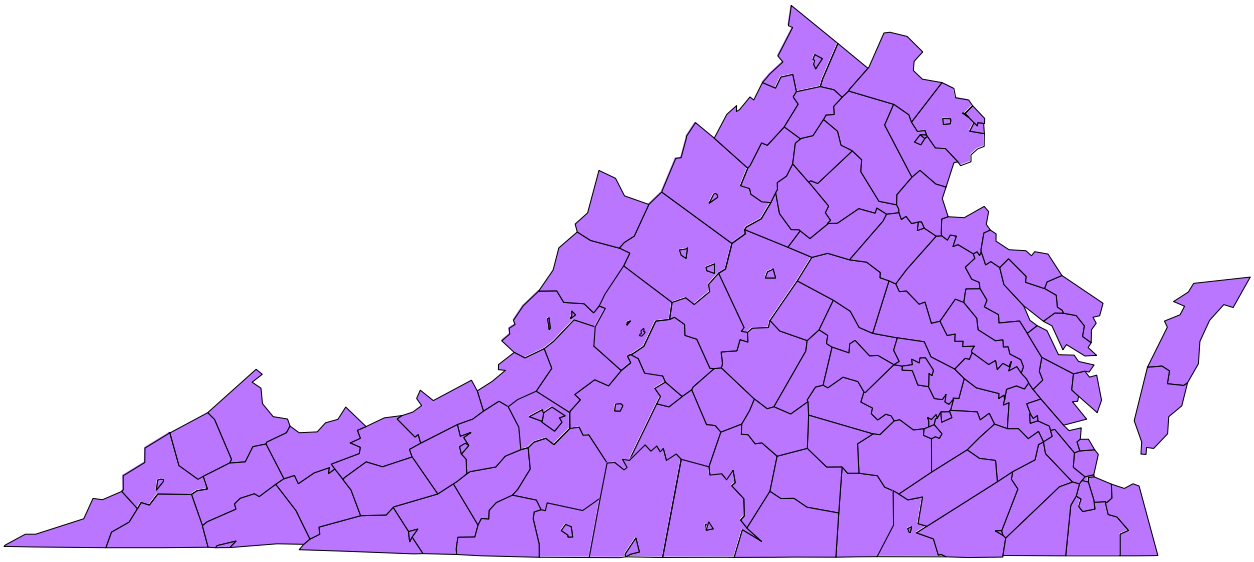
Reportable Disease Surveillance in Virginia, 2015



VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment

Office of Epidemiology

Reportable Disease Surveillance in Virginia, 2015

Marissa J. Levine, MD, MPH
State Health Commissioner

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

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

VDH VIRGINIA DEPARTMENT OF HEALTH

ACKNOWLEDGEMENT

In addition to the employees of the work units listed below, the Office of Epidemiology would like to acknowledge the contributions of all those engaged in disease surveillance and control activities across the state throughout the year.

We appreciate the commitment to public health of all epidemiology staff in local and district health departments and the Regional and Central Offices, as well as the conscientious work of nurses, environmental health specialists, infection preventionists, physicians, laboratory staff, and administrators. These persons report or manage disease surveillance data on an ongoing basis and diligently strive to control morbidity in Virginia. This report would not be possible without the efforts of all those who collect and follow up on morbidity reports.

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

TABLE OF CONTENTS

INTRODUCTION

Introduction 1
Data Summary Tables (2a through 7) ..... 4 - 14

DESCRIPTIVE EPIDEMIOLOGY OF REPORTABLE DISEASES

Amebiasis 15
Anthrax 17
Arboviral Infection 18
Botulism 21
Brucellosis 22
Campylobacteriosis 23
Chancroid 26
Chickenpox (Varicella) 27
Chlamydia trachomatis Infection 29
Cholera 31
Creutzfeldt-Jakob Disease 32
Cryptosporidiosis 33
Cyclosporiasis 36
Diphtheria 37
Ehrlichiosis/Anaplasmosis 38
Escherichia coli Infection, Shiga Toxin-Producing 41
Giardiasis 43
Gonorrhea 46
Granuloma Inguinale 49
Haemophilus influenzae Infection, Invasive 50
Hantavirus Pulmonary Syndrome 53
Healthcare-Associated Infection (HAI) 54
Hemolytic Uremic Syndrome 57
Hepatitis A 58
Hepatitis B, Acute 60
Hepatitis C, Acute 63
Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) 66
Influenza 70
Lead - Elevated Blood Levels in Children 79
Legionellosis 82
Leprosy (Hansen Disease) 85
Listeriosis 86
Lyme Disease 88
Lymphogranuloma Venereum 91
Malaria 92
Measles 95
Meningococcal Disease 96

Monkeypox 99
Mumps 100
Ophthalmia Neonatorum 103
Outbreaks 104
Pertussis 115
Plague 117
Poliovirus Infection, Including Poliomyelitis 118
Psittacosis 119
Q Fever 120
Rabies 121
Rubella 127
Salmonellosis 128
Severe Acute Respiratory Syndrome (SARS) 132
Shigellosis 133
Smallpox 136
Spotted Fever Rickettsiosis, Including Rocky Mountain Spotted Fever 137
Staphylococcus aureus Infection, Invasive, Methicillin-Resistant (MRSA) 140
Staphylococcus aureus Infection, Vancomycin-Intermediate (VISA)
Vancomycin-Resistant (VRSA) 143
Streptococcal Disease, Group A (GAS), Invasive or
Toxic Shock Syndrome 144
Streptococcus pneumoniae, Invasive, in Children Less Than 5 Years of Age 147
Syphilis 149
Tetanus 152
Toxic Substance-Related Illness 153
Trichinosis 156
Tuberculosis 157
Tularemia 160
Typhoid Fever 161
Vaccinia, Disease or Adverse Event 163
Vibrio Infection 164
Viral Hemorrhagic Fever 167
Yellow Fever 168
Yersiniosis 169

NUMBER OF REPORTED CASES AND RATE PER 100,000 POPULATION FOR SELECTED DISEASES BY LOCALITY, DISTRICT, AND REGION

Amebiasis 170
Campylobacteriosis 170
Chickenpox 170
Chlamydia trachomatis Infection 174
Cryptosporidiosis 174
Ehrlichiosis/Anaplasmosis 174
Escherichia coli Infection, Shiga Toxin-Producing 178
Giardiasis 178
Gonorrhea 178

Haemophilus influenzae Infection, Invasive 182
Hepatitis A 182
Hepatitis B, Acute 182
Hepatitis C, Acute 186
HIV Disease 186
Lead - Elevated Blood Levels in Children 186
Legionellosis 190
Listeriosis 190
Lyme Disease 190
Malaria 194
Meningococcal Disease 194
Mumps 194
Pertussis 198
Rabies in Animals 198
Salmonellosis 198
Shigellosis 202
Spotted Fever Rickettsiosis, including Rocky Mountain Spotted Fever 202
Staphylococcus aureus Infection, Invasive (MRSA) 202
Streptococcal Disease, Group A, Invasive or Toxic Shock Syndrome 206
Syphilis, Early 206
Tuberculosis 206

MAPS OF INCIDENCE RATES OF SELECTED DISEASES BY LOCALITY

Health Planning Regions in Virginia 210
Virginia Localities 211
Amebiasis 212
Campylobacteriosis 213
Chickenpox 214
Chlamydia trachomatis Infection 215
Cryptosporidiosis 216
Ehrlichiosis/Anaplasmosis 217
Escherichia coli Infection, Shiga Toxin-Producing 218
Giardiasis 219
Gonorrhea 220
Haemophilus influenzae Infection, Invasive 221
Hepatitis A 222
Hepatitis B, Acute 223
Hepatitis C, Acute 224
HIV Disease 225
Lead - Elevated Blood Levels in Children 226
Legionellosis 227
Listeriosis 228
Lyme Disease 229
Malaria 230
Meningococcal Disease 231
Mumps 232

Pertussis 233
Salmonellosis 234
Shigellosis 235
Spotted Fever Rickettsiosis, including Rocky Mountain Spotted Fever (RMSF) 236
Staphylococcus aureus Infection, Invasive (MRSA) 237
Streptococcal Disease, Group A, Invasive 238
Syphilis, Early Stage 239
Tuberculosis 240

LIST OF TABLES

Table 1. Reportable Diseases in Virginia, 2015 4
Table 2a. Ten-Year Trend in Number of Reported Cases of Reportable Diseases in Virginia, 2006-2015 5
Table 2b. Ten-Year Trend in Incidence Rate per 100,000 Population for Reportable Diseases, Virginia, 2006-2015 7
Table 3. Number of Reported Cases of Selected Diseases and Rate per 100,000 by Age Group, Virginia, 2015 9
Table 4. Number of Reported Cases of Selected Diseases and Rate per 100,000 by Race, Virginia, 2015 10
Table 5. Number of Reported Cases of Selected Diseases and Rate per 100,000 by Sex, Virginia, 2015 11
Table 6. Number of Reported Cases of Selected Diseases and Rate per 100,000 by Health Planning Region, Virginia, 2015 12
Table 7. Number of Reported Cases of Selected Diseases by Quarter of Onset, Virginia, 2015 14
Table 8. Statewide Standardized Infection Ratios (SIRs) for Central Line-Associated Bloodstream Infection (CLABSI), Catheter-Associated Urinary Tract Infection (CAUTI), Surgical Site Infection (SSI), and Laboratory-Identified Hospital-Onset Methicillin-Resistant *Staphylococcus aureus* (MRSA) Bacteremia and *Clostridium difficile* (CDI) Laboratory-Identified Events; Virginia, 2015 56
Table 9. Foodborne Outbreaks Reported in Virginia, 2015 108
Table 10. Waterborne Outbreaks Reported in Virginia, 2015 111
Table 11. Zoonotic Outbreaks Reported in Virginia, 2015 112
Table 12. Number of People Receiving Rabies PEP by Health District, Virginia, 2015 122
Table 13. Animals Testing Positive for Rabies by Species, Virginia, 2015 125
Table 14. Top Ten *Salmonella* Serotypes Reported to CDC PulseNet System, 2015 130
Table 15. *Vibrio* Infections by Species and Specimen Source, 2015 165

INTRODUCTION
AND
DATA SUMMARY TABLES

Introduction

The Virginia Department of Health, Office of Epidemiology is pleased to present its twenty-eighth 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 2015.

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 Virginia Regulations for Disease Reporting and Control. Disease surveillance involves the collection of pertinent data, the tabulation and evaluation of these data, and the dissemination of information based on the analysis of the data. 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 essential 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 1 through 7 summarizing 2015 morbidity are included in this introductory section. These tables include the list of reportable diseases in Virginia; ten-year trends for both the number of reported cases and the incidence rate per 100,000 population for all reportable diseases; the five-year average for number of reported cases and incidence rate based on the five years previous to the current reporting year; the number of reported cases 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 reported cases by quarter of onset.

Descriptive Epidemiology of Reportable Diseases: This section consists of narrative and graphics describing the populations reported with each specific disease or condition. The section includes information about the total number of cases reported; the ten-year trend in number of reported cases and incidence rate; the demographics of cases in terms of age, race and sex; and the distribution of cases by both date of onset and health planning region within the state. Mortality, microbial species, and other attributes of diseases are also presented when applicable. Sources of information include the Virginia Electronic Disease Surveillance System (VEDSS) database, the CDC (http://www.cdc.gov/), Red Book: 2015 Report of the Committee on Infectious Diseases (American Academy of Pediatrics, Kimberlin, D., Brady, M., Jackson, M., Long, S., eds., 2015), and Control of Communicable Diseases Manual (Heymann, D., ed., 2015).

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 data prepared by the United States Census Bureau for the state's cities and counties were used. The data were based on Census population estimates for 2014.

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

In describing the occurrence of disease throughout the year, date of onset is used whenever it is available. Onset is the time when symptoms first occurred. Some cases reported in 2015 experienced onset prior to the year of report. For surveillance purposes, these cases are counted with this report due to receipt of notification or confirmatory test results in 2015. 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. In previous reports, cities and counties that shared one health department were combined and the data were presented as one jurisdiction. Beginning with the 2013 annual report, all independent cities and counties are listed as separate entities. Caution is urged in interpreting the data in this section, as well as in the following section because localities with small populations may have large disease rates but only a few reported cases of disease. Both numbers of cases and incidence rates should be considered when using these tables to rank morbidity by city or county. Population data have been adjusted to represent the specific population under surveillance when data are restricted to certain age groups, including childhood elevated blood lead levels (less than 16 years of age), Creutzfeldt-Jakob disease (less than 55 years of age), and invasive *Streptococcus pneumoniae* infection (less than 5 years of age) .

Maps of Incidence Rates: Disease-specific maps are presented within several of the narratives to depict incidence rates by locality. 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.

