exposure of susceptible persons might have occurred. Contacts were defined as persons who had touched the infant or who had come into contact with the infant's secretions. Of the 20 contacts identified, 18 were immune to rubella by history or antibody titer. One contact could not be reached; one was unvaccinated because of HIV infection. The unvaccinated individual had no symptoms of rubella infection for at least 4 weeks after contact with the infant.

On January 31, 2005, the U.S. Department of State notified investigators that a rubella outbreak had occurred during February – April 2004 in Côte d'Ivoire. This outbreak, which was linked to four refugee transit centers, resulted in 34 confirmed rubella cases; no CRS cases were reported. The transit center in which the infant's family had lived was not affected by this outbreak, but they had come in contact with refugees from affected centers during a brief hotel stay in Abidjan, Côte d'Ivoire on February 16 prior to departure to the U.S. Based on the infant's gestational age, the mother's last menstrual period and conception were projected to have occurred on February 8 and February 22, 2004, respectively. Viremia begins 5-7 days after exposure to rubella and lasts approximately one week. Therefore, in utero infection of the fetus likely occurred during this stage. The mother reported no symptoms of acute rubella infection, but it is important to note that subclinical rubella infections can occur in up to 50% of rubella cases.

This case is an important reminder for clinicians to maintain a high index of suspicion for CRS in infants with relevant clinical signs, particularly those infants born to recently immigrated women from countries with no, or recently implemented, national rubella control program. Timely diagnosis of CRS can prevent exposure of susceptible individuals to rubella virus shed by an infant with CRS. Vaccination of susceptible persons, such as recently resettled refugees and those who serve these populations, will also help prevent disease transmission.

This report is a summary of the investigation published in the CDC's Morbidity and Mortality Weekly Report in 2005 (see references section for more information).

Foodborne Outbreak Surveillance and the use of Molecular Methods: Importance of Specimen Collection and Submission to Public Health Laboratories

The development of molecular laboratory techniques has significantly contributed to the recognition of foodborne outbreaks in the last decade. The epidemiology of foodborne outbreaks in the United States has seen a shift from the typical easier-to-detect point source outbreaks to large, widespread outbreaks that may affect only a few people in each state. This shift is due to the centralization of food production and our ability to detect outbreaks through molecular methods. Because the food supply in the U.S. is largely centrally processed and food items are distributed across the country, recognition of foodborne outbreaks can be difficult if only a few people become ill in each area where a food may be distributed (ie. one or two cases in each state). Molecular techniques, which can indicate relatedness between specific strains of bacteria found in patients across the state and country, significantly enhance recognition of outbreaks caused by a common food item.

Between 2003-2005, there were several large multistate outbreaks that were identified in the U.S. by State Public Health Laboratories using molecular techniques. Many of these outbreaks received national attention including three separate tomato-associated outbreaks of *Salmonella* affecting hundreds of people across the northeast in 2004.

Use of molecular techniques relies on specimen submission by patients and subsequent delivery of the specimen to the NH Public Health Laboratories (NH PHL). When a patient with gastrointestinal symptoms visits a healthcare provider and submits a stool specimen, the stool specimen will be submitted to a clinical microbiology laboratory where it will be analyzed for enteric pathogens. If a bacterial enteric pathogen is isolated from the patient's stool, the isolated bacteria (called an isolate) should be forwarded to the NH PHL for further testing. Once at the NH PHL, all isolates of *Salmonella*, *Shigella*, *Listeria*, *Campylobacter*, and Shiga toxin-producing *E. coli* (STEC) undergo a molecular technique called pulsed-field gel electrophoresis (PFGE). The PFGE process produces a DNA fingerprint of the isolate provided by each patient. These fingerprints can then be compared between patients; if some are found to have the same fingerprint, this may indicate that the patients became infected from a common source. The fingerprints from NH patients are uploaded to a national database called PulseNet, which is maintained by the Centers for Disease Control and Prevention. PulseNet scientists are then able to compare fingerprints from across states to look for patients with the same fingerprints.

Table 1. Number of PFGE Foodborne Illness Clusters* Identified in NH, NH Clusters and Multistate Clusters involving NH Residents, 2003-2005

Identified Clusters	2003	2004	2005	Total
PFGE Clusters in NH	20	14	17	51
Multistate Clusters involving NH Residents	13	18	16	47
Total	33	32	33	98

* A cluster is defined as 2 or more isolates with indistinguishable PFGE fingerprints within a 30 day period.

In 2005, NH PHL identified 28 *Salmonella* clusters, four *E. coli* O157:H7 clusters, and one *Shigella* cluster. Once identified, PFGE clusters are followed up with an epidemiologic investigation to determine whether the cluster is a true foodborne outbreak. After additional epidemiologic investigation six of the 33 clusters (18%) in 2005 were determined to be common source foodborne outbreaks.

