Reportable Disease Surveillance in Virginia, 2011

Cynthia C. Romero, MD, FAAFP
State Health Commissioner

Report Production Team: Division of Surveillance and Investigation, Division of Disease Prevention, Division of Environmental Epidemiology and Division of Immunization

Virginia Department of Health
Post Office Box 2448
Richmond, Virginia 23218
www.vdh.virginia.gov

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Divisions in the Virginia Department of Health
Office of Epidemiology

Disease Prevention
Telephone: 804-864-7964

Environmental Epidemiology
Telephone: 804-864-8182

Immunization
Telephone: 804-864-8055

Surveillance and Investigation
Telephone: 804-864-8141

Introduction

The Virginia Department of Health, Office of Epidemiology is pleased to present its twenty-fourth annual report of disease surveillance activities. This report summarizes morbidity data reported by the Virginia Department of Health, Office of Epidemiology to the federal Centers for Disease Control and Prevention (CDC) during calendar year 2011.

The Office of Epidemiology, in conjunction with health departments in districts throughout Virginia, is responsible for the ongoing statewide surveillance of diseases according to the provisions of the *Regulations for Disease Reporting and Control.* Disease surveillance involves the collection of pertinent data, the tabulation and evaluation of the data, and the dissemination of the information to all who need to know. These data provide the foundation for public health activities to reduce morbidity.

Diseases must be diagnosed and reported to the health department before case investigations can occur and disease control activities can begin. Physicians, personnel in medical care facilities, laboratory directors, and other health care providers are therefore key to the surveillance process. By reporting diseases, health care personnel aid the health department in identifying unusual disease patterns occurring in the community. The health department notifies physicians of these unusual disease patterns, which helps physicians provide a more rapid diagnosis and treatment of individuals who present with compatible symptoms.

This report summarizes those diseases and conditions that are listed as officially reportable in the *Regulations for Disease Reporting and Control*. The report is divided into four sections as described below.

Introduction and Data Summary: Tables summarizing 2011 morbidity are included in this introductory section. These tables include the list of reportable diseases; ten year trends; the number of reports and incidence rate per 100,000 population for selected diseases by age group, race, sex, and health planning region; and the number and percent of reports by quarter of onset.

Descriptive Epidemiology of Reportable Diseases: This section consists of narrative and graphics summarizing the populations reported with each disease or condition. The section includes information about the total number of cases reported; the ten year trend in reported cases; the demographics of cases in terms of age, race and sex; and the distribution of cases by date of onset and health planning region of the state. Mortality, microbial species, and other attributes of diseases also are presented when applicable. Sources of information include the CDC (http://www.cdc.gov/), *Infectious Disease Epidemiology* (Nelson, K., Williams, C., & Graham, N., 2004), *Red Book: 2009 Report of the Committee on Infectious Diseases* (American Academy of Pediatrics, Pickering, L., Baker, C., Kimberlin, D., Long, S., eds., 2009), and *Control of Communicable Diseases Manual* (Heymann, D., ed., 2008)

Population-based rates are often presented to provide a measure of disease frequency in the population and to allow for comparisons between groups. When calculating rates, population estimates for 2010 prepared by the United States Census Bureau for the state's cities and counties and total population were used. Some additional notes on coding are listed below.

Race is usually presented as black, white, or other. The "other" race category includes Asian/Pacific Islanders, American Indians, and Alaskan Natives.

Date of onset is used whenever it is available. Onset is the time at which symptoms first occurred. Some cases reported in 2011 experienced onset prior to the year of report. In some situations information is only available on the date of report, or the date the report was first received by the health department, and these dates are used in place of date of onset. Date of specimen collection or date of diagnosis may also be used to estimate date of onset.

To the extent possible, rates by locality are calculated based on residence of the patient. When the address of the patient is neither reported by the health care provider nor ascertained by the health department, the location of the reporting source, such as the physician, hospital, or laboratory, is used.

Number of Cases and Rate by Locality: This section of the report presents the number of cases and incidence rate per 100,000 population for selected diseases by locality, district, and health planning region. Cities and counties that have separate health departments are listed individually. Those that share one health department are combined. Caution is urged in interpreting the data in this section as well as in the following section. Localities with small populations may have large disease rates but only a few reported cases of disease. Both number of cases and incidence rates should be weighed when using these tables to rank morbidity by city or county.