Table 1. Reportable Diseases in Virginia, 2015

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

Table 2a. Ten-Year Trend in Number of Reported Cases of Reportable Diseases in Virginia, 2006-2015

Disease	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Previous 5-year Avg
AIDS~	589	599	638	–	–	–	–	–	–	–	–
Amebiasis	45	53	42	20	14	17	29	26	29	25	23.0
Anthrax	0	0	0	0	0	0	0	0	0	0	0.0
Arboviral infection	5	5	3	8	20	20	51	34	84	69	41.8
Botulism, foodborne	0	1	0	0	0	0	0	0	0	0	0.0
Botulism, non-foodborne	0	0	3	4	1	2	2	3	1	3	1.8
Brucellosis	0	0	0	5	0	0	0	3	1	2	0.8
Campylobacteriosis	669	665	669	770	778	805	764	709	744	1,564	760.0
Chancroid	1	0	0	0	0	0	1	0	0	0	0.2
Chickenpox (Varicella)	1,959	1,582	1,489	773	548	549	505	374	324	354	460.0
Chlamydia trachomatis infection	24,081	24,528	31,205	30,904	30,799	36,317	35,016	33,561	35,725	35,341	34,283.6
Cholera	0	0	0	0	1	1	0	0	0	0	0.4
Creutzfeldt-Jakob disease (CJD)*****	1	1	0	0	0	0	0	0	2	0	0.4
Cryptosporidiosis	71	90	81	86	109	140	144	144	152	234	137.8
Cyclosporiasis	0	2	2	1	1	2	1	4	4	8	2.4
Diphtheria	0	0	0	0	0	0	0	0	0	0	0.0
Ehrlichiosis/Anaplasmosis	8	39	65	72	93	131	148	143	137	116	130.4
E. coli infection, Shiga toxin-producing	168	165	241	156	149	123	81	109	121	107	116.6
Giardiasis	514	582	432	503	512	290	272	278	256	269	321.6
Gonorrhea	6,474	6,267	10,336	7,791	7,401	6,521	6,894	6,992	8,196	8,095	7,200.8
Granuloma inguinale	0	0	0	0	0	0	0	0	0	0	0.0
Haemophilus influenzae infection, invasive	69	80	92	88	85	108	101	98	88	121	96.0
Hantavirus pulmonary syndrome	0	0	0	0	0	0	0	0	0	0	0.0
Hemolytic uremic syndrome	2	1	2	2	2	3	3	6	6	4	4.0
Hepatitis A	64	89	51	42	52	30	49	36	27	50	38.8
Hepatitis B, acute	78	144	130	110	97	84	84	72	61	69	79.6
Hepatitis C, acute	9	8	8	10	13	25	76	41	53	52	41.6
HIV disease~	914	836	844	1429*	1,194	1,085	1,105	1,151	1,090	1,062	1,125.0
Influenza	16,107	8,416	24,580	40,614	2,467	18,153	19,146	27,564	36,663	2,099	20,798.6
Influenza-associated deaths in children******	3	3	3	8	0	5	1	2	7	2	3.0
Kawasaki syndrome	6	2	3	3	2	–	–	–	–	–	0.4
Lead - elevated blood levels in children*******	515	394	307	389	350	274	201	164	264	226	250.6
Legionellosis	68	61	66	67	79	93	76	123	129	139	100.0
Leprosy (Hansen disease)	1	1	0	0	1	1	0	0	1	2	0.6
Listeriosis	20	16	17	16	13	15	18	29	25	22	20.0
Lyme disease	357	959	933	908	1,245	1,023	1,110	1,307	1,346	1,539	1,206.2
Lymphogranuloma venereum	0	0	0	0	0	0	0	0	0	0	0.0
Malaria	55	65	49	61	67	78	65	75	77	66	72.4
Measles	0	0	1	1	3	7	0	0	2	1	2.4

Table 2a. Ten-Year Trend in Number of Reported Cases of Reportable Diseases in Virginia, 2006-2015 (continued)

Disease	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Previous 5-year Avg
Meningococcal disease	22	23	24	18	21	18	5	7	10	10	12.2
Monkeypox	0	0	0	0	0	0	0	0	0	0	0.0
Mumps	117	27	9	9	13	13	7	109	20	34	32.4
Ophthalmia neonatorum	11	5	10	7	7	8	11	4	6	4	7.2
Pertussis	221	128	198	222	384	399	625	418	505	369	466.2
Plague	0	0	0	0	0	0	0	0	0	0	0.0
Poliovirus infection, including poliomyelitis	0	0	0	0	0	0	0	0	0	0	0.0
Psittacosis	0	0	0	0	0	0	0	0	0	0	0.0
Q fever	4	4	2	1	2	3	0	3	4	0	2.4
Rabies in animals	637	730	620	564	573	618	562	488	519	500	552.0
Rabies in humans	0	0	0	1	0	0	0	0	0	0	0.0
Rubella, including congenital rubella syndrome	0	0	0	0	2	0	0	0	0	0	0.4
Salmonellosis	1,089	1,249	1,165	1,095	1,210	1,208	1,144	1,048	1,150	1,181	1,152.0
Severe acute respiratory syndrome (SARS)	0	0	0	0	0	0	0	0	0	0	0.0
Shigellosis	120	200	310	198	145	107	91	115	214	317	134.4
Smallpox	0	0	0	0	0	0	0	0	0	0	0.0
Spotted fever rickettsiosis, including RMSF	114	123	155	53	145	231	461	350	373	296	312.0
Staphylococcus aureus infection, invasive (MRSA)	-	253	1,524	1,124	1,201	1,304	1,294	1,247	1,134	1,142	1,236.0
Staphylococcus aureus infection, VISA or VRSA	0	1	0	0	1	2	2	3	3	1	2.2
Streptococcal disease, Group A, invasive or TSS	132	162	150	174	191	192	168	190	210	222	190.2
Streptococcus pneumoniae infection, invasive****	50	52	52	47	59	33	36	37	19	28	36.8
Syphilis, early	351	407	500	529	553	502	593	676	556	745	576.0
Tetanus	0	0	0	0	0	0	1	2	0	0	0.6
Toxic shock syndrome (Staphylococcal)	0	1	0	0	2	–	–	–	–	–	0.4
Toxic substance-related illness	415	434	356	342	298	273	317	304	357	381	309.8
Trichinosis (Trichinellosis)	0	0	1	0	0	2	2	2	1	0	1.4
Tuberculosis	332	309	292	273	268	221	235	180	198	212	220.4
Tularemia	0	3	1	0	1	6	2	2	0	4	2.2
Typhoid fever	20	21	19	12	11	9	10	10	9	11	9.8
Vaccinia, disease or adverse event	0	0	1	0	0	0	0	1	0	0	0.2
Vibrio infection	32	33	29	29	40	30	41	42	59	40	42.4
Viral hemorrhagic fever	0	0	0	0	0	0	0	0	0	0	0.0
Yellow fever	0	0	0	0	0	0	0	0	0	0	0.0
Yersiniosis	10	10	14	11	13	10	8	11	21	17	12.6

~ Beginning in 2009, HIV infection and AIDS data, formerly presented separately, are presented together as HIV disease. This category encompasses persons newly reported to VDH with HIV infection regardless of disease progression, including those with an AIDS-defining condition at first report.

– Not a reportable disease at this time.

* Condition is reportable only in individuals < 55 years of age.

** Condition is reportable only in children < 18 years of age.

*** Condition is reportable only in children < 16 years of age.

**** Condition is reportable only in children < 5 years of age.

Table 2b. Ten-Year Trend in Incidence Rate per 100,000 Population for Reportable Diseases, Virginia, 2006-2015

Disease	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Previous 5-yr Annual Rate
AIDS~	7.8	7.8	8.3	–	–	–	–	–	–	–	–
Amebiasis	0.6	0.7	0.5	0.3	0.2	0.2	0.4	0.3	0.4	0.3	0.3
Anthrax	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Arboviral infection	0.1	0.1	0.0	0.1	0.3	0.2	0.6	0.4	1.0	0.8	0.5
Botulism, foodborne	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Botulism, non-foodborne	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brucellosis	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Campylobacteriosis	8.8	8.7	8.7	9.9	9.9	10.1	9.4	8.7	9.0	18.8	9.4
Chancroid	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chickenpox (Varicella)	25.9	20.7	19.3	9.9	7.0	6.9	6.2	4.6	3.9	4.3	5.7
Chlamydia trachomatis infection	318.2	320.9	404.6	397.8	390.7	453.9	432.5	410.0	432.5	424.5	424.0
Cholera	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Creutzfeldt-Jakob disease (CJD)*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cryptosporidiosis	0.9	1.2	1.1	1.1	1.4	1.7	1.8	1.8	1.8	2.8	1.7
Cyclosporiasis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Diphtheria	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ehrlichiosis/Anaplasmosis	0.1	0.5	0.8	0.9	1.2	1.6	1.8	1.7	1.7	1.4	1.6
E. coli infection, Shiga toxin-producing	2.2	2.2	3.1	2.0	1.9	1.5	1.0	1.3	1.5	1.3	1.4
Giardiasis	6.8	7.6	5.6	6.5	6.5	3.6	3.4	3.4	3.1	3.2	4.0
Gonorrhea	85.6	82.0	134.0	100.3	93.9	81.5	85.1	85.4	99.2	97.2	89.1
Granuloma inguinale	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haemophilus influenzae infection, invasive	0.9	1.0	1.2	1.1	1.1	1.3	1.2	1.2	1.1	1.5	1.2
Hantavirus pulmonary syndrome	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hemolytic uremic syndrome	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Hepatitis A	0.8	1.2	0.7	0.5	0.7	0.4	0.6	0.4	0.3	0.6	0.5
Hepatitis B, acute	1.0	1.9	1.7	1.4	1.2	1.0	1.0	0.9	0.7	0.8	1.0
Hepatitis C, acute	0.1	0.1	0.1	0.1	0.2	0.3	0.9	0.5	0.6	0.6	0.5
HIV disease~	12.1	10.9	10.9	18.4	15.1	13.6	13.6	14.1	13.2	12.8	13.9
Influenza	212.8	110.1	318.7	522.8	31.3	226.9	236.5	336.7	443.8	25.2	257.2
Influenza-associated deaths in children**	0.2	0.2	0.2	0.4	0.0	0.3	0.1	0.1	0.4	0.1	0.2
Kawasaki syndrome	0.1	0.0	0.0	0.0	0.0	–	–	–	–	–	–
Lead - elevated blood levels in children***	31.9	24.7	19.0	24.0	21.3	16.7	12.2	10.0	15.9	13.6	15.2
Legionellosis	0.9	0.8	0.9	0.9	1.0	1.2	0.9	1.5	1.6	1.7	1.2
Leprosy (Hansen disease)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Listeriosis	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.3	0.3	0.2
Lyme disease	4.7	12.5	12.1	11.7	15.8	12.8	13.7	16.0	16.3	18.5	14.9
Lymphogranuloma venereum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Malaria	0.7	0.9	0.6	0.8	0.8	1.0	0.8	0.9	0.9	0.8	0.9
Measles	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0

Table 2b. Ten-Year Trend in Incidence Rate per 100,000 Population for Reportable Diseases, Virginia, 2006-2015 (continued)

Disease	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Previous 5-yr Annual Rate
Meningococcal disease	0.3	0.3	0.3	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.2
Monkeypox	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mumps	1.5	0.4	0.1	0.1	0.2	0.2	0.1	1.3	0.2	0.4	0.4
Ophthalmia neonatorum	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1
Pertussis	2.9	1.7	2.6	2.9	4.9	5.0	7.7	5.1	6.1	4.4	5.8
Plague	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Poliovirus infection, including poliomyelitis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Psittacosis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Q fever	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rabies in humans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubella, including congenital rubella syndrome	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salmonellosis	14.4	16.3	15.1	14.1	15.4	15.1	14.1	12.8	13.9	14.2	14.2
Severe acute respiratory syndrome (SARS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shigellosis	1.6	2.6	4.0	2.5	1.8	1.3	1.1	1.4	2.6	3.8	1.7
Smallpox	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spotted fever rickettsiosis, including RMSF	1.5	1.6	2.0	0.7	1.8	2.9	5.7	4.3	4.5	3.6	3.9
Staphylococcus aureus infection, invasive (MRSA)	–	3.3	19.8	14.5	15.2	16.3	16.0	15.2	13.7	13.7	15.3
Staphylococcus aureus infection, VISA or VRSA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Streptococcal disease, Group A, invasive or TSS	1.7	2.1	1.9	2.2	2.4	2.4	2.1	2.3	2.5	2.7	2.4
Streptococcus pneumoniae infection, invasive****	9.7	10.2	10.0	9.0	11.1	6.5	7.1	7.3	3.7	5.4	7.1
Syphilis, early	4.6	5.3	6.5	6.8	7.0	6.3	7.3	8.3	6.7	8.9	7.1
Tetanus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Toxic shock syndrome (Staphylococcal)	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–
Toxic substance-related illness	5.5	5.7	4.6	4.4	3.8	3.4	3.9	3.7	4.3	4.6	3.8
Trichinosis (Trichinellosis)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tuberculosis	4.4	4.0	3.8	3.5	3.4	2.8	2.9	2.2	2.4	2.5	2.7
Tularemia	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Typhoid fever	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Vaccinia, disease or adverse event	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vibrio infection	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.5	0.7	0.5	0.5
Viral hemorrhagic fever	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow fever	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yersiniosis	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.3	0.2	0.2

~ Beginning in 2009, HIV infection and AIDS data, formerly presented separately, are presented together as HIV disease. This category encompasses persons newly reported to VDH with HIV infection regardless of disease progression, including those with an AIDS-defining condition at first report.

– Not a reportable disease at this time.

***** Condition is reportable only in individuals < 55 years of age.

****** Condition is reportable only in children < 18 years of age.

******* Condition is reportable only in children < 16 years of age.

******** Condition is reportable only in children < 5 years of age.

Table 3. Number of Reported Cases of Selected Diseases and Rate per 100,000 by Age Group, Virginia, 2015