PFGE analysis has proved particularly useful in distinguishing between sporadic cases and outbreak-related cases of common diseases. For example, approximately 40 to 64 cases of *Salmonella* serotype Enteritidis and *Salmonella* serotype Typhimurium, the two most common types of *Salmonella* in

the U.S., are reported in NH each year. This represents approximately 30% of all reported cases of *Salmonella*. In 2005, a total of seven *S*. Typhimurium clusters and eight *S*. Enteritidis clusters were identified in NH. Of those 15, only four were found to be common source outbreaks and involved 26 patients (approximately 50% of all reported *S*. Typhimurium and *S*. Enteritidis cases in NH). Because of how common these particular types of *Salmonella* are, PFGE allows for the efficient use of limited public health resources by helping to distinguish between sporadic cases and related cases. With over 30,000 cases of *Salmonella* reported each year to the CDC, the utility of PulseNet and PFGE testing is apparent in the number of outbreaks recognized that may otherwise go undetected.

The major limitation of a molecular outbreak surveillance system such as PulseNet is that it is entirely reliant on a physician's decision to collect the specimen in the first place and the delivery of the isolate from the local clinical microbiology laboratory to the NH PHL. For clinicians, diarrhea is a common clinical presentation and is often treated empirically or symptomatically. According to the Infectious Diseases Society of America, any patient with community-acquired diarrhea lasting more than one day, especially if accompanied by fever, bloody stool, systemic illness, recent use of antibiotics, day-care center attendance, hospitalization, or dehydration, should have a stool sample cultured for the presence of *Salmonella*, *Shigella*, and *Campylobacter* species and, in certain circumstances, *E. coli* O157:H7 and *Clostridium difficile*. Once these pathogens are identified in the patient's stool, the isolate should then be forwarded to the NH PHL. Currently, all 50 states and U.S. territories have statutes that mandate the submission of certain isolates to public health agencies. Increased specimen collection and submission would improve outbreak detection here in NH and across the U.S.

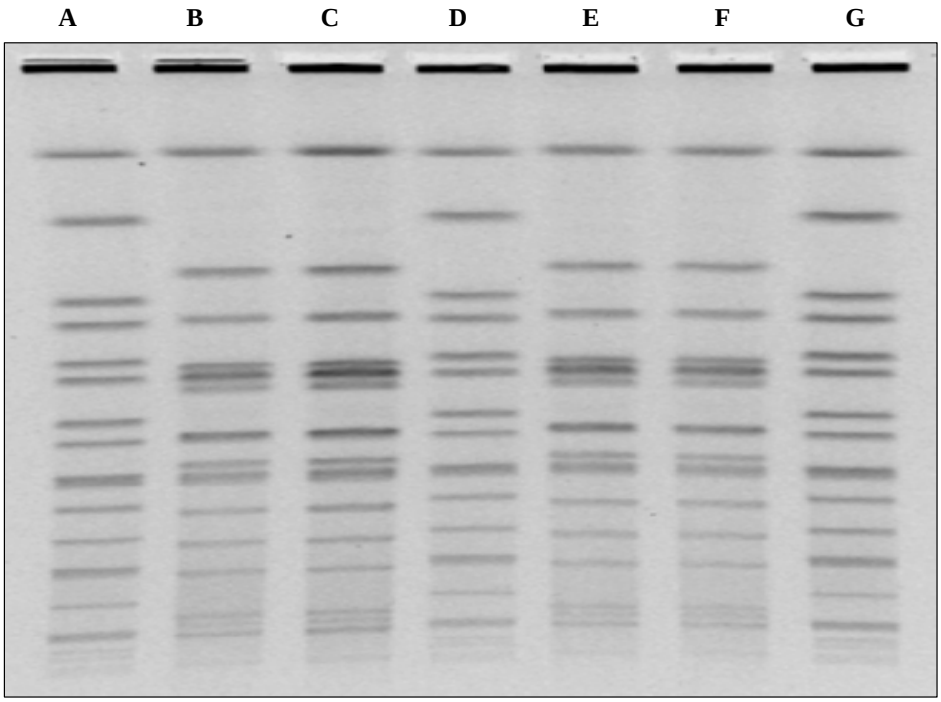


Figure 1. Pulsed-Field Gel Electrophoresis patterns of four isolates from an outbreak of *Salmonella* Newport in New Hampshire in 2004. Outbreak isolates B, C, E, and F are indistinguishable. Courtesy of the NH Public Health Laboratories

Norovirus Activity in New Hampshire, 2003-2005

Background

Norovirus infection is a common cause of acute gastroenteritis in the United States. Norovirus infection is caused by one of several viruses in a group of related viruses called noroviruses. This group of viruses includes the Norwalk virus, for which the group is named. Noroviruses are highly communicable and can be transmitted in a number of ways including person-to-person contact, consumption of contaminated food and water, via airborne droplets of vomit, and contact with contaminated surfaces. Infection is primarily characterized by vomiting and diarrhea, which may also be accompanied by abdominal cramps, nausea, fever, and headache. Symptoms of infection may last between 12 and 60 hours. Aside from supportive therapy for dehydration in severe cases, there is no treatment given for norovirus infection since it is a viral agent and symptoms usually resolve within 48 hours.