Maps of Incidence Rates: Disease-specific maps for selected conditions are presented which depict the incidence rates listed in the previous section. For each disease-specific map, the rates have been divided into four categories using the following process:

Category 1 – Localities reporting zero cases of the disease.

Category 2 – Localities with an incidence rate greater than zero and up to the mean for the state.

Category 3 – Localities with an incidence rate greater than the mean and up to one standard deviation above the mean for the state.

Category 4 – Localities with an incidence rate greater than one standard deviation above the mean for the state.

The Office of Epidemiology hopes that the readers of this report will find it to be a valuable resource for understanding the epidemiology of reportable diseases in Virginia. Any questions or suggestions about this report may be directed to Lala Wilson at the Virginia Department of Health, Office of Epidemiology, P.O. Box 2448, 109 Governor St., 5th Floor, Richmond, Virginia 23218, or by telephone at 804-864-8141.

Data Summary

Following this section are pages containing tables of statewide summary data for selected diseases. Table 1 is a list of reportable conditions in Virginia in 2011. Table 2 presents the number of cases of selected diseases reported annually during the past ten years. The number of cases of selected diseases reported for 2011 is delineated by age group in Table 3, by race in Table 4, and by sex in Table 5. Table 6 shows the number of cases and rate per 100,000 by health planning region. Table 7 provides the number and percent of cases with onset by quarter of the year. A brief summary of the major findings presented in these tables follows.

TREND – In 2011, there were notable increases in numbers of cases (>5%) observed for the following diseases when compared to the previous year: Amebiasis, *Chlamydia trachomatis* infection, cryptosporidiosis, ehrlichiosis/anaplasmosis, invasive *Haemophilus influenzae* infection, hemolytic uremic syndrome, acute hepatitis C, influenza, influenza-associated deaths in children, legionellosis, listeriosis, malaria, measles, rabies in animals, spotted fever rickettsiosis (including RMSF), invasive *Staphylococcus aureus* infection (MRSA), *Staphylococcus aureus* infections (VISA or VRSA), trichinosis (trichinellosis), and tularemia. Notable decreases were observed for the number of cases of shiga toxin-producing *E. coli* infection, giardiasis, gonorrhea, hepatitis A, hepatitis B, elevated blood lead levels in children, lyme disease, meningococcal disease, shigellosis, invasive *Streptococcus pneumoniae*, early syphilis, toxic substance-related illness, tuberculosis, typhoid fever, *Vibrio* infection, and yersiniosis. The number of cases for HIV was significantly lower in 2011 than in 2010 or 2009. Due to a revision of case definition, the numbers for HIV are not comparable to data collected before 2009.*

AGE – In 2011, infants (age <1 year) had the highest incidence rates for campylobacteriosis, shiga toxin-producing *E. coli* infection, listeriosis, measles, pertussis, salmonellosis, and invasive *Streptococcus pneumoniae* in children under 5 years of age. Infants had the lowest incidence rates for amebiasis, arboviral infection, hemolytic uremic syndrome, hepatitis A, acute hepatitis B, acute hepatitis C, legionellosis, lyme disease, malaria, meningococcal disease, mumps, Q fever, shigellosis, spotted fever rickettsiosis, early syphilis, tuberculosis, typhoid fever, and *Vibrio* infection. Within the infant group, there were no reported cases of amebiasis, arboviral infection, hemolytic uremic syndrome, hepatitis A, hepatitis B, hepatitis C, legionellosis, lyme disease, malaria, meningococcal disease, mumps, Q fever, shigellosis, early syphilis, tuberculosis, typhoid fever, and *Vibrio* infection.