Disease	<1 year		1-9 years		10-19 years		20-29 years		30-39 years		40-49 years		50-59 years		60+ years		Unk.
Population:	103,122		931,531		1,059,336		1,197,267		1,117,372		1,121,552		1,173,016		1,623,093		
	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	
Amebiasis	0	0.0	1	0.1	2	0.2	5	0.4	4	0.4	4	0.4	4	0.3	5	0.3	0
Arboviral infection	0	0.0	1	0.1	5	0.5	5	0.4	7	0.6	13	1.2	18	1.5	20	1.2	0
Campylobacteriosis	61	59.2	187	20.1	113	10.7	189	15.8	191	17.1	205	18.3	229	19.5	389	24.0	0
Chickenpox (Varicella)	28	27.2	145	15.6	73	6.9	36	3.0	37	3.3	20	1.8	11	0.9	4	0.2	0
Chlamydia trachomatis infection	0	0.0	0	0.0	8,937	843.6	21,359	1,784.0	3,835	343.2	828	73.8	287	24.5	64	3.9	31
Cryptosporidiosis	0	0.0	30	3.2	20	1.9	32	2.7	48	4.3	28	2.5	24	2.0	52	3.2	0
Ehrlichiosis/Anaplasmosis	0	0.0	3	0.3	5	0.5	6	0.5	8	0.7	16	1.4	24	2.0	54	3.3	0
E. coli infection, Shiga toxin-producing	0	0.0	32	3.4	19	1.8	8	0.7	18	1.6	10	0.9	6	0.5	14	0.9	0
Giardiasis	1	1.0	43	4.6	15	1.4	44	3.7	32	2.9	46	4.1	50	4.3	37	2.3	1
Gonorrhea	0	0.0	2	0.2	1,591	150.2	4,692	391.9	1,196	107.0	373	33.3	188	16.0	44	2.7	9
Haemophilus influenzae infection, invasive	5	4.8	7	0.8	2	0.2	8	0.7	3	0.3	3	0.3	11	0.9	82	5.1	0
Hemolytic uremic syndrome	0	0.0	3	0.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1	0
Hepatitis A	0	0.0	4	0.4	7	0.7	8	0.7	3	0.3	4	0.4	8	0.7	16	1.0	0
Hepatitis B, acute	0	0.0	0	0.0	0	0.0	7	0.6	16	1.4	25	2.2	11	0.9	10	0.6	0
Hepatitis C, acute	0	0.0	0	0.0	1	0.1	23	1.9	14	1.3	7	0.6	7	0.6	0	0.0	0
HIV disease*	0	0.0	3	0.3	46	4.3	394	32.9	274	24.5	178	15.9	121	10.3	46	2.8	0
Lead - elevated blood levels in children**	18	17.5	205	22.0	3	0.5	-	-	-	-	-	-	-	-	-	-	0
Legionellosis	0	0.0	0	0.0	0	0.0	6	0.5	13	1.2	14	1.2	43	3.7	63	3.9	0
Listeriosis	2	1.9	0	0.0	0	0.0	0	0.0	1	0.1	2	0.2	3	0.3	14	0.9	0
Lyme disease	1	1.0	220	23.6	206	19.4	150	12.5	150	13.4	183	16.3	244	20.8	385	23.7	0
Malaria	0	0.0	2	0.2	10	0.9	7	0.6	15	1.3	10	0.9	10	0.9	12	0.7	0
Measles	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0
Meningococcal disease	1	1.0	1	0.1	3	0.3	0	0.0	2	0.2	0	0.0	1	0.1	2	0.1	0
Mumps	0	0.0	3	0.3	6	0.6	17	1.4	2	0.2	1	0.1	1	0.1	4	0.2	0
Pertussis	24	23.3	71	7.6	159	15.0	17	1.4	19	1.7	31	2.8	23	2.0	25	1.5	0
Q fever	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Salmonellosis	69	66.9	222	23.8	114	10.8	121	10.1	124	11.1	128	11.4	151	12.9	252	15.5	0
Shigellosis	2	1.9	131	14.1	39	3.7	38	3.2	39	3.5	28	2.5	20	1.7	18	1.1	2
Spotted fever rickettsiosis, including RMSF	0	0.0	12	1.3	13	1.2	23	1.9	35	3.1	54	4.8	68	5.8	91	5.6	0
Staphylococcus aureus infection, invasive (MRSA)	10	9.7	13	1.4	7	0.7	35	2.9	80	7.2	101	9.0	196	16.7	699	43.1	1
Streptococcal disease, Group A, invasive or TSS	2	1.9	14	1.5	5	0.5	19	1.6	24	2.1	26	2.3	33	2.8	99	6.1	0
Streptococcus pneumoniae, invasive***	11	10.7	17	4.1	-	-	-	-	-	-	-	-	-	-	-	-	0
Syphilis, early	0	0.0	0	0.0	31	2.9	333	27.8	187	16.7	105	9.4	70	6.0	19	1.2	0
Tuberculosis	0	0.0	7	0.8	10	0.9	28	2.3	28	2.5	31	2.8	34	2.9	74	4.6	0
Typhoid fever	0	0.0	0	0.0	4	0.4	3	0.3	1	0.1	2	0.2	0	0.0	1	0.1	0
Vibrio infection	0	0.0	3	0.3	6	0.6	1	0.1	3	0.3	4	0.4	10	0.9	13	0.8	0

- Not reportable at this age.

***** Beginning in 2009, HIV infection and AIDS data, formerly presented separately, are presented together as HIV disease. This category encompasses persons newly reported to VDH with HIV infection regardless of disease progression, including those with an AIDS-defining condition at first report.

****** Condition is reportable only in children < 16 years of age. Rates are based on 0-15 year old population.

******* Condition is reportable only in children < 5 years of age. Rates are based on 0-4 year old population.

Table 4. Number of Reported Cases of Selected Diseases and Rate per 100,000 by Race, Virginia, 2015

Disease	Total	Black		White		Other		Unk.
Population:	8,326,289	1,711,801		5,985,615		628,873		
		N	Rate	N	Rate	N	Rate	N
Amebiasis	25	2	0.1	10	0.2	2	0.3	11
Arboviral infection	69	1	0.1	23	0.4	4	0.6	41
Campylobacteriosis	1,564	134	7.8	872	14.6	60	9.5	498
Chickenpox (Varicella)	354	37	2.2	195	3.3	33	5.2	89
Chlamydia trachomatis infection	35,341	14,822	865.9	8,981	150.0	1,575	250.4	9,963
Cryptosporidiosis	234	28	1.6	142	2.4	9	1.4	55
Ehrlichiosis/Anaplasmosis	116	4	0.2	53	0.9	1	0.2	58
E. coli infection, Shiga toxin-producing	107	7	0.4	74	1.2	3	0.5	23
Giardiasis	269	23	1.3	107	1.8	11	1.7	128
Gonorrhea	8,095	5,142	300.4	1,311	21.9	205	32.6	1,437
Haemophilus influenzae infection, invasive	121	16	0.9	78	1.3	9	1.4	18
Hemolytic uremic syndrome	4	0	0.0	4	0.1	0	0.0	0
Hepatitis A	50	1	0.1	32	0.5	3	0.5	14
Hepatitis B, acute	69	10	0.6	33	0.6	2	0.3	24
Hepatitis C, acute	52	1	0.1	35	0.6	1	0.2	15
HIV disease*	1,062	651	38.0	260	4.3	137	21.8	14
Lead - elevated blood levels in children**	226	51	13.0	48	4.2	26	18.8	101
Legionellosis	139	46	2.7	79	1.3	2	0.3	12
Listeriosis	22	4	0.2	16	0.3	2	0.3	0
Lyme disease	1,539	24	1.4	727	12.1	31	4.9	757
Malaria	66	43	2.5	6	0.1	9	1.4	8
Measles	1	0	0.0	0	0.0	1	0.2	0
Meningococcal disease	10	1	0.1	8	0.1	0	0.0	1
Mumps	34	2	0.1	22	0.4	4	0.6	6
Pertussis	369	30	1.8	221	3.7	7	1.1	111
Q fever	0	0	0.0	0	0.0	0	0.0	0
Salmonellosis	1,181	149	8.7	592	9.9	47	7.5	393
Shigellosis	317	113	6.6	80	1.3	7	1.1	117
Spotted fever rickettsiosis, including RMSF	296	15	0.9	102	1.7	2	0.3	177
Staphylococcus aureus infection, invasive (MRSA)	1,142	176	10.3	621	10.4	13	2.1	332
Streptococcal disease, Group A, invasive or TSS	222	41	2.4	134	2.2	13	2.1	34
Streptococcus pneumoniae, invasive***	28	9	7.4	13	3.7	0	0.0	6
Syphilis, early	745	425	24.8	269	4.5	35	5.6	16
Tuberculosis	212	53	3.1	65	1.1	94	14.9	0
Typhoid fever	11	1	0.1	1	0.0	9	1.4	0
Vibrio infection	40	5	0.3	28	0.5	1	0.2	6

* Beginning in 2009, HIV infection and AIDS data, formerly presented separately, are presented together as HIV disease. This category encompasses persons newly reported to VDH with HIV infection regardless of disease progression, including those with an AIDS-defining condition at first report.

** Condition is reportable only in children < 16 years of age. Rates are based on 0-15 year old population.

*** Condition is reportable only in children < 5 years of age. Rates are based on 0-4 year old population.

Table 5. Number of Reported Cases of Selected Diseases and Rate per 100,000 by Sex, Virginia, 2015

Disease	Total	Female		Male		Unk.
Population:	8,293,247	4,231,045		4,062,202		
		N	Rate	N	Rate	N
Amebiasis	25	7	0.2	18	0.4	0
Arboviral infection	69	37	0.9	32	0.8	0
Campylobacteriosis	1,564	714	16.9	848	20.9	2
Chickenpox (Varicella)	354	167	3.9	187	4.6	0
Chlamydia trachomatis infection	35,341	23,856	563.8	11,456	282.0	29
Cryptosporidiosis	234	127	3.0	107	2.6	0
Ehrlichiosis/Anaplasmosis	116	51	1.2	65	1.6	0
E. coli infection, Shiga toxin-producing	107	54	1.3	53	1.3	0
Giardiasis	269	81	1.9	188	4.6	0
Gonorrhea	8,095	4,007	94.7	4,082	100.5	6
Haemophilus influenzae infection, invasive	121	61	1.4	60	1.5	0
Hemolytic uremic syndrome	4	3	0.1	1	0.0	0
Hepatitis A	50	24	0.6	26	0.6	0
Hepatitis B, acute	69	32	0.8	37	0.9	0
Hepatitis C, acute	52	30	0.7	22	0.5	0
HIV disease*	1,062	200	4.7	862	21.2	0
Lead - elevated blood levels in children**	226	107	13.2	119	14.0	0
Legionellosis	139	46	1.1	93	2.3	0
Listeriosis	22	12	0.3	10	0.2	0
Lyme disease	1,539	696	16.4	841	20.7	2
Malaria	66	22	0.5	44	1.1	0
Measles	1	0	0.0	1	0.0	0
Meningococcal disease	10	4	0.1	6	0.1	0
Mumps	34	19	0.4	15	0.4	0
Pertussis	369	216	5.1	153	3.8	0
Q fever	0	0	0.0	0	0.0	0
Salmonellosis	1,181	620	14.7	560	13.8	1
Shigellosis	317	168	4.0	149	3.7	0
Spotted fever rickettsiosis, including RMSF	296	105	2.5	191	4.7	0
Staphylococcus aureus infection, invasive (MRSA)	1,142	457	10.8	682	16.8	3
Streptococcal disease, Group A, invasive or TSS	222	114	2.7	107	2.6	1
Streptococcus pneumoniae, invasive***	28	11	4.4	17	6.5	0
Syphilis, early	745	60	1.4	684	16.8	1
Tuberculosis	212	104	2.5	108	2.7	0
Typhoid fever	11	7	0.2	4	0.1	0
Vibrio infection	40	12	0.3	28	0.7	0

* Beginning in 2009, HIV infection and AIDS data, formerly presented separately, are presented together as HIV disease. This category encompasses persons newly reported to VDH with HIV infection regardless of disease progression, including those with an AIDS-defining condition at first report.

** Condition is reportable only in children < 16 years of age. Rates are based on 0-15 year old population.

*** Condition is reportable only in children < 5 years of age. Rates are based on 0-4 year old population.

Table 6. Number of Reported Cases of Selected Diseases and Rate per 100,000 by Health Planning Region, Virginia, 2015

Disease	Total		Northwest Region		Northern Region		Southwest Region		Central Region		Eastern Region	
Population:	8,326,289		1,293,706		2,419,504		1,355,465		1,410,972		1,846,642	
	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
Amebiasis	25	0.3	0	0.0	15	0.6	1	0.1	4	0.3	5	0.3
Arboviral infection	69	0.8	6	0.5	49	2.0	2	0.1	5	0.4	7	0.4
Campylobacteriosis	1,564	18.8	431	33.3	556	23.0	200	14.8	183	13.0	194	10.5
Chickenpox (Varicella)	354	4.3	87	6.7	131	5.4	51	3.8	40	2.8	45	2.4
Chlamydia trachomatis infection	35,341	424.5	3,804	294.0	6,624	273.8	4,303	317.5	8,676	614.9	11,934	646.3
Cryptosporidiosis	234	2.8	38	2.9	104	4.3	24	1.8	12	0.9	56	3.0
Ehrlichiosis/Anaplasmosis	116	1.4	35	2.7	16	0.7	41	3.0	12	0.9	12	0.6
E. coli infection, Shiga toxin-producing	107	1.3	32	2.5	27	1.1	24	1.8	14	1.0	10	0.5
Giardiasis	269	3.2	49	3.8	116	4.8	31	2.3	23	1.6	50	2.7
Gonorrhea	8,095	97.2	488	37.7	905	37.4	913	67.4	2,371	168.0	3,418	185.1
Haemophilus influenzae infection, invasive	121	1.5	18	1.4	27	1.1	38	2.8	8	0.6	30	1.6
Hemolytic uremic syndrome	4	0.0	2	0.2	0	0.0	2	0.1	0	0.0	0	0.0
Hepatitis A	50	0.6	9	0.7	20	0.8	10	0.7	2	0.1	9	0.5
Hepatitis B, acute	69	0.8	5	0.4	4	0.2	38	2.8	18	1.3	4	0.2
Hepatitis C, acute	52	0.6	21	1.6	1	0.0	20	1.5	9	0.6	1	0.1
HIV disease*	1,062	12.8	99	7.7	275	11.4	72	5.3	271	19.2	345	18.7
Influenza	2,099	25.2	544	42.0	317	13.1	767	56.6	230	16.3	241	13.1
Lead - elevated blood levels in children**	226	13.6	26	10.2	56	10.5	35	14.8	53	19.5	56	15.3
Legionellosis	139	1.7	15	1.2	28	1.2	31	2.3	24	1.7	41	2.2
Listeriosis	22	0.3	4	0.3	5	0.2	6	0.4	2	0.1	5	0.3
Lyme disease	1,539	18.5	479	37.0	518	21.4	418	30.8	65	4.6	59	3.2
Malaria	66	0.8	7	0.5	43	1.8	1	0.1	8	0.6	7	0.4
Measles	1	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0
Meningococcal disease	10	0.1	0	0.0	2	0.1	0	0.0	5	0.4	3	0.2
Mumps	34	0.4	22	1.7	6	0.2	1	0.1	3	0.2	2	0.1
Pertussis	369	4.4	218	16.9	62	2.6	49	3.6	25	1.8	15	0.8
Q fever	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Rabies in animals ~	500	-	126	-	77	-	130	-	97	-	70	-
Salmonellosis	1,181	14.2	211	16.3	323	13.3	147	10.8	221	15.7	279	15.1
Shigellosis	317	3.8	14	1.1	84	3.5	12	0.9	50	3.5	157	8.5
Spotted fever rickettsiosis, including RMSF	296	3.6	63	4.9	40	1.7	96	7.1	60	4.3	37	2.0
Staphylococcus aureus infection, invasive (MRSA)	1,142	13.7	229	17.7	178	7.4	337	24.9	220	15.6	178	9.6

Table 6. Number of Reported Cases of Selected Diseases and Rate per 100,000 by Health Planning Region, Virginia, 2015 (continued)

Disease	Total		Northwest Region		Northern Region		Southwest Region		Central Region		Eastern Region	
Population:	8,326,289		1,293,706		2,419,504		1,355,465		1,410,972		1,846,642	
	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
Streptococcal disease, Group A, invasive or TSS	222	2.7	43	3.3	48	2.0	53	3.9	37	2.6	41	2.2
Streptococcus pneumoniae, invasive***	28	5.4	4	5.4	8	4.6	4	5.7	6	7.4	6	5.1
Syphilis, early	745	8.9	47	3.6	153	6.3	68	5.0	186	13.2	291	15.8
Tuberculosis	212	2.5	20	1.5	129	5.3	9	0.7	16	1.1	38	2.1
Typhoid fever	11	0.1	0	0.0	10	0.4	1	0.1	0	0.0	0	0.0
Vibrio infection	40	0.5	2	0.2	8	0.3	1	0.1	7	0.5	22	1.2

* Beginning in 2009, HIV infection and AIDS data, formerly presented separately, are presented together as HIV disease. This category encompasses persons newly reported to VDH with HIV infection regardless of disease progression, including those with an AIDS-defining condition at first report.