New Hampshire Epidemiology

Norovirus infection is not a reportable disease in NH, however, outbreaks must be reported to the NH Department of Health and Human Services (NH DHHS) under RSA 141-C. Most outbreaks occur during the winter months between December and February and occur most often in institutional settings such as long-term care facilities (LTCF) and schools. Foodborne outbreaks of norovirus can occur year round and are most commonly associated with ready-to-eat foods that have been prepared by an ill foodservice worker. Between 2003 and 2005, there were 70 outbreaks of viral gastroenteritis reported to NH DHHS (Table 1). All 70 outbreaks were either suspect or laboratory-confirmed outbreaks of norovirus. Laboratory diagnosis of norovirus is conducted using a molecular test at the NH Public Health Laboratories.

Table 1. Reported outbreaks of viral gastroenteritis, New Hampshire, 2003-2005

Year	Foodborne	Person-to-person	Total
2003	1	29	30
2004	4	17	21
2005	3	16	19
Total	8	62	70

Note: Number of outbreaks includes all outbreaks with a suspect or confirmed viral etiology.

Prevention

Prevention of norovirus outbreaks is strongly dependent on scrupulous hand washing and appropriate environmental cleaning. In food service establishments, managers should ensure that employees frequently wash their hands with soap and water and that employees that report gastrointestinal illness are excluded from work until 48 hours after their symptoms have resolved. In healthcare facilities and schools, administrators should ensure that patients/students and staff frequently wash their hands and that all commonly touched surfaces in the facility should be properly cleaned. Additionally, healthcare workers experiencing gastrointestinal illnesses should be excluded from work until 48 hours after their symptoms have resolved. See Table 2 for additional prevention and control measures.

Table 2. Prevention and Control Measures for Outbreaks of Norovirus and other Viruses that Cause Gastroenteritis

Food Service	Schools	Healthcare Facilities
• Follow proper food safety recommendations regarding temperature, heating, reheating, and holding • People preparing foods must wash hands frequently • Managers should ensure adequate supply of soap and paper towels for employees and patrons • Employers should encourage all workers preparing food to report whether they have been ill diarrhea or vomiting; those reporting illness should be asked to leave work until 48 hours after symptom resolution • Managers should review food preparation practices and remind food service workers that ready-to-eat food must not be contacted with bare hands • Commonly touched surfaces and food preparation surfaces should be frequently disinfected using freshly prepared 0.1% (1,000 ppm) hypochlorite solution • At self-service stations, patrons should be provided with serving utensils and tongs to self-serve appetizer-type foods such as cut vegetables, fruit, and bread	• Promptly clean contaminated areas with freshly prepared 0.1% (1000 ppm) hypochlorite solution • Review kitchen practices and health status of food workers; exclude symptomatic workers until 48 hours after symptom resolution • Assess health status of students and staff and exclude symptomatic individuals from school/work until full recovery • Practice frequent hand washing and gloving by food workers in the facility • Practice frequent hand washing by students and staff • Use gloves and aprons whenever contact with an affected individual or contaminated environment is anticipated • Wash hands after contact with affected individuals, on leaving affected areas, or before handling food/drinks • Clean soiled carpets and soft furnishings with hot water and detergent or steam clean; avoid vacuum cleaning • Clean frequently handled objects such as door handles • Do terminal cleaning 72 hours after resolution of last case	• Promptly clean contaminated areas with freshly prepared 0.1% (1000 ppm) hypochlorite solution • Review kitchen practices; exclude symptomatic food service workers until 48 hours after symptom resolution • Exclude symptomatic healthcare workers from direct patient care until 48 hours after symptom resolution • Practice frequent hand washing and gloving by food and health workers • Practice frequent hand washing by patients/residents • Restrict or defer admissions to affected units • Stop all group activities • Exclude non-essential staff from affected areas • Interrupt movement of non-essential inter-department staff • Use gloves and aprons whenever contacting an affected individual or contaminated environment • Wash hands after contact with affected individuals/areas • Notify visitors and instruct regarding hand washing • Clean soiled carpets and soft furnishings with hot water and detergent or steam clean • Clean frequently handled objects (i.e. water taps, door handles, and toilet/bath rails) • Do terminal cleaning 72 hours after resolution of last case

For more information on noroviruses:

CDC Norovirus Website: http://www.cdc.gov/ncidod/dvrd/revb/gastro/norovirus.htm

NH DHHS Website: http://www.dhhs.nh.gov/DHHS/CDCS/LIBRARY/Fact+Sheet/norwalk-virus.htm

Acute Respiratory Disease Surveillance

This report gives an overview of surveillance for acute respiratory diseases in New Hampshire, and describes surveillance for influenza in particular.

Background

Acute respiratory illnesses are caused by a wide variety of viral and bacterial agents. Respiratory illnesses can have a significant impact on individuals and on society in general, depending on many factors such as age, overall health of the individual infected, and the causative agent.

Viral etiology

The most common viral respiratory tract infections include acute viral rhinitis (the common cold), acute viral pharyngitis, influenza, croup, acute viral tracheobronchitis, bronchitis, bronchiolitis, and acute viral pneumonia. Acute viral illness may be caused by rhinoviruses, coronaviruses, adenoviruses, respiratory syncytial virus, influenza viruses, parainfluenza viruses, and certain enteroviruses. Many of these viruses share a common mode of transmission, reservoir, incubation period, and period of communicability. The mode of transmission can be by direct contact with an infectious person; by indirect contact with a contaminated surface or instrument; by droplets generated by coughing, sneezing or talking; and possibly by airborne transmission of infectious particles <5µm in size. The incubation period is usually between 12 hours and 5 to 10 days. The period of communicability ranges from 24 hours prior to symptom onset to 5 days after onset.