Incidence rates amongst children aged 1-9 years were the highest for chickenpox, hemolytic uremic syndrome, elevated blood lead levels in children, lyme disease, and shigellosis. The only cases (3 cases) of hemolytic uremic syndrome (HUS) were reported from this age group. This age group experienced the lowest rates of amebiasis, *Chlamydia trachomatis* infection, cryptosporidiosis, ehrlichiosis/anaplasmosis, gonorrhea, hepatitis A, acute hepatitis B, acute hepatitis C, HIV disease, legionellosis, listeriosis, meningococcal disease, Q fever, invasive *Streptococcus pneumonia*e and early syphilis. There were no cases of amebiasis, hepatitis A, acute hepatitis B, acute hepatitis C, legionellosis, listeriosis, meningococcal disease, Q fever, or early syphilis reported in children aged 1-9 years.

* Beginning with 2009 data, HIV infection and AIDS are no longer being presented separately. Instead, HIV disease will represent the number of persons newly reported to VDH with HIV infection regardless of disease progression, and includes people with an AIDS defining condition at first HIV report.

The 10-19 year age group had the highest incidence rates for arboviral infection, meningococcal disease, and mumps. This age group had the lowest incidence rates for campylobacteriosis, giardiasis, invasive *Haemophilus influenzae* infection, hemolytic uremic syndrome, elevated blood lead levels in children, listeriosis, Q fever, invasive *Staphylococcus aureus* infection, and typhoid fever. There were no cases of hemolytic uremic syndrome (HUS), listeriosis, Q fever, or typhoid fever reported in this age group.

Incidence rates of the 20-29 year age group were highest for *Chlamydia trachomatis* infection, gonorrhea, HIV disease, early syphilis, tuberculosis, and typhoid fever. Individuals in their twenties had the lowest rates for arboviral infection, hemolytic uremic syndrome, listeriosis, meningococcal disease, mumps, Q fever, and group A *Streptococcus pneumoniae* for 2011. No cases of arboviral infection, hemolytic uremic syndrome (HUS), listeriosis, meningococcal disease, mumps and Q fever were reported for this age group.

Rates for persons in their thirties exceeded the rates in other age groups for cryptosporidiosis, hepatitis A, acute hepatitis C, and malaria. This age group had the lowest rates for hemolytic uremic syndrome, mumps, and typhoid fever. No cases of hemolytic uremic syndrome (HUS), mumps or typhoid fever were reported in this age group.

The 40-49 year age group had the highest incidence rates for giardiasis and acute hepatitis B. The incidence rates were the lowest in this age group for hemolytic uremic syndrome, measles, mumps, salmonellosis, and typhoid fever. No cases of hemolytic uremic syndrome, measles, mumps, and typhoid fever were reported in this age group.

Individuals age fifty to fifty-nine had the highest incidence rates for amebiasis, ehrlichiosis/anaplasmosis, and spotted fever rickettsiosis. The lowest rate for cryptosporidiosis, shiga toxin-producing *E. coli* infection, hemolytic uremic syndrome, acute hepatitis C, measles, mumps and Q fever occurred in this group. There were no cases of hemolytic uremic syndrome (HUS), measles, mumps, or Q fever reported in this age group.

The sixty year and older age group had the highest rates of arboviral infection, cryptosporidiosis, invasive *Haemophilus influenzae* infection, legionellosis, listeriosis, invasive *Staphylococcus aureus* infection, group A streptococcal disease, and *Vibrio* infection. Within this age group, the lowest rates occurred for chickenpox, hemolytic uremic syndrome, acute hepatitis C, measles, and pertussis. In this age group, no cases of hemolytic uremic syndrome (HUS), acute hepatitis C, or measles were reported.

RACE – Race information is often not available for cases. Among conditions where race was known for at least 80% of cases, the black population had a higher incidence rate for gonorrhea, HIV disease, listeriosis, meningococcal disease, invasive *Streptococcus pneumoniae* in children less than 5 years old, and early syphilis. The three cases of hemolytic uremic syndrome (HUS) reported in 2011 occurred in the white population. The white population also had the highest rates for invasive *Haemophilus influenzae* infection, and acute hepatitis C. The "other" race group had the highest rate for hepatitis A, measles, and tuberculosis.