** Condition is reportable only in children < 16 years of age. Rates are based on 0-15 year old population.

~ Population rate is not applicable for rabies in animals

*** Condition is reportable only in children < 5 years of age. Rates are based on 0-4 year old population.

Table 7. Number of Reported Cases of Selected Diseases by Quarter of Onset, Virginia, 2015

Disease	Total	Prior to 2015		1st Quarter		2nd Quarter		3rd Quarter		4th Quarter	
		N	%	N	%	N	%	N	%	N	%
Amebiasis	25	4	16.0	7	28.0	5	20.0	6	24.0	3	12.0
Arboviral infection	69	2	2.9	10	14.5	8	11.6	40	58.0	9	13.0
Campylobacteriosis	1,564	8	0.5	294	18.8	464	29.7	444	28.4	354	22.6
Chickenpox (Varicella)	354	2	0.6	96	27.1	81	22.9	79	22.3	96	27.1
Chlamydia trachomatis infection	35,341	0	0.0	8,609	24.4	9,096	25.7	9,247	26.2	8,389	23.7
Cryptosporidiosis	234	2	0.9	31	13.2	39	16.7	114	48.7	48	20.5
Ehrlichiosis/Anaplasmosis	116	4	3.4	5	4.3	68	58.6	38	32.8	1	0.9
E. coli infection, Shiga toxin-producing	121	3	2.5	11	9.1	37	30.6	45	37.2	25	20.7
Giardiasis	269	10	3.7	53	19.7	57	21.2	83	30.9	66	24.5
Gonorrhea	8,095	0	0.0	1,874	23.2	2,256	27.9	2,169	26.8	1,796	22.2
Haemophilus influenzae infection, invasive	121	5	4.1	28	23.1	24	19.8	21	17.4	43	35.5
Hemolytic uremic syndrome	4	0	0.0	0	0.0	2	50.0	1	25.0	1	25.0
Hepatitis A	50	0	0.0	9	18.0	9	18.0	14	28.0	18	36.0
Hepatitis B, acute	69	0	0.0	17	24.6	16	23.2	15	21.7	21	30.4
Hepatitis C, acute	52	0	0.0	11	21.2	17	32.7	13	25.0	11	21.2
HIV disease*	1,062	0	0.0	235	22.1	261	24.6	276	26.0	290	27.3
Influenza	2,099	0	0.0	1,268	60.4	379	18.1	65	3.1	387	18.4
Legionellosis	139	0	0.0	21	15.1	29	20.9	49	35.3	40	28.8
Listeriosis	22	0	0.0	1	4.5	5	22.7	7	31.8	9	40.9
Lyme disease	1,539	62	4.0	134	8.7	581	37.8	565	36.7	197	12.8
Malaria	66	0	0.0	9	13.6	19	28.8	24	36.4	14	21.2
Measles	1	0	0.0	0	0.0	1	100.0	0	0.0	0	0.0
Meningococcal disease	10	0	0.0	3	30.0	2	20.0	4	40.0	1	10.0
Mumps	34	0	0.0	23	67.6	6	17.6	1	2.9	4	11.8
Pertussis	369	9	2.4	59	16.0	140	37.9	68	18.4	93	25.2
Q fever	0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Salmonellosis	1,181	2	0.2	152	12.9	291	24.6	510	43.2	226	19.1
Shigellosis	317	1	0.3	39	12.3	114	36.0	93	29.3	70	22.1
Spotted fever rickettsiosis, including RMSF	296	7	2.4	5	1.7	132	44.6	135	45.6	17	5.7
Staphylococcus aureus infection, invasive (MRSA)	1,142	3	0.3	273	23.9	317	27.8	283	24.8	266	23.3
Streptococcal disease, Group A, invasive or TSS	222	3	1.4	53	23.9	75	33.8	28	12.6	63	28.4
Streptococcus pneumoniae, invasive**	28	0	0.0	5	17.9	7	25.0	6	21.4	10	35.7
Syphilis, early	745	0	0.0	133	17.9	217	29.1	186	25.0	209	28.1
Typhoid fever	11	0	0.0	2	18.2	3	27.3	6	54.5	0	0.0
Vibrio infection	40	0	0.0	2	5.0	12	30.0	21	52.5	5	12.5

* Beginning in 2009, HIV infection and AIDS data, formerly presented separately, are presented together as HIV disease. This category encompasses persons newly reported to VDH with HIV infection regardless of disease progression, including those with an AIDS-defining condition at first report.

** Condition is reportable only in children < 5 years of age.

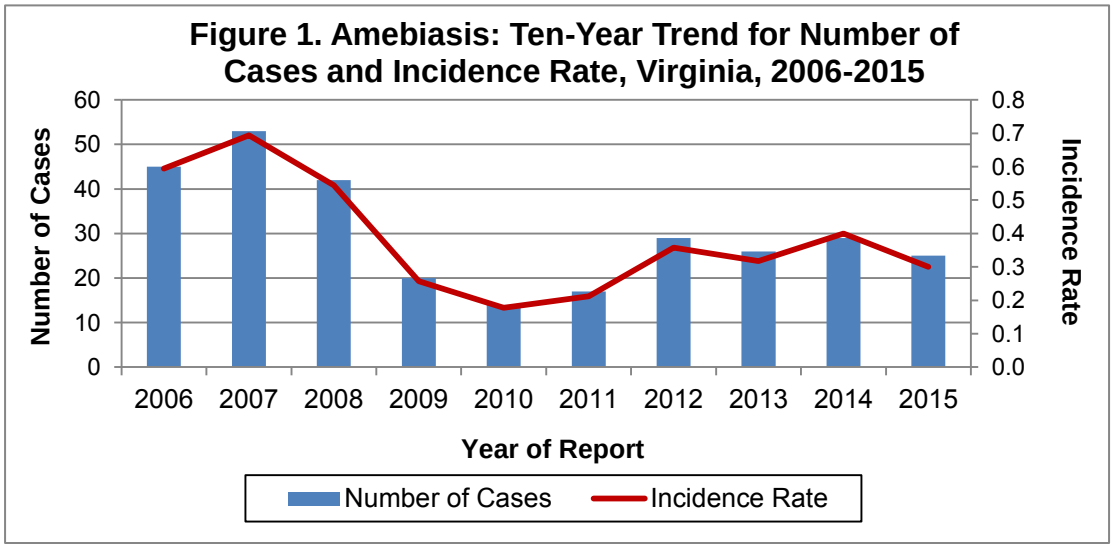
DESCRIPTIVE EPIDEMIOLOGY OF REPORTABLE DISEASES

Amebiasis

Agent: *Entamoeba histolytica* (parasite)
Mode of Transmission: Ingestion of food or water contaminated with amebic cysts, by fecal-oral contact with an infected person, or by swallowing cysts picked up from contaminated surfaces or fingers.
Signs/Symptoms: Most infections are asymptomatic. Symptomatic infections are often mild and can include diarrhea, stomach pain, and stomach cramping. Amebic dysentery is a severe form of amebiasis associated with diarrhea (which may be bloody or contain mucus), abdominal pain, and fever. In a small number of cases, the parasite invades other body sites, such as the liver, lung, brain, or skin.
Prevention: Hands should be washed carefully after using the bathroom, after changing diapers or cleaning a child who has used the bathroom, and before preparing and eating food. When traveling to a country with poor sanitary conditions, do not eat or drink: fountain drinks or any drinks with ice cubes; fresh fruit or vegetables that you did not peel yourself; milk, cheese, or dairy products that may not have been pasteurized; anything sold by street vendors; or water unless it is bottled or has been boiled for 1 minute or made safe by filtering it through an "absolute 1 micron or less" filter and dissolving chlorine, chlorine dioxide, or iodine tablets in the filtered water.
Other Important Information: Amebiasis can affect anyone, but it is most common in people who live in tropical areas with poor sanitary conditions. In the United States, it is mainly seen in people who travel to or emigrate from these tropical areas, people living in institutions with poor sanitary conditions, and in men who have sex with men.

Amebiasis: 2015 Data Summary	
Number of Cases:	25
5-Year Average Number of Cases:	23.0
% Change from 5-Year Average:	+9%
Incidence Rate per 100,000:	0.3

Twenty-five cases of amebiasis were reported in Virginia during 2015, which was slightly higher than the five-year average of 23.0 cases per year (Figure 1). Overall, the number of cases of amebiasis has decreased since a peak in 2007, in part due to a change in the

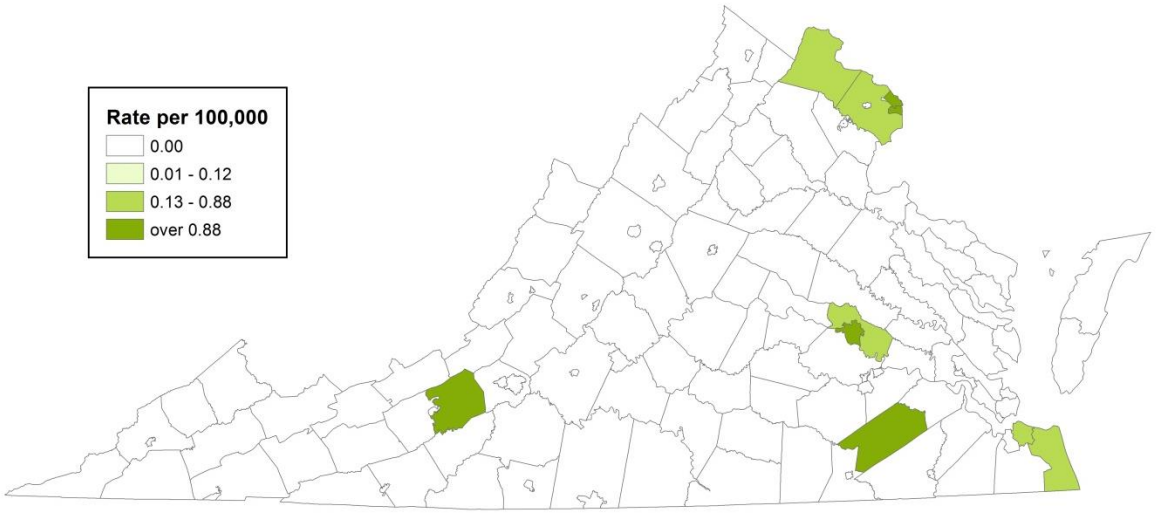


national surveillance case definition in 2008. This change required that individuals with laboratory-confirmed infection also be symptomatic to be counted for surveillance purposes. Since 2012, the number of reported cases has stabilized.

Among cases reported in 2015, the highest incidence rate occurred among adults in the 20-29, 30-39, and 40-49 year age groups (0.4 per 100,000 each), followed closely by the 50-59 and 60 year and older age groups (0.3 per 100,000 each). No cases occurred in infants and only one case occurred in a child less than ten years of age. Race was reported for 56% of the cases. Of those cases with race information provided, the "other" race population had the highest incidence rate at 0.3 per 100,000. Incidence was higher in males (0.4 per 100,000) than females (0.2 per 100,000).

Fifteen of the twenty-five cases of amebiasis were reported from the northern health planning region (incidence rate of 0.6 per 100,000). Five cases were reported from the eastern region and four cases from the central region (0.3 per 100,000 population each). One case was reported from the southwest region (0.1 per 100,000), and no cases were reported from the northwest region. For incidence rates by locality, please see the map below. Cases occurred throughout the year, with the majority of cases reported during the first quarter (January through March). No outbreaks or deaths attributed to amebiasis were reported in Virginia in 2015.

Amebiasis Incidence Rate by Locality
Virginia, 2015



Anthrax

Agent: *Bacillus anthracis* (spore-forming bacteria)
Mode of Transmission: By direct contact with contaminated animal products; ingestion of contaminated, undercooked meat; and inhalation of spores during certain animal-related industrial practices (e.g., processing wool or hides) or through an intentional bioterrorism release.
Signs/Symptoms: There are three recognized forms of anthrax. The type of illness that develops depends on the route of exposure. Cutaneous anthrax occurs when the bacteria enter a cut or abrasion on the skin and presents as a skin lesion that often develops a black scab. Intestinal anthrax occurs after the ingestion of contaminated meat and presents as abdominal distress (e.g., nausea, vomiting, diarrhea, fever). Inhalation anthrax occurs when the bacteria are inhaled; the symptoms are initially nonspecific, (e.g., fever, cough, chest pain), but progress to respiratory distress and death if untreated.
Prevention: Contact with infected animals and animal products should be minimal. A vaccine is available to immunize high-risk individuals, such as laboratorians who work with *B. anthracis* or military personnel.
Other Important Information: Person-to-person transmission is very rare. The incubation period, or time from exposure to onset of symptoms, ranges from 1 to 60 days. Anthrax is classified as a potential bioweapon because it can cause serious public health problems, be spread across a large area, and require extensive planning to protect the public's health.

No cases of anthrax have been reported in Virginia since 2001. In 2001, two Virginia residents were reported with inhalation anthrax from an intentional release of *Bacillus anthracis* spores through a letter received by the U.S. Postal Service. Both individuals were exposed at their workplace and both survived. These represented the first reported cases of anthrax in Virginia since 1970.

Arboviral Infection

Agent(s): In Virginia, the agents of arboviral infection, from most to least common, are the mosquito-borne West Nile virus (WNV), La Crosse encephalitis (LAC) virus, St. Louis encephalitis (SLE) virus and Eastern equine encephalitis (EEE) virus. Other arboviral agents causing illness in Virginians include the imported dengue virus and chikungunya virus, which typically infect travelers to endemic regions of the tropics and subtropics, but have not become established in Virginia. Powassan (POW) virus, which is a tick-borne encephalitis virus, was recently discovered in Virginia.