Bacterial etiology

The most common bacterial respiratory infections include otitis media, bacterial sinusitis, pharyngotonsillitis (most often caused by group A streptococcus), and pneumonia, either bacterial or atypical. Bacterial pneumonias are responsible for 50% of all adult pneumonias; 60-90% of these are due to *Streptococcus pneumoniae*. *Haemophilus influenzae* is also a common causative bacterial agent in the adult population. Bacterial pneumonia often occurs with concurrent viral infection. Atypical pneumonias are most common in individuals younger than 40 years of age. Causative agents include *Mycoplasma pneumoniae*, C*hlamydia pneumoniae*, and *Legionella pneumophila*. For bacterial respiratory infections, the mode of transmission, reservoir, incubation period, and period of communicability varies depending on the bacterial agent, and may not always be known.

Other etiology

Although viral and bacterial agents may be the major causes, acute respiratory illness can also occur as a result of fungal infections, parasitic infections, chemical or physical damage to the lungs, or another medical illness (i.e., lung cancer or alcohol abuse).

Surveillance systems

Following the terrorist attacks in 2001, the emergence of severe acute respiratory syndrome (SARS) in 2003, and the ongoing possibility of an influenza pandemic, surveillance systems for respiratory illnesses have been enhanced in recent years.

By NH state statute RSA 141-C, many communicable respiratory diseases and related positive laboratory results are reportable to the NH Department of Health and Human Services (NH DHHS). Mandatory disease reporting enables the NH DHHS Communicable Disease Surveillance Section (CDSS) to identify disease clusters and outbreaks, monitor trends in morbidity and mortality, and assess the statewide impact of disease over time. In addition to specific diseases, state statute also requires that any unusual occurrence or cluster of illness that poses a threat to the public's health be reported immediately to NH DHHS.

Influenza surveillance

Surveillance for influenza requires global and national monitoring for both virus and disease activity. Influenza viruses are constantly changing and knowledge of which viruses are circulating is needed to make decisions about the annual influenza vaccine. Disease surveillance is required to track the impact of circulating viruses on the human population. The objectives of influenza surveillance are to determine when, where, and which influenza viruses are circulating; to measure the intensity and impact of influenza activity; and to detect the emergence of novel influenza viruses and unusual or severe outbreaks of influenza. Surveillance efforts, particularly in Asia and surrounding countries, have increased dramatically since the emergence of avian influenza A (H5N1).

In NH, influenza is not a reportable disease, but surveillance systems are in place to help determine the extent of illness and current circulating influenza virus subtypes. The systems are modeled after components of the national influenza surveillance system and include the following:

- Virologic surveillance. The NH Public Health Laboratories (PHL) isolates and subtypes influenza viruses year round and transmits these data electronically to the Centers for Disease Control and Prevention (CDC) via the Public Health Laboratory Information System. Unusual specimens are sent to the CDC for further antigenic characterization.

- U.S. Influenza Sentinel Provider Surveillance Network. Approximately 30 volunteer NH healthcare providers (specializing in family practice, internal medicine, pediatric, or student health) participate in this CDC managed system. Sentinel providers report the number of patient visits for influenza-like illness (ILI) by age group, and the total number of patient visits, each week, and are requested to send respiratory specimens to the PHL on select patients.

- Emergency department syndromic surveillance. Peaks in fever and respiratory syndromes, reported through a system put in place in September 2001, closely mirrors peaks in ILI reported by sentinel providers.

- Estimated influenza activity. Overall influenza activity in the State, reported weekly to CDC, is based on reports of ILI, reported numbers of patients with ILI or with fever and/or respiratory symptoms through the emergency department syndromic surveillance systems, reported outbreaks in facilities, and reports of confirmed influenza.

- Pneumonia and influenza-related deaths. All death certificates recorded by NH's Bureau of Vital Statistics are monitored. The causes of death provide a key tool for tracking influenza and pneumonia mortality, in addition to other categories of disease.

Early Detection Surveillance Systems

Expanded surveillance systems have been developed specifically to enhance the State's capacity for early detection, which will be critical in the event of pandemic influenza or other infectious disease outbreak. These include several systems useful in identifying incidence of respiratory disease:

- Automated Hospital Emergency Department Data (AHEDD). This system was implemented in 2005 and automatically collects real-time Emergency Department (ED) electronic data from hospitals using chief complaint and diagnosis codes (ICD-9 codes) from hospitals statewide. ILI syndrome was added in the AHEDD surveillance system, based on relevant ICD-9 codes. Additionally, in 2006 query tools were developed and utilized to routinely query chief complaint text for ILI. During influenza season, these data are analyzed daily and compared to the influenza systems previously described. The goal of this surveillance system is to connect every NH hospital by 2008.