SEX – In general, the incidence rates of reportable diseases tend to be similar in males and females. Among conditions where the percent difference between reported sexes was at least 50%, females had notably higher incidence rates for *Chlamydia trachomatis* infection, hepatitis A, and listeriosis in 2011. Males had higher incidence rates than females for arboviral infection, acute hepatitis B, HIV disease, legionellosis, malaria, spotted fever rickettsiosis, early syphilis, and *Vibrio* infection. In addition, the three Q fever were all male. Incidence rates were the same for females and males for amebiasis, acute hepatitis C, measles, meningococcal disease, group A streptococcal disease, and typhoid fever.

REGION – The northwest health planning region had the highest incidence rates for chickenpox, ehrlichiosis/anaplasmosis, shiga toxin-producing *E. coli* infection, acute hepatitis C, lyme disease, measles, meningococcal disease, pertussis, Q fever, spotted fever rickettsiosis, and group A streptococcal disease compared to the other health planning regions of the state. The lowest incidence rates for HIV disease, mumps, and early syphilis were seen in this region. No cases of amebiasis, hemolytic uremic syndrome, mumps, or typhoid fever were reported from the northwest region.

The northern health planning region experienced the highest incidence rates for amebiasis, arboviral infection, cryptosporidiosis, giardiasis, listeriosis, malaria, mumps, shigellosis, invasive *Streptococcus pneumoniae*, tuberculosis, and typhoid fever. The lowest incidence rates for *Chlamydia trachomatis* infection, ehrlichiosis/anaplasmosis, gonorrhea, acute hepatitis C, invasive *Haemophilus influenzae* infection, elevated blood lead levels in children, rabies in animals, salmonellosis, and invasive *Staphylococcus aureus* infection were reported from the northern region. There were no cases of Q fever reported from this region in 2011.

The southwest health planning region had the highest incidence rates for campylobacteriosis, hemolytic uremic syndrome, hepatitis A, acute hepatitis B, influenza, legionellosis, rabies in animals, and invasive *Staphylococcus aureus* infection. It had the lowest rates for listeriosis, malaria, group A streptococcal disease, invasive *Streptococcus pneumoniae*, tuberculosis, and *Vibrio* infection. There were no cases of amebiasis, listeriosis, measles, Q fever, typhoid fever, or *Vibrio* infection reported from the southwest region.

The central health planning region experienced the highest rates for amebiasis and elevated blood lead levels in children. This region experienced the lowest rates for cryptosporidiosis, giardiasis, hepatitis A, and meningococcal disease. No cases of hemolytic uremic syndrome, measles, meningococcal disease or typhoid fever were reported from the central region.

The eastern health planning region had the highest incidence rates for *Chlamydia trachomatis* infection, gonorrhea, invasive *Haemophilus influenzae* infection, HIV disease, listeriosis, salmonellosis, early syphilis, and *Vibrio* infection. The lowest rates for arboviral infection, campylobacteriosis, chickenpox, shiga toxin-producing *E. coli* infection, influenza, legionellosis, lyme disease, pertussis, and spotted fever rickettsiosis occurred in this region. No cases of arboviral infection, hemolytic uremic syndrome, or Q fever were reported from the eastern region.

ONSET – In 2011, there were many diseases that showed distinct seasonal trends with the majority of onset occurring within one or two quarters. Large percentages of cases in the first quarter were observed for amebiasis (35.3%), influenza (90.8%), pertussis (32.8%), Q fever (66.7%), group A streptococcal disease (47.4%), invasive *Streptococcus pneumonia* (36.4%), and typhoid fever (33.3%). All cases of hemolytic uremic syndrome (100.0%) occurred in the second quarter of 2011. In addition, the largest majority of cases for lyme disease (46.1%) and measles (85.7%) occurred in the second quarter as well. The largest proportion of cases for arboviral infection (85%), listeriosis (60.0%), salmonellosis (42.4%), and *Vibrio* infection (56.7%) occurred in the third quarter. In the fourth quarter of 2011, the largest proportions for gonorrhea (35.7%), acute hepatitis B (32.1%), HIV disease (33.5%), and mumps (61.5%) occurred.