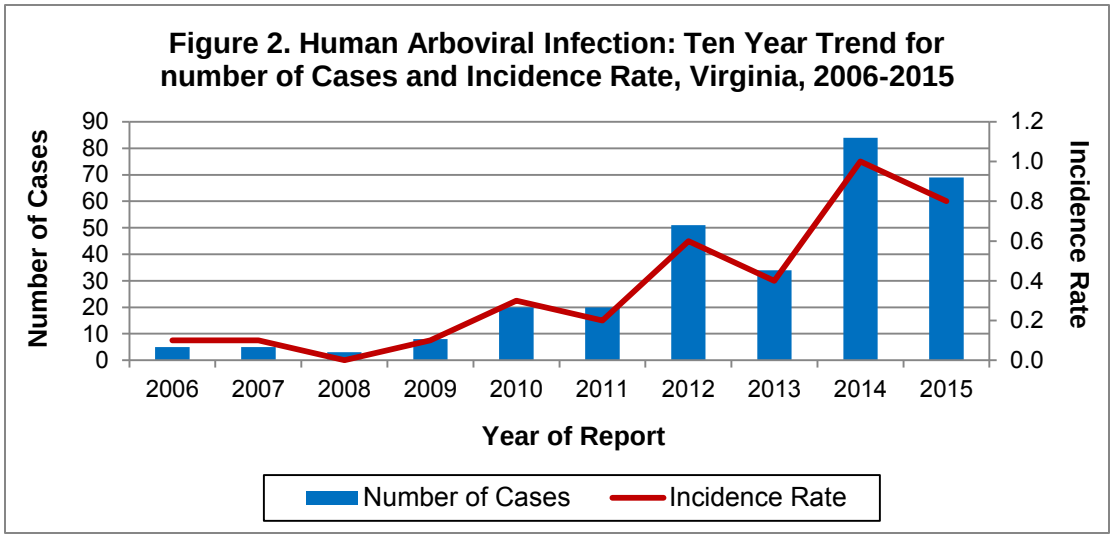
Mode of Transmission: Most commonly through the bite of an infected mosquito. WNV may also be transmitted by blood products via transfusion or transplanted organs from infected donors, and more rarely by cuts or punctures with contaminated scalpels or needles in a laboratory.

Signs/Symptoms: Severity of symptoms differs depending on the particular virus and characteristics of the infected person. Most infections are asymptomatic. Mild cases may appear as fever with headache. More severe disease can cause encephalitis (i.e., inflammation of the brain) or meningitis (i.e., inflammation of the lining of the brain and spinal cord) and may lead to long term or permanent neurological impairment, or death.

Prevention: Minimize bites by avoiding areas infested by mosquitoes or ticks, and, when in those areas, use mosquito or tick repellents and wear long-sleeved, light-colored clothing with pants legs tucked into socks. Additional mosquito control measures include maintaining screens on all open windows and doors and eliminating or regularly dumping all containers that could hold water and breed mosquitoes, including buckets, birdbaths and discarded tires. After visiting tick habitats, a person should thoroughly check all body surfaces for ticks and, if found, carefully remove attached ticks as soon as possible.

Other Important Information: WNV and SLE infections are more likely to cause severe disease in persons over the age of 50, but the majority of infections are asymptomatic. LAC is seen primarily in individuals less than 16 years of age. EEE has a high fatality rate and is more likely to affect children under the age of 15 and adults over the age of 50. The dengue viruses may cause fever, headache, body pain and a rash as well as mild or severe hemorrhagic symptoms in some patients. The chikungunya virus causes fever, headache, rashes, and severe, debilitating joint pain/arthritis in joints of the extremities (hands, arms, feet and legs). Dengue or chikungunya may affect persons of all ages. The dengue and chikungunya viruses are found primarily in the tropical regions of the world, and travelers to those regions may become infected and return to Virginia carrying one of these viruses. Asian tiger mosquitoes in Virginia are capable of being infected with these viruses if they bite infected travelers, and may potentially transmit these viruses locally.

Arboviral Infection: 2015 Data Summary	
Number of Cases:	69
5-Year Average Number of Cases:	41.8
% Change from 5-Year Average:	+65%
Incidence Rate per 100,000:	0.8



Human

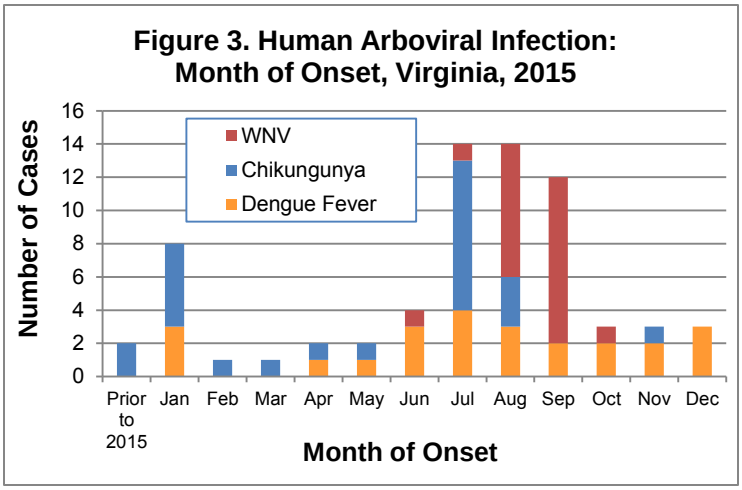
In 2015, 69 cases of arboviral infection were reported in Virginia, which is higher than the 5-year average of 41.8 cases per year, but less than the 84 cases reported in 2014 (Figure 2). The majority of arboviral infections (70%) were determined to have been acquired through travel to another country. Specifically, the 24 cases each of chikungunya and dengue were determined to have been acquired in other countries. Of the 21 locally-acquired arboviral infections reported, all were West Nile virus cases. No cases of La Cross encephalitis virus, St. Louis encephalitis, Eastern equine encephalitis or Powassan virus were reported in 2015.

The lower number of reported arboviral cases in 2015 compared to 2014 was attributed to a decrease in the number of imported chikungunya infections, from 58 in 2014 to 24 in 2015. Chikungunya cases were reported across all age groups except infants, with the highest number of cases (n=6) reported among persons 40-49 years of age. Nineteen cases were reported in females and five cases were reported in males. One chikungunya case occurred in a person who traveled to the Caribbean and the remaining cases were associated with travel to Central and South America. Chikungunya cases associated with travel to the American tropics resulted from the introduction and spread of the chikungunya virus into the tropical Americas beginning in 2013.

All 24 dengue cases occurred among people who traveled to dengue endemic countries of South America, Hispaniola, Mexico, or south Asia. The age range of cases was 12 to 75 years. Eleven of 24 dengue cases were among females. There were no reported cases of dengue hemorrhagic fever in 2015.

The number of WNV cases increased dramatically in 2015. Twenty-one cases were reported in 2015 compared to seven cases in 2014. The age range of cases was 36 to 91 years of age. Cases occurred in four regions of the state, sixteen in the northern region, three in the eastern region, and one case each in the central and southwest regions. Two fatalities were attributed to WNV in 2015.

Arboviral infection cases occurred throughout the year, but locally-acquired arboviral infection (WNV) occurred only from June through October (Figure 3). Cases of imported dengue were reported nearly year round, except February and March, while cases of imported chikungunya were reported in every month except June, October and December. As these infections were acquired out of the country, any seasonality would be based on travel patterns and seasonality of the illness in the endemic countries of origin.



Animal

Zoonotic surveillance for WNV is conducted each year by a limited number of jurisdictions in northern Virginia, the Richmond metropolitan area, and Hampton Roads. These surveillance programs test for the presence of arboviruses in mosquitoes and sentinel chickens. Zoonotic surveillance for EEE is done only by jurisdictions in the Hampton Roads region. Sentinel chicken flocks are maintained only by surveillance programs in the Hampton Roads area. Veterinary records are also obtained from around the state from the Virginia Department of Agriculture and Consumer Services (VDACS) Veterinary Program which surveys for cases of arboviral infection in equines and other animals statewide. No mosquito or zoonotic surveillance and testing programs are in place for LAC or SLE viruses.

In 2015, 417,422 mosquitoes were tested for WNV and 185,832 were tested for EEE. All mosquitoes were tested as "pools" (i.e., batches of approximately 50 mosquitoes). Of the 13,093 pools tested for WNV, 894 (7%) were positive, and of the 5,725 pools tested for EEE, 53 (1%) were positive. Among the positive pools, each was likely to have only contained one infected mosquito. Of the 894 WNV positive pools, 821 were collected in northern Virginia, 55 were collected in eastern Virginia, and 18 in central Virginia. All of the EEE positive pools were collected in eastern Virginia.

In 2015, three EEE-infected horses were reported in the eastern region and one WNV-infected horse was reported in the northern region. Testing of sentinel chickens revealed 21 WNV-positive chickens in the Chesapeake, Norfolk, Suffolk, and Virginia Beach area, and 19 EEE-positive chickens in the Chesapeake, Norfolk, Suffolk, and Virginia Beach area.

Botulism

Agent: Neurotoxin produced by *Clostridium botulinum* (spore-forming, anaerobic bacteria)
Mode of Transmission: For foodborne botulism, ingestion of food that contains toxin and has not been sufficiently heated to inactivate the toxin. For non-foodborne botulism, ingestion of food contaminated with spores that then germinate, multiply, and produce toxin in the intestine (also known as infant botulism or adult intestinal botulism, depending on the age of the patient); or contamination of wounds or open fractures with soil or gravel that contain *C. botulinum* spores (also known as wound botulism). *C. botulinum* is not transmitted from person to person.
Signs/Symptoms: Both foodborne and non-foodborne botulism can result in descending, flaccid paralysis which can lead to cessation of breathing and death unless respiration is aided. Additional distinguishing symptoms of foodborne botulism, which usually begin 12-36 hours after the toxin is ingested, but might be delayed for up to several days after exposure, include fatigue, weakness, vertigo, and sometimes diarrhea and vomiting. Infant botulism is characterized by constipation, weakness, loss of appetite, poor feeding or sucking, an altered cry and loss of head control. Symptoms of wound botulism are similar to those associated with foodborne botulism.
Prevention: For prevention of foodborne botulism, all canned and preserved food should be properly processed and prepared. Boiling food for 10 minutes will destroy the toxin. To prevent non-foodborne botulism, honey and corn syrup should not be given to children younger than 12 months of age because *C. botulinum* spores have been identified in these foods. Also, all wounds should be maintained properly and medical attention should be sought when wounds become infected.
Other Important Information: Botulism is a condition that requires rapid reporting to the local health department. Botulism antitoxin, released by public health authorities, is effective in reducing the severity of symptoms if administered early. Botulism is listed by CDC as a potential bioweapon because an aerosolized or foodborne botulinum-toxin weapon could cause widespread, severe disease and would require rapid public health response to control.

Foodborne

No cases of foodborne botulism were reported in Virginia during 2015. The last reported case in Virginia occurred in 2007 in an adult female. The five-year average for foodborne botulism cases in Virginia is less than one case per year.

Non-Foodborne (including infant, intestinal and wound botulism)

Three cases of non-foodborne botulism were reported in Virginia during 2015. All were infant botulism cases; two from the southwest region and one from the northwest region. All were caused by type B neurotoxin. All infants survived and no risk factors were identified. The five-year average for non-foodborne botulism cases in Virginia is 1.8 cases per year.

Brucellosis

Agent: *Brucella* species (bacteria)
Mode of Transmission: Most commonly through ingestion of unpasteurized milk or milk products from infected animals, but also may be transmitted by contamination of skin wounds with infected animal tissue or body fluids and by inhalation of the organism.
Signs/Symptoms: Intermittent or irregular fever, headache, chills, sweating, and muscle pain. Some signs and symptoms may persist for longer periods of time, while others may never resolve.
Prevention: Unpasteurized dairy products, especially milk, cheese, or ice cream, should not be consumed. Barrier precautions, such as wearing rubber gloves, should be used when handling animal tissue. Laboratory workers should take proper infection control precautions when handling samples known to contain or suspected of containing *Brucella*.
Other Important Information: Considered an occupational disease of those working with infected animals, especially farm workers, veterinarians, and abattoir workers. Hunters of certain game animals such as elk, moose and feral swine may also be at increased risk of exposure. *Brucella* is listed by the CDC as a potential bioterrorism agent because the organism may be relatively easily disseminated, may cause moderate injury or death, and may need enhanced surveillance for detection.

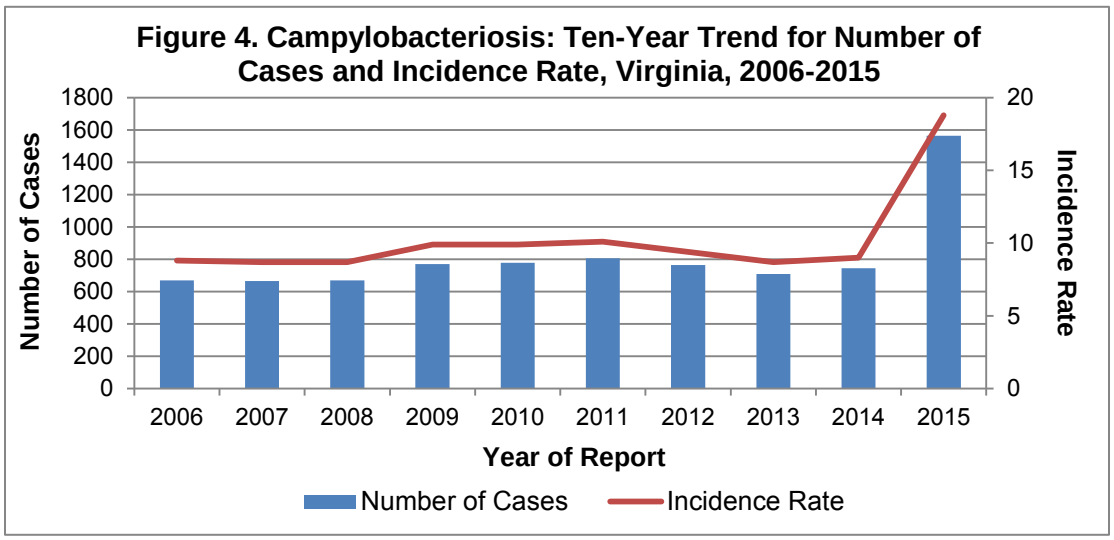
Two cases of brucellosis were reported in Virginia in 2015. One confirmed case occurred in an adult male from the northern region and one probable case was reported in an adult female from the northwest region. Consumption of unpasteurized milk and calving assistance while traveling in Central America were considered likely risk factors for illness for the confirmed case. A definitive exposure could not be determined for the probable case. The 5-year average in number of cases of brucellosis in Virginia is less than one case per year.