- Over-the-Counter Pharmaceutical Surveillance (OTC): In NH, two OTC systems are used in parallel to obtain a representative sample of OTC sales data within the State. Together, these two systems track approximately 40% of all over-the-counter pharmaceutical sales activity occurring within NH.

- School Encounter Surveillance: This system collects daily encounter data on school nurse visits from all 22 schools within the Manchester School District and aggregates this information into syndromes. This represents approximately 8% of all school-aged children within the State. These data are monitored daily and are useful indicators of community illness activity within the greater Manchester area.

Other early detection systems, which also may be useful for monitoring respiratory disease, include: BioSense, a national syndromic surveillance system maintained by CDC; Trauma and Emergency Medical Services Information System, which collects data from patient care reports entered by pre-hospital providers after each emergency medical response; Veterinary surveillance, which identifies incidence of animal diseases that threaten human health; Early Warning Infectious Disease Surveillance, a system developed to communicate disease information and/or threats along the international border.

New Hampshire Epidemiology

It is difficult to estimate the actual number of upper and lower respiratory tract infections in NH, as the vast majority of these infections are not reportable including influenza. However, among all reportable respiratory diseases, pertussis continues to have the highest annual incidence.

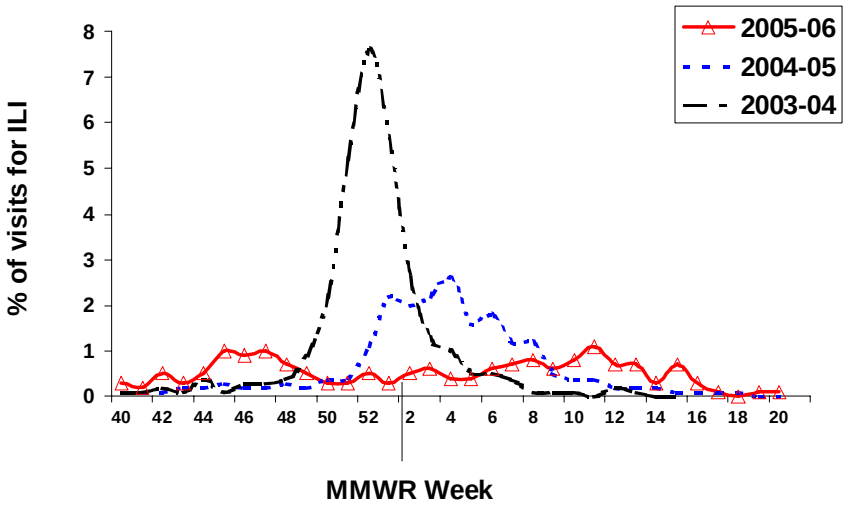
Influenza-like Illness and Confirmed Influenza, 2003-2006

Influenza-like illness (ILI) reported by the sentinel providers gives a good representation of influenza activity in the State. Figure 1 below shows ILI activity for three influenza seasons (the beginnning of October to mid-May) beginning with October 2003 and ending with May 2006. Highlights of influenza activity were as follows:

- 2003-2004: reported ILI peaked at 7.5% of the total patient visits in late December 2003. The dramatic rise in ILI in NH, followed by a rapid decline, was consistent with an earlier and more severe influenza season seen in the U.S.

- 2004-2005: reported ILI peaked at 2.6% of the total patient visits during the last week of January 2005.
- 2005-2006: reported ILI remained at low levels, and did not reach a discernible peak as is typically seen in seasonal influenza activity. The highest levels reported were 1.0% and 1.1% of the total patient visits to sentinel providers during week 45 and week 11, respectively.

Figure 1: Percentage of Visits for Influenza-like Illness (ILI) Reported by NH Sentinel Providers 2003-2006 Influenza Seasons



Influenza isolates identified by the PHL indicate which influenza viruses predominate in each influenza season. It should be noted that the majority of influenza specimens the PHL receives are for subtyping of specimens that have already tested positive by rapid test, and therefore it is expected that the majority will be positive. Also, beginning in the 2004-2005 season, Polymerase Chain Reaction (PCR) became the test of choice. PCR results are reliable and usually available the same day, compared to culture results that typically are not available for 1-2 weeks. With this test, the hemagglutinin (HA) gene is identified but not the neuraminadase (N). Therefore, beginning with that year, positive results are reported as influenza A (H1) or A (H3) and not influenza A (H1N1) or A (H3N2). The PHL continues to culture any respiratory specimens that test negative by PCR. Results for specimens received by the PHL for influenza testing are in Table 1 below.

Table 1: Confirmed Influenza, NH Public Health Laboratories, 2003-2006

	2003-04	2004-05	2005-06
Results	N (% of positives [n=149])	N (% of positives [n=141])	N (% of positives [n=217])
Influenza A (H3N2)	138 (93%)	-	-
Influenza A (H3)	-	122 (87%)	178 (82%)
Influenza A (H1)	-	-	7 (3%)
Influenza A, not subtyped	10 (7%)	2 (1%)	-
Influenza B	1 (<1%)	17 (12%)	32 (15%)
Negative for influenza	74	72	65
Total	223	213	282

Public Health Response to Acute Respiratory Disease

The Communicable Disease Control Section (CDCS) staff investigates all reportable communicable respiratory diseases and related positive laboratory results that are reported to NH DHHS. The CDSS staff follows up on any increase in activity from any of the surveillance systems described above to determine the cause. If appropriate, prompt disease control investigations are conducted by CDCS staff. The CDCS staff investigates any reported suspect or confirmed respiratory disease outbreaks in facilities following the NH DHHS *Guidelines for a Public Health Response To an Acute Respiratory Illness Outbreak*. Submission of clinical specimens to the PHL is requested so that the causative agent can be determined.