Concerning diseases where the majority of the cases occurred over two quarters, the diseases with the highest proportions for the second and third quarters were cryptosporidiosis (67.8%), ehrlichiosis/anaplasmosis (89.3%), shiga toxin-producing *E. coli* infection (69.1%), malaria (61.6%), and spotted fever rickettsiosis (79.7%). The third and fourth quarters accounted for the largest proportion of cases of legionellosis (68.8%). Meningococcal disease had a large portion of cases occur in the first and fourth quarters (72.2%). More than 10% of the cases for acute hepatitis C (33.3%), pertussis (11.8%), Q fever (33.3%), invasive *Streptococcus pneumoniae* (15.2%) and typhoid fever (11.1%) in 2011 had onset in the prior year (2010). This is a result of delays in obtaining case reports or information needed to confirm a case. Similar delays for cases with late onset in 2010 are likely to have reduced the number of reported cases in the fourth quarter.

Several diseases had very low onset percentages for at least one quarter. These included ehrlichiosis/anaplasmosis (3.1%), legionellosis (9.7%), lyme disease (9.2%) spotted fever rickettsiosis (7.8%), and *Vibrio* infection for the first quarter; influenza (5.1%), meningococcal disease (5.6%), and mumps (7.7%) for the second quarter; influenza infection (0.6%) and invasive *Streptococcus pneumoniae* (3.0%) for the third quarter; and arboviral infection (5.0%), ehrlichiosis/anaplasmosis (6.9%), and influenza infection (3.4%) for the fourth quarter. In addition, several diseases had no case onsets reported in at least one quarter. These diseases included arboviral infection (2^{nd} quarter), hemolytic uremic syndrome (1^{st}, 3^{rd}, and 4^{th} quarters), measles (1^{st} and 4^{th} quarter), and Q fever (2^{nd}, 3^{rd}, and 4^{th} quarters).

Table 1. Reportable Diseases in Virginia, 2011

Acquired immunodeficiency syndrome (AIDS)	Meningococcal disease
Amebiasis	Monkeypox
Anthrax	Mumps
Arboviral infection (e.g., dengue, EEE, LAC, SLE, WNV)	Mycobacterial Diseases (including AFB)
Botulism	Ophthalmia neonatorum
Brucellosis	Outbreaks, all (including foodborne, healthcare-associated, occupational, toxic substance-related, and waterborne
Campylobacteriosis	
Chancroid	Pertussis
Chickenpox (Varicella)	Plague
Chlamydia trachomatis infection	Poliovirus infection, including poliomyelitis
Cholera	Psittacosis
Creutzfeldt-Jakob disease if <55 years of age	Q fever
Cryptosporidiosis	Rabies, human and animal
Cyclosporiasis	Rabies treatment, post exposure
Diphtheria	Rubella, including congenital rubella syndrome
Disease caused by an agent that may have been used as a weapon	Salmonellosis
Ehrlichiosis/Anaplasmosis	Severe acute respiratory syndrome (SARS)
Escherichia coli infection, Shiga toxin-producing	Shigellosis
Giardiasis	Smallpox (variola)
Gonorrhea	Spotted fever rickettsiosis, including RMSF
Granuloma inguinale	*Staphylococcus aureus* infection, invasive methicillin-resistant (MRSA) and vancomycin-intermediate or vancomycin-resistant
Haemophilus influenzae infection, invasive	
Hantavirus pulmonary syndrome	Streptococcal disease, Group A, invasive or toxic shock
Hemolytic uremic syndrome (HUS)	*Streptococcus pneumoniae* infection, invasive, in children <5 years of age
Hepatitis A	Syphilis
Hepatitis B (acute and chronic)	Tetanus
Hepatitis C (acute and chronic)	Toxic substance-related illness
Hepatitis, other acute viral	Trichinosis (Trichinellosis)
Human immunodeficiency virus (HIV) infection	Tuberculosis (TB), active disease
Influenza	Tuberculosis infection in children <4 years of age
Influenza-associated deaths in children <18 years of age	Tularemia
Lead, elevated blood levels in children	Typhoid/paratyphoid fever
Legionellosis	Unusual occurrence of disease of public health concern
Leprosy (Hansen disease)	Vaccinia, disease or adverse event
Listeriosis	*Vibrio* infection
Lyme disease	Viral hemorrhagic fever
Lymphogranuloma venereum	Yellow fever
Malaria	Yersiniosis
Measles (Rubeola)	