Campylobacteriosis

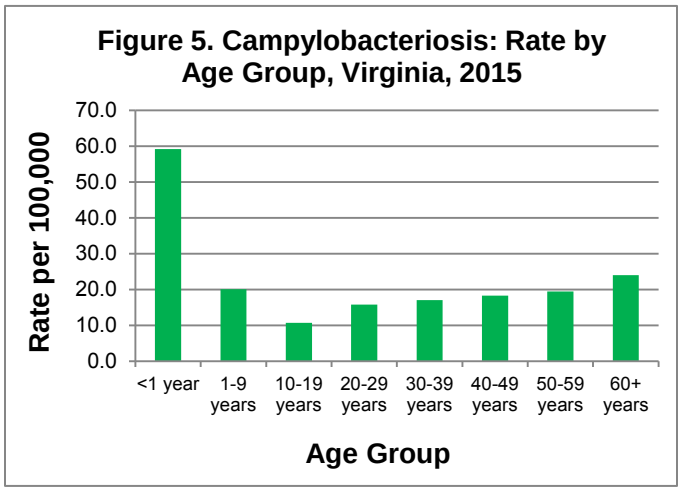
Agent: *Campylobacter* species (bacteria)
Mode of Transmission: Ingestion of undercooked meat, particularly poultry; ingestion of contaminated food, water, or raw milk; and direct contact with fecal material from infected animals or people.
Signs/Symptoms: Include diarrhea (frequently with bloody stools), abdominal pain, malaise, fever, nausea, or vomiting. In neonates and young infants, bloody diarrhea without fever may be the only manifestation of illness. Many infections are asymptomatic. Rarely, complications can develop, including reactive arthritis, febrile convulsions, or Guillain-Barré Syndrome; bacteremia can occur in children.
Prevention: Hands should be washed carefully after using the bathroom, after changing diapers or cleaning a child who has used the bathroom, after handling animals or their feces, and before preparing and eating food. Pasteurization of milk and chlorination of water supplies are also important. All foods containing eggs and meats, particularly poultry, should be cooked thoroughly.
Other important information: In 2015, a change was implemented to the campylobacteriosis case definition, allowing cases identified by the detection of *Campylobacter* species in a clinical specimen using a culture independent diagnostic test (CIDT) method to count as probable cases; prior to 2015, these cases were classified as suspect cases and were not included in campylobacteriosis case counts. Data regarding the performance of CIDTs indicate variability in the sensitivity, specificity, and positive predictive value of these assays depending on the manufacturer (CDC unpublished data). The use of CIDT methods by laboratories is increasing and may contribute to an increase in probable campylobacteriosis cases and a decline in confirmed campylobacteriosis cases.

Campylobacteriosis: 2015 Data Summary	
Number of Cases:	1,564
5-Year Average Number of Cases:	760.0
% Change from 5-Year Average:	+106%
Incidence Rate per 100,000:	18.8

In 2015, 1,564 cases of campylobacteriosis were reported in Virginia, including 712 confirmed cases and 852 probable cases. This represents a 110% increase from the 744 (729 confirmed and 15 probable) cases reported in 2014, and a 106% increase from the five-year average of 760 cases per year (Figure 4). The dramatic increase in cases from 2014 to 2015 is explained by a change in national case definition, described above.

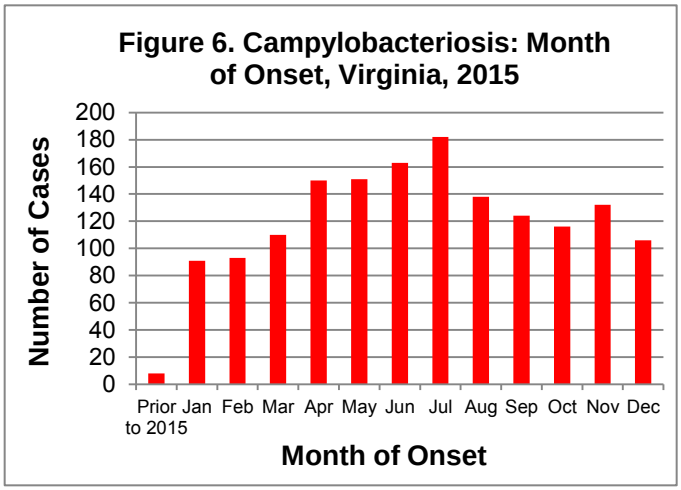


In Virginia, the highest incidence rates of *Campylobacter* infection are typically seen in children less than one year of age. In 2015, incidence was again highest among this age group, at 59.2 cases per 100,000 persons, while rates among other age groups ranged from 10.7 (10-19 years) to 24.0 (60 years and older) per 100,000 (Figure 5).



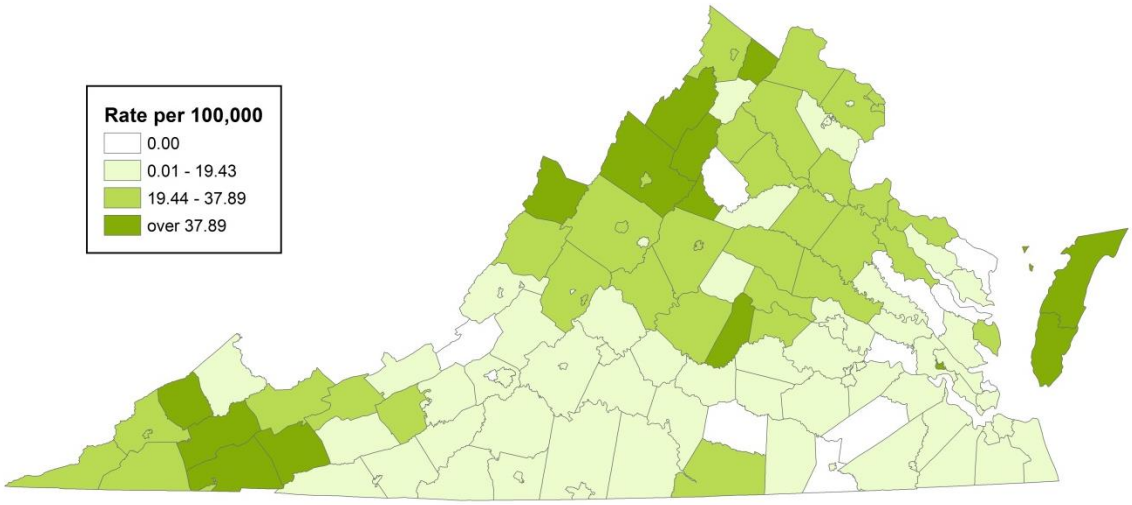
Race information was not reported for 32% of cases. For cases with a known race, incidence was highest among the white population (14.6 per 100,000), followed by the "other" race population (9.5 per 100,000), and the black population (7.8 per 100,000). Historically in Virginia, incidence is higher in males; this remained unchanged in 2015, with a rate of 20.9 per 100,000 among males and 16.9 per 100,000 among females.

Regionally, the highest incidence rate occurred in the northwest region (33.3 per 100,000), while the lowest rate was seen in the eastern region (10.5 per 100,000). Rates in the remaining regions ranged from 23.0 to 13.0 per 100,000. The occurrence of campylobacteriosis varied widely by locality, with the highest rates tending to be reported from adjacent localities (see map below).



While cases were reported in every month of the year, more cases were seen during the warmer months, peaking in July with 182 cases (Figure 6). Four outbreaks of *Campylobacter* infection were reported during 2015. These outbreaks occurred in the northern (3 outbreaks) and northwest (1 outbreak) regions and involved two restaurants, one water spray park and one business. One death attributed to campylobacteriosis was reported in 2015. This death occurred in an adult male from the 60 year and older age group.

Campylobacteriosis Incidence Rate by Locality
Virginia, 2015



Chancroid

Agent: *Haemophilus ducreyi* (bacteria)
Mode of Transmission: Sexual transmission through skin-to-skin contact with open sores. Transmission not related to sexual contact is rare. Auto-inoculation to non-genital sites from open sores may occur.
Signs/Symptoms: One or more sores or raised bumps on the genitals. Sores are surrounded by a narrow red border and become filled with purulent secretion, and eventually rupture, leaving a painful open lesion. The chancroid ulcer is soft to the touch. In 50% of untreated cases, the chancroid bacteria infect the lymph nodes in the groin.
Prevention: Preventive measures include adhering to safe sexual practices and abstaining from sexual relations with an infected partner until the infection is cleared.
Other Important Information: Chancroid is uncommon in the United States. Most cases are seen in tropical countries. This disease is a cofactor for HIV transmission; high rates of HIV infection among patients who have chancroid are seen worldwide.

No cases of chancroid were reported in Virginia in 2015. Only two cases have been reported in Virginia since 2005.

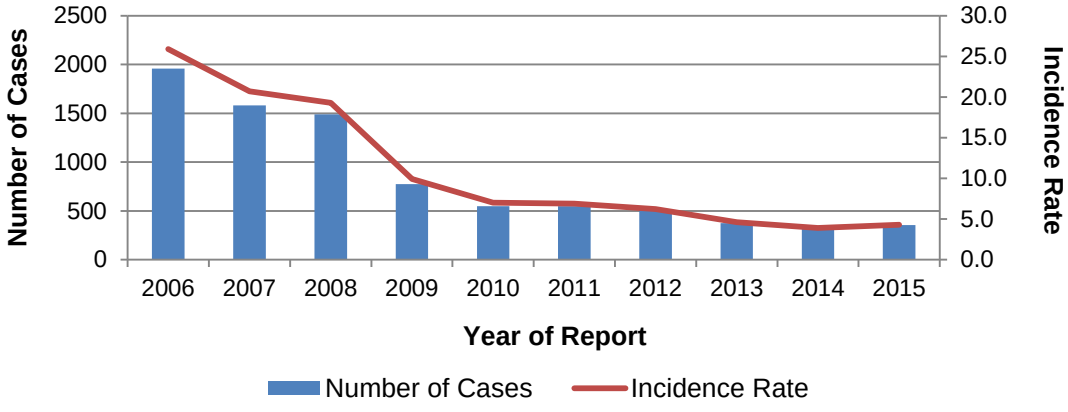
Chickenpox (Varicella)

Agent: Varicella-zoster virus (VZV)
Mode of Transmission: Person-to-person transmission by direct contact or through droplet or airborne spread of vesicular lesion fluids or respiratory secretions from an infected person.
Signs/Symptoms: Acute onset of fever and generalized, pruritic, vesicular rash typically consisting of 250-500 lesions. Successive crops of lesions appear first on the head and progress to the trunk and extremities. Lesions can appear on the scalp, armpit, and mucous membranes of the mouth, respiratory tract, and eye.
Prevention: Administration of vaccine should occur for children starting at age 12 months followed by a second dose at age 4-6 years.
Other Important Information: The disease is highly transmissible; susceptible household contacts have an 80-90% risk of becoming infected. In healthy children, acute varicella is generally mild and self-limited; however, severe complications may occur, especially in adults. Herpes zoster, or shingles, occurs when latent VZV reactivates and causes recurrent disease.

Chickenpox: 2015 Data Summary	
Number of Cases:	354
5-Year Average Number of Cases:	460.0
% Change from 5-Year Average:	-23%
Incidence Rate per 100,000:	4.3

The 354 cases of chickenpox reported in 2015 represents a 9% increase from the 324 cases reported in 2014, but a 23% decrease from the five-year average of 460 cases per year (Figure 7). The statewide incidence rate was 4.3 cases per 100,000 population. The overall decline in cases since 2006 is likely due to the introduction of the two dose vaccination requirement for daycare and school entry.

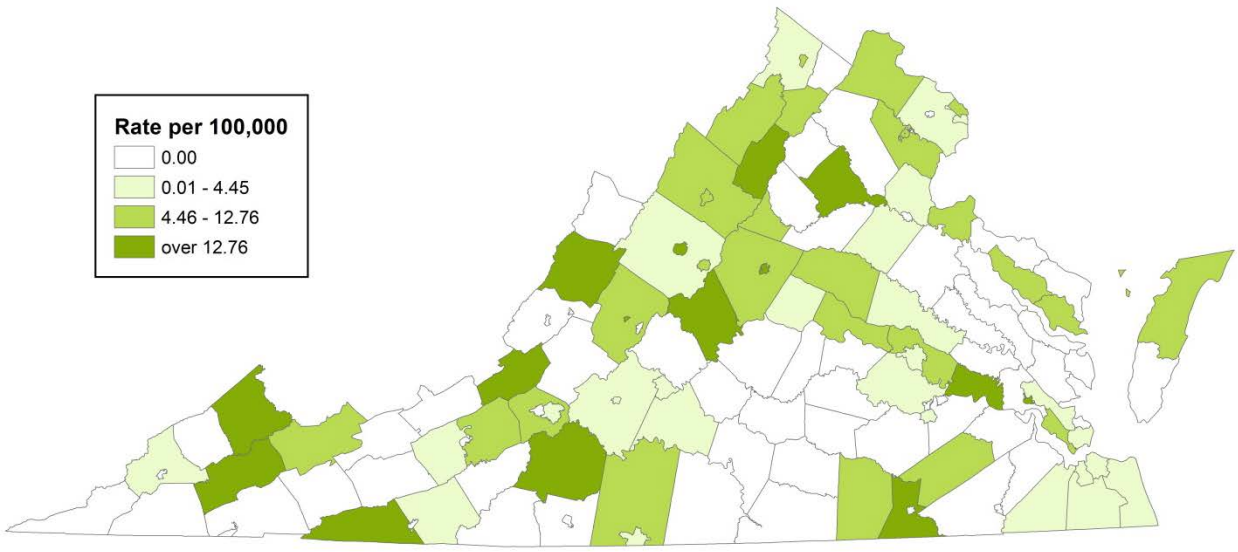
Figure 7. Chickenpox: Ten-Year Trend for Number of Cases and Incidence Rate, Virginia, 2006-2015



Rates for chickenpox remain highest in the youngest age groups. The highest incidence rate was observed in those less than one year of age (27.2 cases per 100,000). Incidence rates generally declined as age increased, with 15.6 cases per 100,000 for the 1-9 year age group and 6.9 cases per 100,000 for the 10-19 year age group. Incidence rates for the remaining age groups ranged from 3.3 to 0.2 per 100,000 with the lowest rate occurring in the 60 year and older age group. Incidence rates were higher in males compared to females (4.6 and 3.9 cases per 100,000 respectively). Information on race was reported for 75% of cases. Of the cases with a known race, incidence was highest among the "other" race population at 5.2 cases per 100,000, followed by the white population (3.3 cases per 100,000), and the black population (2.2 cases per 100,000). Cases of chickenpox were reported evenly throughout the year. The northwest region had the highest incidence with 6.7 cases per 100,000 followed by the northern region with 5.4 cases per 100,000. Incidence rates for the other three regions were below the state incidence rate. Incidence by locality can be seen in the map below.

Four outbreaks were reported in 2015; two outbreaks occurred within correctional facilities, one at a daycare, and one at an elementary school. This is an increase from the one outbreak reported in 2014 and two outbreaks in 2013. The average number of cases reported per outbreak has declined over the past five years from 9.6 cases per outbreak in 2011 to 6.0 cases per outbreak in 2015. Vaccination status was assessed for each outbreak. More than half of the outbreak-associated patients had an immunization status of unknown, or only received one dose of vaccine as they were not recommended for the second dose based on age. The outbreaks, while small in scale, highlight the need for vaccination within congregate settings including schools and correctional facilities.