It is critical that any novel influenza viruses or unusual or severe outbreaks of influenza be investigated immediately. Healthcare providers should maintain a high index of suspicion if they see a patient with influenza-like illness symptoms who also has recently traveled to a country with known outbreaks of avian influenza A (H5N1). The healthcare provider should immediately contact the NH DHHS at (603) 271-4496, or after hours 1-800-852-3345 extension 5300, to report this case and to recieve guidance and recommendations for testing and patient management.

Planning for pandemic influenza began in NH in the late 1990's and is an ongoing process. The current plan, *State of New Hampshire Influenza Pandemic Public Health Preparedness and Response Plan*, updated in February 2007 is available at the following link:

http://www.dhhs.state.nh.us/DHHS/CDCS/LIBRARY/Policy-Guideline/dphs-influenza-plan.htm

Epidemiology of Tuberculosis in New Hampshire 1991-2005

Tuberculosis (TB) is a disease caused by a bacterium called *Mycobacterium tuberculosis*. It can be transmitted person-to-person through the air when someone who is sick with active TB disease of the lung or throat coughs the germs into the air where another person can inhale the bacteria. Not everyone who breathes in the germs becomes sick. Two conditions can result from exposure to a person with active TB disease, both of which are treatable and curable. Some people do get sick with active TB disease after an exposure, but more commonly, persons develop latent TB infection (LTBI). A person with LTBI usually has a skin test or blood test indicating TB infection, but doesn't feel sick and can't spread the germs to others. About 10% of those with LTBI will develop TB disease at some point in the future. Treatment of LTBI can prevent this from happening. It is estimated that there are 9-14 million persons in the United States with LTBI.

Nationally, there were 14,097 persons with active TB disease reported in 2005, the lowest number of cases in history. New Hampshire has been one of the ten lowest incidence states for TB in the U.S. over the past 15 years. The case count and case rate figures below depict consistently stable TB incidence numbers and rates. There have been an average of 18 cases annually. The rate has remained below 2 cases per 100,000 population since 1993. The rate of TB in NH was 0.3 per 100,000 in 2005 compared to the national rate of 4.8 per 100,000 people (see Figure 1). Healthy People 2000 had a goal rate of < 3 cases per 100,000 population, which NH has consistently met over the last 15 years.

Hillsborough, Rockingham, and Strafford counties have had the highest percentage of cases over the last 15 years (see Table 1) and Cheshire County had the least amount of TB cases. Five counties had no cases of TB in 2004. Nashua and Manchester, the two largest NH cities, had the highest number of cases over the last 15 years with 17% and 15% respectively. The highest percentage of both U.S.-born and foreign-born cases resided in Hillsborough County, where Manchester and Nashua are located and where many immigrants relocate.

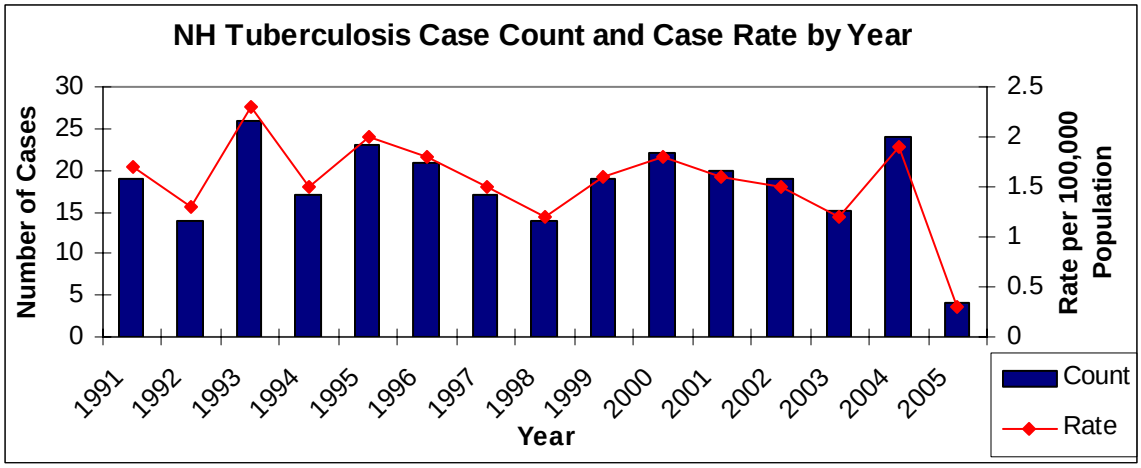


Figure 1. Case count and case rate of tuberculosis cases in New Hampshire, 1991-2005

Table 1. Number and Percentage of Cases by County of Residence and Nationality: New Hampshire 1991-2005

County/Nationality	U.S born		Foreign-born		Total	
County	**# Cases**	**%**	**# Cases**	**%**	**# Cases**	**%**
Belknap	11	8	6	4	17	6
Carroll	5	4	3	2	8	3
Cheshire	4	3	1	1	5	2
Coos	5	4	2	1	7	3
Grafton	6	5	2	1	8	3
Hillsborough	37	29	79	55	116	42
Merrimack	16	12	5	4	21	7
Rockingham	30	23	24	17	54	20
Strafford	11	8	20	14	31	11
Sullivan	5	4	2	1	7	3
Total	**130**	**47**	**144**	**53**	**274**	**100**

As shown in Figure 2, the number of U.S.-born TB cases began to decline in 2000 while the number of foreign-born TB cases increased dramatically that same year. From 1991 through 2005, 47% of tuberculosis cases in NH were U.S.-born and 53% were foreign-born (see Table 1). Consistent with a national trend, there was a dramatic shift that began in 2000 with 77% of TB cases being foreign-born compared to only 37% foreign-born between 1990-1999 (see Figure 2). The U.S.-born case rate was 0.5 compared to the disproportionately high foreign-born case rate of 29.6 in 2004. In 2005, NH was one of only six states in the nation with ≥70% of their annual state case totals among foreign-born persons.

TB is not necessarily a disease of the elderly as is often believed. The highest average annual case rates occurred in the 25-29, the 60-64, and the 80-84 year age groups. Also, the 20-24, 55-59, 75-79, and the 85+ year age group show average annual rates above 2.5. The trend displayed in Figure 3 demonstrates that U.S.-born cases have active disease later in life than foreign-born cases.

Between 1991 and 2005, 66% of TB cases in NH had pulmonary TB, 30% had extra-pulmonary TB, and 4% have had both. The most common site of extra-pulmonary TB is TB lymphadenopathy accounting for 42%. Other common sites include: pleural, bone and genito-urinary disease. Pleural TB is sometimes contagious, but generally extra-pulmonary is not considered contagious.