Chickenpox Incidence Rate by Locality
Virginia, 2015



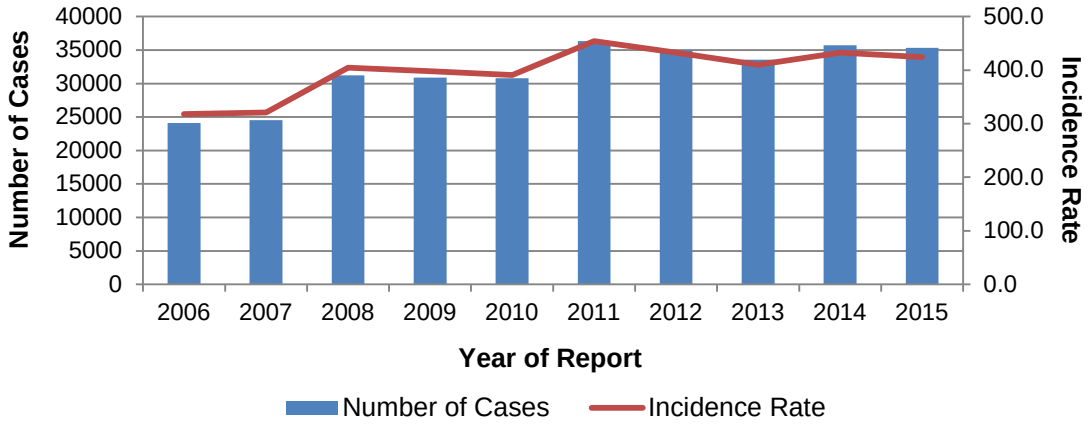
Chlamydia trachomatis Infection

Agent: *Chlamydia trachomatis* (bacteria)
Mode of Transmission: Person-to-person via sexual transmission, or from the genital tract of an infected mother to her infant during birth.
Signs/Symptoms: Men may experience urethritis with discharge, itching, and burning upon urination. Women may experience cervical inflammation, discharge, and vaginal bleeding, but are frequently asymptomatic. Untreated *Chlamydia* can lead to pelvic inflammatory disorder and infertility. Infants may become infected in the eyes or respiratory tract.
Prevention: Preventive measures include adhering to safe sexual practices, screening women less than 25 years of age, and presumptive treatment for *Chlamydia* infection among people who are exposed. Pregnant women who have recently been infected with *Chlamydia* should be retested during the third trimester to prevent postnatal infection in the infant.
Other Important Information: Many chlamydial infections go undiagnosed and unreported. Approximately 70% of infected women are asymptomatic, and patients are frequently not tested at extragenital (pharyngeal or rectal) sites.

***Chlamydia trachomatis* Infection: 2015 Data Summary**	
Number of Cases:	35,341
5-Year Average Number of Cases:	34,283.6
% Change from 5-Year Average:	+3%
Incidence Rate per 100,000:	424.5

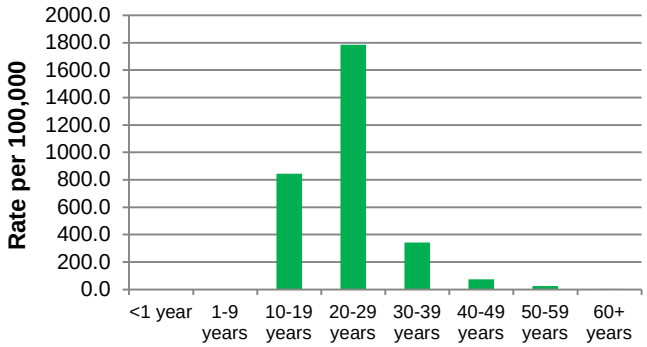
There were 35,341 cases of *C. trachomatis* infection reported in Virginia during 2015 with a statewide incidence rate of 424.5 cases per 100,000 population (Figure 8). This rate has remained relatively stable for the past five years. Nationwide, *C. trachomatis* remains the most frequently reported bacterial sexually transmitted infection. Despite improvements in expanded screening, lab test sensitivity, and reporting, CDC estimates that *C. trachomatis* infection is significantly underreported. *C. trachomatis* cases are frequently asymptomatic, and screening programs are focused largely on sexually active women and male partners of infected women.

Figure 8. *Chlamydia trachomatis* Infection: Ten-Year Trend for Number of Cases and Incidence Rate, Virginia, 2006-2015



In 2015, the highest incidence rate occurred in the 20-29 year age group (1,784.0 per 100,000), followed by the 10-19 year age group (843.6 per 100,000) (Figure 9). Four cases of *C. trachomatis* ophthalmia neonatorum were reported in infants in 2015; however, ophthalmic (eye) infections due to perinatal exposure are counted as cases of Ophthalmia Neonatorum and not *C. trachomatis* infection. For information on these cases, please see the Ophthalmia Neonatorum section of this report.

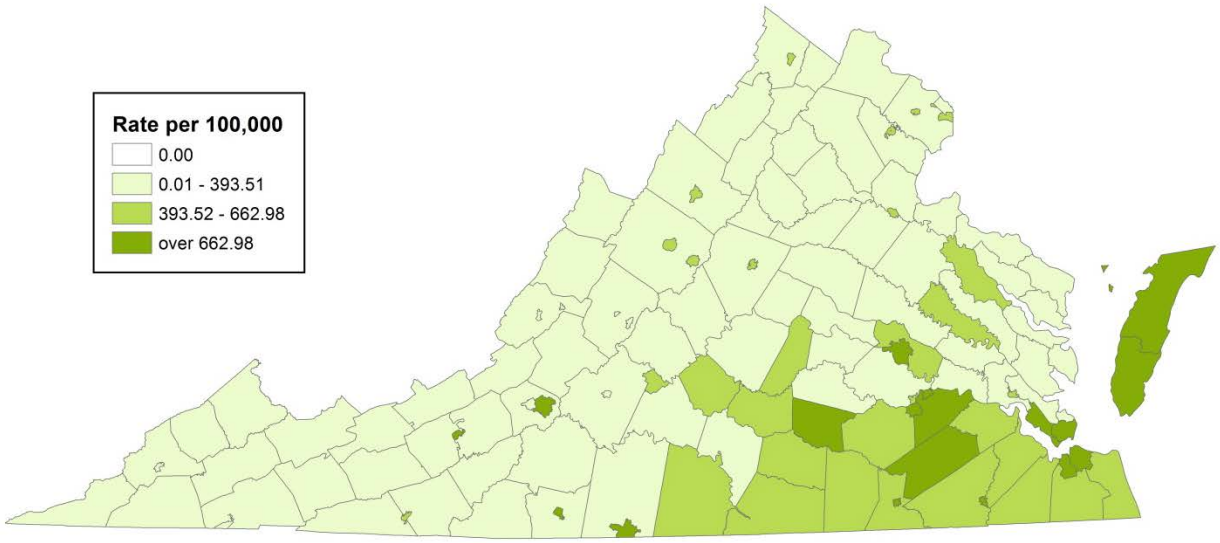
Figure 9. *Chlamydia trachomatis* Infection: Rate by Age Group, Virginia, 2015



Race information was not provided for 28% of reported cases. However, among those with a known race, incidence of *C. trachomatis* infection was more than five times higher (865.9 per 100,000) in the black population when compared to the white population (150.0 per 100,000), and more than three times higher when compared to the "other" race population (250.4 per 100,000). Incidence of *C. trachomatis* infection in females (563.8 per 100,000) was twice that of males (282.0 per 100,000), which may be largely explained by more frequent screening in women. While women remain disproportionately affected by chlamydia, the gender gap in infection rates has been narrowing as rates in women decrease and rates in men increase.

Since 2001, the highest incidence rate of *C. trachomatis* has been noted in the eastern region (646.3 per 100,000 in 2015), followed by the central region (614.9 per 100,000), southwest region (317.5 per 100,000), northwest region (294.0 per 100,000) and northern region (273.8 per 100,000). The map below displays incidence rates by locality.

Chlamydia trachomatis Infection Incidence Rate by Locality
Virginia, 2015



Cholera

Agent: *Vibrio cholerae* (serogroup O1 and O139)
Mode of Transmission: Epidemics and pandemics are strongly linked to the consumption of unsafe water and food, poor hygiene, inadequate water treatment, poor sanitation, and crowded living conditions. Conditions leading to epidemics exist in many developing countries where cholera is either endemic or a recurring problem in a large number of areas. The disease is not easily spread directly from one person to another.
Signs/Symptoms: Sudden onset of profuse, painless watery stools, often described as rice-water stool, provoked by a toxin that affects the small intestine. Nausea and profuse vomiting occur early in the course of illness. In untreated cases, rapid dehydration, dangerously high levels of acid or low levels of glucose in the blood, circulatory collapse, and renal failure can rapidly lead to death. In most cases infection is asymptomatic or causes mild diarrhea.
Prevention: Safe drinking water and proper sanitation are the keys to cholera prevention. When traveling in countries where cholera is present, only thoroughly cooked hot foods or fruits/vegetables that are peeled just before eating should be eaten, and only bottled beverages or water that has been boiled or treated with chlorine should be used for drinking, brushing teeth, or cleaning food preparation surfaces. Hands should be washed thoroughly with soap after using the bathroom and before preparing or eating food. Seafood should be cooked thoroughly before it is eaten. Existing oral cholera vaccines are not available in the U.S. and are not recommended for most travelers.
Other Important Information: In severely dehydrated cases, death may occur within a few hours and the case-fatality rate may exceed 50%. With proper and timely rehydration, this rate can be less than 1%.

No cases of cholera were reported in Virginia during 2015, marking the fourth consecutive year without a reported case. The last two reported travel-associated cholera cases occurred in 2010 and 2011. No cases of cholera were reported in Virginia from 1995 to 2009.

Creutzfeldt-Jakob Disease (CJD)

Agent: Believed to be caused by a prion protein
Mode of Transmission: The majority of CJD cases (80-90%) are sporadic CJD, with no known source. A small percentage of cases (5-15%) may be due to heredity (familial CJD) or exposure to organ tissue contaminated with the prion (iatrogenic CJD). Classic CJD includes sporadic CJD, familial CJD, and iatrogenic CJD. A form of the disease, variant Creutzfeldt-Jakob disease (vCJD), is thought to be transmitted through ingestion of beef from cattle with bovine spongiform encephalopathy (BSE, commonly referred to as mad cow disease).
Signs/Symptoms: Symptoms may begin with confusion, and they rapidly progress to a wide range of neurological signs and symptoms, including loss of coordination and dementia.
Prevention: Organ and tissue transplants from infected individuals should be avoided. For protection against vCJD, the federal government has regulations in place to prevent the spread of BSE in the United States.
Other Important Information: vCJD occurs in younger individuals, while classic CJD occurs more often in older individuals and has a slower progression. In Virginia, CJD is reportable when it occurs in persons under 55 years of age.

No cases of Creutzfeldt-Jakob disease in persons less than 55 years of age were reported in Virginia during 2015. In 2014, two cases were identified; both cases were diagnosed with classic CJD with no known exposures for either case. Ten cases of classic CJD infection have been reported in Virginia residents less than 55 years of age since 1995.

The only case of vCJD diagnosed in a Virginia resident occurred in 2006. Based on the patient's history, the infection most likely occurred from consumption of contaminated cattle products as a child while living in Saudi Arabia. This is one of four cases of vCJD reported in U.S. residents. The most recent vCJD case in the U.S. occurred in 2014 in a Texas resident. This person is thought to have acquired the infection while living overseas.

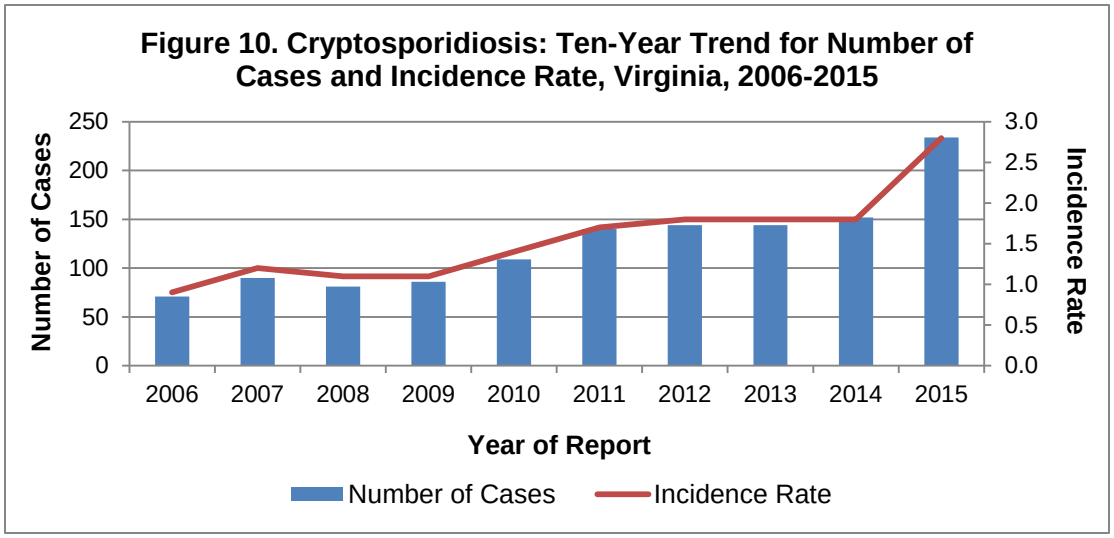
Cryptosporidiosis

Agent: *Cryptosporidium parvum* and *Cryptosporidium hominis* are the most common species that cause disease in humans (parasite)
Mode of Transmission: Occurs via the fecal-oral route and can include person-to-person, animal-to-person, foodborne, and waterborne transmission. Animals such as cattle, sheep, and goats have tested positive for the parasite and are an important reservoir, contributing to both direct transmission and contamination of water supplies; however, many other animals, including cats and dogs, can be infected and transmit disease. *Cryptosporidium* oocysts may be excreted from infected individuals for up to several months after diarrhea has resolved. Oocysts can remain infectious for 2-6 months after being excreted. The oocysts are very resistant to chemicals used to purify drinking water and disinfect recreational water (e.g., chlorine in pools).
Signs/Symptoms: Profuse watery diarrhea with nausea, cramping, and abdominal pain. The diarrhea may be preceded by anorexia and vomiting in children. Illness is typically self-limiting, and will either resolve on its own or have no harmful long-term effects. However, immunocompromised persons have a higher risk of severe disease, which can lead to poor outcomes, including death. Asymptomatic infections are common.
Prevention: Preventive measures include careful hand hygiene after using the bathroom, after changing diapers or cleaning a child who has used the bathroom, after handling animals or their feces, and before preparing and eating food. People with diarrhea should not enter public recreational water. Water purification methods, including boiling water or filtration, should be considered when drinking water from natural streams, lakes, springs, or any unknown source.