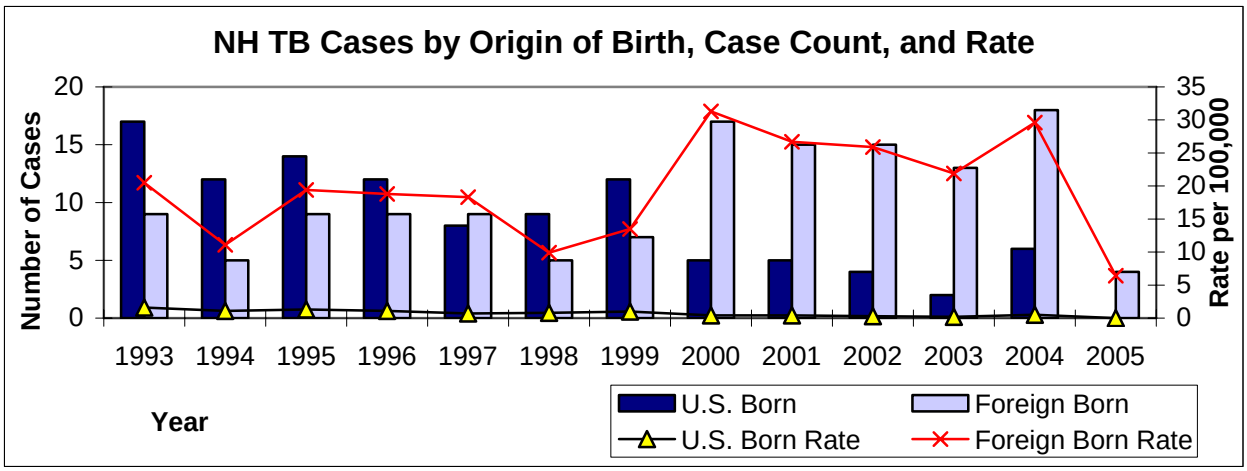


Figure 2. Case count and case rate stratified by nationality, 1993-2005

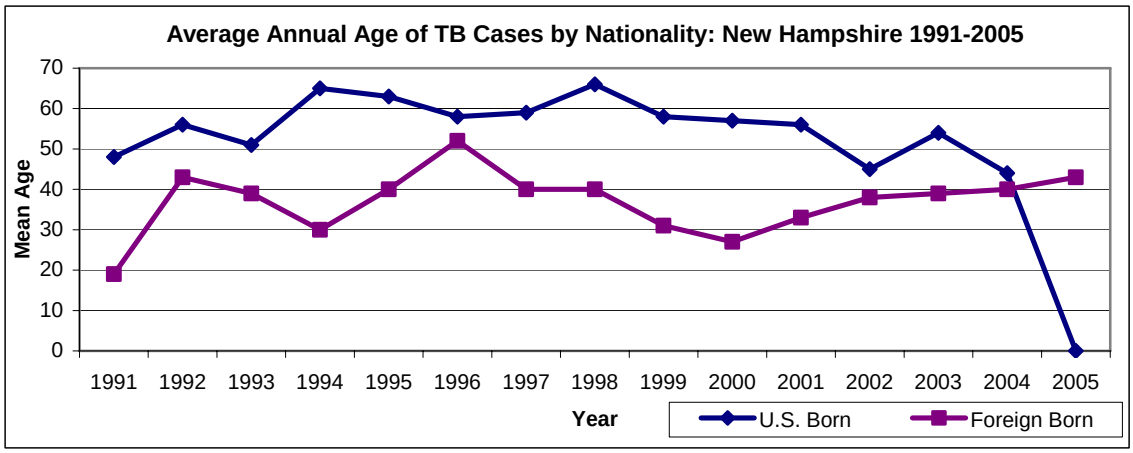


Figure 3. Average age of NH TB Cases stratified by nationality, 1991-2005

The highest numbers of foreign-born TB cases were born in India, Vietnam, Indonesia, and the Philippines (see Figure 4). The majority of U.S.-born cases are white, and no U.S.-born cases are Asian/Pacific Islander. Over half of the foreign-born cases were Asian/Pacific Islander. More than 50% of TB in foreign-born cases originated from one of the six countries shown in Figure 4.

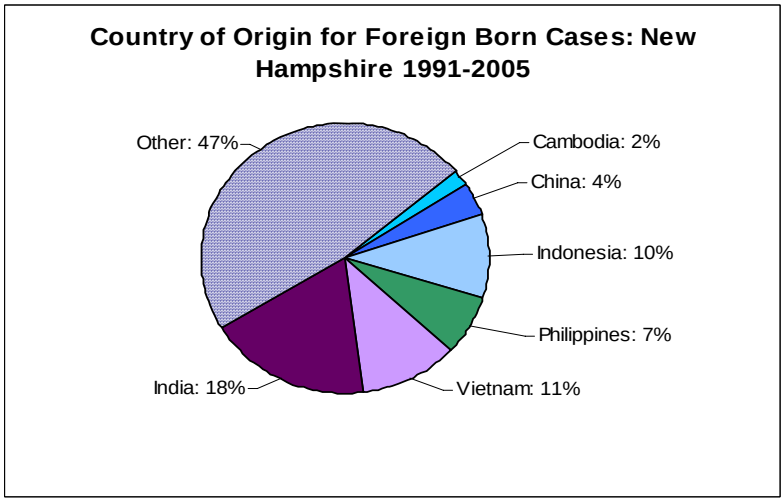


Figure 4. Country of origin for foreign-born tuberculosis cases, 1991-2005

Fifty-seven percent of foreign-born cases were diagnosed with TB within 5 years of arrival in the U.S. (see Table 2), compared to only 16% diagnosed 20 years or more after arrival, which is similar to national trends.

Table 2. Length of Time Foreign-born Case was in the U.S. Prior to Diagnosis New Hampshire 1991-2005

Length of Time	Number	Percent
< 1 Year	33	23%
1-4 Years	49	34%
5-9 Years	23	16%
10-19 Years	17	11%
20+ Years	23	16%
Total	145	100%

Unlike some areas of the nation, TB is not commonly diagnosed in persons in correctional facilities, homeless shelters or long-term care facilities in NH. Over the last fifteen years, 10 U.S.-born cases and 1 foreign-born case were living in a long-term care facility and 2 U.S. born cases were in a correctional facility at the time of diagnosis. There is also a low incidence of TB and HIV/AIDS co-infection in NH. There were only 4 cases diagnosed with both TB and HIV or AIDS between 1991-2005. Three of these cases were U.S.-born and one was foreign-born.

NH provides universal genotyping for all TB cases tested at the NH Public Health Laboratories. TB genotyping, a laboratory method, is used to identify genetic links between *Mycobacterium tuberculosis* isolates from different TB patients. TB genotyping results, when combined with epidemiologic data, help to distinguish TB patients who are involved in the same chain of recent transmission. Furthermore, TB genotyping allows us for the first time to monitor our progress toward eliminating TB transmission. NH participated in CDCs low-incidence state genotyping program from the end of 2000 to 2003 and no genotype clusters have been identified that were not previously linked through an epidemiologic investigation.

NH has held a strong performance record in meeting national TB objectives and patient outcomes as defined by the Centers for Disease Control and Prevention. The biggest challenge in a low-incidence state is to keep TB on the radar screen. Trends in recent years show progress toward elimination of TB in NH. These trends include a decreasing number of U.S.-born persons, the number of U.S.-born persons increasing with age, which is indicative of reactivation of old infection and the absence of any genotyping clusters that hadn't been previously linked through contact investigations. Program activities are prioritized toward prompt identification of cases and assurance of completion of treatment through the implementation of Directly Observed Therapy (DOT) as the standard of care for all cases. Nursing case management for active cases includes the following: the implementation of isolation, treatment by DOT, patient education and monitoring for adherence and adverse reactions, arranging for HIV testing, and conducting contact investigations. Most active cases are managed in the home setting and hospitalization is rare.

The goal of eliminating TB in NH can be accomplished by identifying and treating cases, stopping transmission promptly, and preventing future disease by identifying high-risk groups and treating infected persons.

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