Cryptosporidiosis: 2015 Data Summary	
Number of Cases:	234
5-Year Average Number of Cases:	137.8
% Change from 5-Year Average:	+70%
Incidence Rate per 100,000:	2.8

In 2015, 234 cases of cryptosporidiosis were reported in Virginia. This represents a 54% increase when compared to the 152 cases reported in 2014 and a 70% increase from the five-year average of 137.8 cases per year (Figure 10). The statewide incidence rate of 2.8 cases per 100,000 population was an increase from the rate of 1.8 per 100,000 seen each year from 2012 to 2014. Of the 234 cases reported in 2015, 55 (24%) were associated with outbreaks.

With the increase in cases in 2015, the incidence rate for cryptosporidiosis in Virginia approached the overall U.S. incidence rate. From 2005 to 2012 (the most recent year for which national data are available), the overall U.S. incidence rate was 2.9 cases per 100,000 population. For national reporting, Virginia is considered to be part of the Southern region; the incidence rate for this region in 2012 was 1.7 per 100,000.

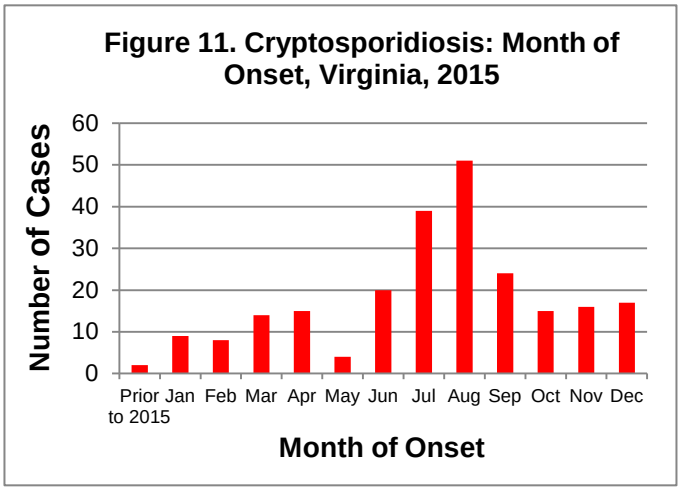


In 2015, the highest incidence rate in Virginia was observed in the 30-39 year age group (4.3 per 100,000), followed by the 1-9 and 60 year and older age groups (both with rates of 3.2 per 100,000). Incidence among all other age groups fell below the statewide rate of 2.8 cases per 100,000 population, and ranged from 1.9 to 2.7 per 100,000. No cases were reported among children less than one year of age.

Race was not reported for 55 cases (24%) in 2015. Among cases with a known race, incidence was higher among the white population (2.4 per 100,000) than the black population (1.6 per 100,000) and the "other" race population (1.4 per 100,000). This represents a change from 2014, when the highest incidence rate was seen among the black population. Incidence was higher among females (3.0 per 100,000) compared to males (2.6 per 100,000) during 2015.

Geographically, the highest incidence rate was observed in the northern region (4.3 per 100,000). Rates ranged from 0.9 to 3.0 cases per 100,000 in other regions, with the lowest incidence occurring in the central region (see map below for incidence by locality).

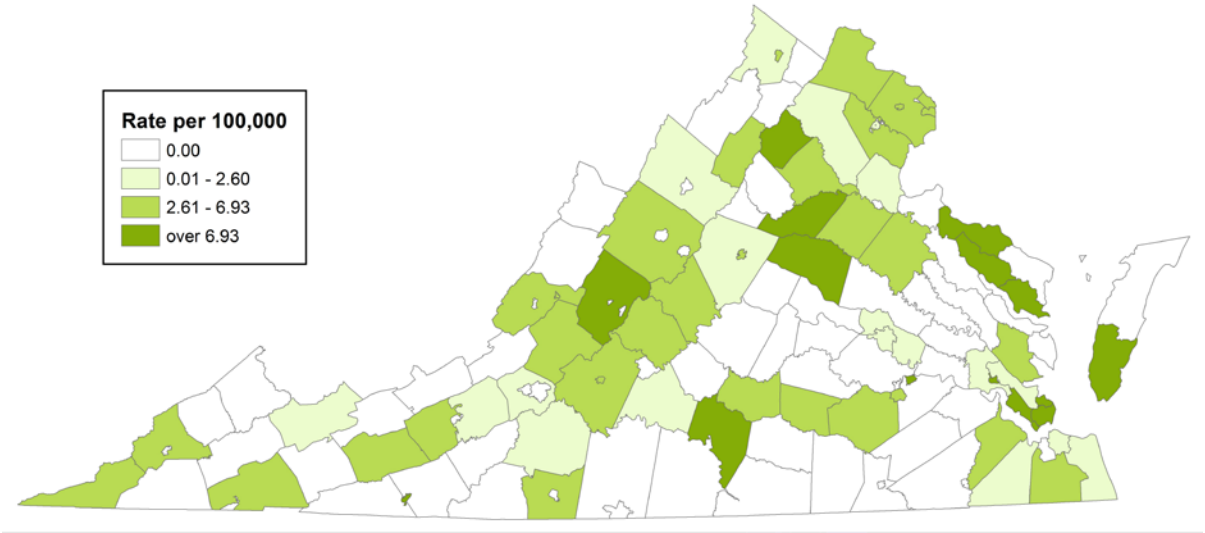
Nationally, a higher number of illnesses are typically seen during the summer and early fall months, which is consistent with increased recreational water exposure, including public pools. This seasonal pattern was also observed in Virginia, with onsets of cases peaking during July and August (Figure 11).



The most commonly reported risk factors among cases in 2015 included travel (88 cases, 38%), recreational water exposure (82 cases, 35%), and contact with animals (65 cases, 28%).

Four outbreaks of cryptosporidiosis were reported in Virginia during 2015. Two outbreaks were zoonotic and attributed to contact with sick calves, leading to illnesses in 5 and 13 Virginia residents, respectively. The remaining two outbreaks were waterborne and associated with recreational water venues; the numbers of Virginia residents affected were 4 and 33, respectively. The waterborne outbreak involving 33 Virginia residents occurred at a campground and also affected 63 persons residing outside of Virginia, for a total of 96 cases associated with the outbreak.

Cryptosporidiosis Incidence Rate by Locality
Virginia, 2015



Cyclosporiasis

Agent: *Cyclospora cayetanensis* (parasite)
Mode of Transmission: Can be spread by ingesting food or water contaminated with *Cyclospora*. *Cyclospora* are resistant to chlorine and iodine treatment and are unlikely to be killed by routine chemical disinfection or sanitizing methods. Direct person-to-person transmission has not been documented.
Signs/Symptoms: Profuse watery diarrhea commonly occurs, along with nausea, anorexia, substantial weight loss, abdominal bloating or cramping, increased gassiness and prolonged fatigue. Low-grade fever and vomiting are uncommon but can occur. Some infected persons are asymptomatic, particularly in settings where cyclosporiasis is endemic. If not treated, symptoms can persist for a month or more.
Prevention: Fresh produce should be washed thoroughly before it is consumed. No vaccine for cyclosporiasis is available.
Other Important Information: *C. cayetanensis* is known to be endemic in many resource-limited countries and has been reported as a cause of traveler's diarrhea. Most outbreaks reported in the U.S. have been associated with the consumption of imported fresh produce, including raspberries, basil, cilantro, snow peas and lettuce. No commercially frozen or canned produce has been implicated as the source of an outbreak.

Cyclosporiasis: 2015 Data Summary	
Number of Cases:	8
5-Year Average Number of Cases:	2.4
% Change from 5-Year Average:	+233%
Incidence Rate per 100,000:	0.1

During 2015, 8 cases of cyclosporiasis were reported in Virginia, representing a 100% increase from the 4 cases reported in 2014 and a 233% increase from the five-year average of 2.4 cases per year. Six cases occurred in adults and two occurred in children. Cases were split equally by sex, (4 males, and 4 females).

Geographically, the northwest region had the highest number of infections, with five cases reported. No other region in Virginia had more than one reported case. Seven of the individuals consumed fresh produce prior to symptom onset and one travelled internationally. Most cases and outbreaks of cyclosporiasis in the U.S. occur in spring and summer months, but not all cases identified during the same time of year are caused by the same exposure. During 2015 in Virginia, 50% of cases occurred in June and July.

CDC and other institutions are working to develop advanced molecular detection methods for *C. cayetanensis* that could distinguish among strains of this parasite. In the future, DNA fingerprinting methods could help public health investigators determine whether cases of cyclosporiasis are linked to each other and to particular food items or other sources of infection.

Diphtheria

Agent: Toxin secreted by strains of the bacterium *Corynebacterium diphtheriae*
Mode of Transmission: Person-to-person transmission via respiratory droplets. Rarely, transmission may occur from contact with skin lesions or articles soiled with discharges from the lesions of infected persons.
Signs/Symptoms: Sore throat, anorexia, nasal discharge, and formation of a bluish-white, grayish-green, or black adherent membrane in the throat. More severe cases can include swelling of the neck and airway passages.
Prevention: Diphtheria vaccine is available as part of the diphtheria/tetanus/pertussis (DTaP) vaccine for children and the combination tetanus/diphtheria/pertussis (Tdap) vaccine for adolescents and adults. One dose of Tdap should be given at 11 to 12 years of age with booster doses of tetanus/diphtheria (Td) every ten years thereafter.
Other Important Information: The overall case-fatality rate for diphtheria is 5%-10%, with higher death rates in young children and those over 40 years of age.

No cases of diphtheria have been reported in Virginia since 1989. Nationally, two cases have been reported in the last decade. The most recent case of diphtheria was reported in 2014 and the preceding case occurred in 2012. Diphtheria is still endemic in certain areas of the world, with 4,778 cases being reported to the World Health Organization in 2015.

Ehrlichiosis/Anaplasmosis

Agent(s): Bacteria belonging to the family *Anaplasmataceae.* *Ehrlichia chaffeensis* infects monocytes (a type of white blood cell involved with immune function) and causes an illness called human monocytic ehrlichiosis (HME). *E. ewingii* infects granulocytes (a different category of white blood cells) and causes a disease referred to as an *E. ewingii* infection. *Anaplasma phagocytophilum* also infects granulocytes, causing an illness called human granulocytic anaplasmosis (HGA).

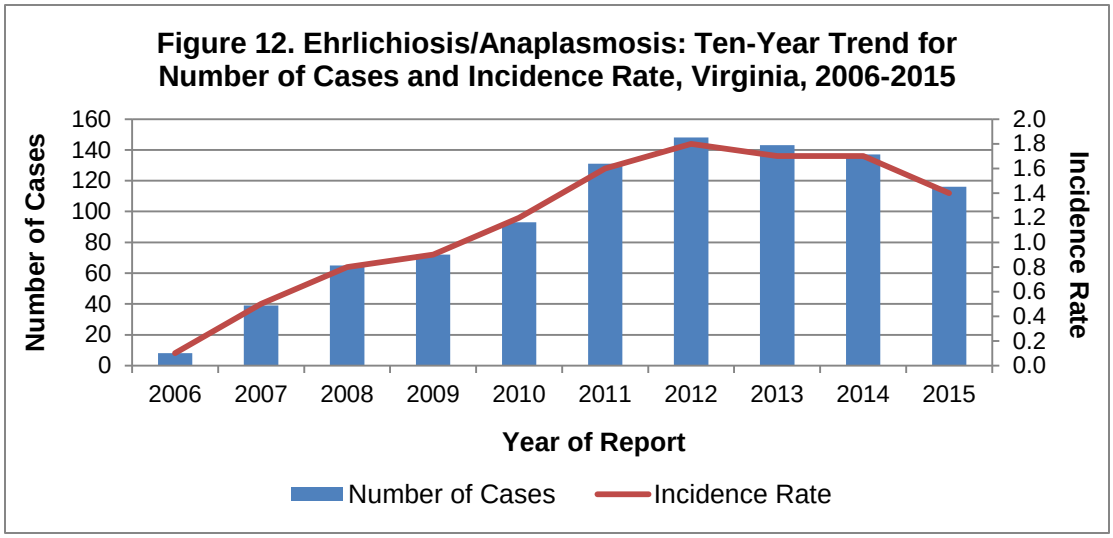
Mode of Transmission: Transmitted to humans through the bite of an infected tick. *E. chaffeensis* and *E. ewingii* may infect adult and nymph stage lone star ticks and be transmitted by them. *Anaplasma phagocytophilum* may infect nymph stage and adult blacklegged ticks (deer ticks) and is primarily transmitted by the nymph stage ticks. Transmission of these pathogens occurs when an infected tick bites a person and feeds on that person and remains attached for more than 24 hours.

Signs/Symptoms: Illness symptoms commonly include the sudden onset of fever, accompanied by one or more of the following symptoms: headache, body aches, nausea, vomiting and rash. In cases of ehrlichiosis, a rash may occur in up to 30% of adults and 60% of children; rashes are rare in cases of anaplasmosis. Patients may exhibit signs of thrombocytopenia (low blood platelet count) and leucopenia (low white blood cell count) and have elevated liver function test results. Severe forms of illness can result in meningitis/encephalitis, bleeding disorders, difficulty breathing, organ damage and death. Persons with weakened immune systems are prone to develop more severe disease. Persons who do not have a spleen have a high risk of death.

Prevention: Common practice should include minimizing tick bites by recognizing and avoiding the habitats of lone star ticks and blacklegged ticks. These habitats include humid forest environments with undergrowth or heavy leaf litter, and tall weeds and vegetative ground cover along shady forest margins, tree lines, forest trails and forest clearings. Repellents containing DEET, Picaridin, BioUD, IR3535, or oil of lemon eucalyptus are effective against ticks and should be applied to exposed areas of skin before entering tick habitats. When in tick-prone habitats, light-colored clothing should be worn with pants legs tucked into socks. Permethrin-based repellents should be applied to clothing, socks and shoes. After visiting tick habitats, a person should remove and wash clothing, thoroughly check all body surfaces for ticks and, if found, carefully remove attached ticks as soon as possible.

Other Important Information: Due to the many difficulties associated with diagnosis and testing of tick-borne diseases, cases of ehrlichiosis or anaplasmosis may be misdiagnosed as Rocky Mountain spotted fever (RMSF). However, based on tick infection surveys, ehrlichiosis is thought to be much more common than RMSF in Virginia.

Ehrlichiosis/Anaplasmosis: 2015 Data Summary	
Number of Cases:	116
5-Year Average Number of Cases:	130.4
% Change from 5-Year Average:	-11%
Incidence Rate per 100,000:	1.4



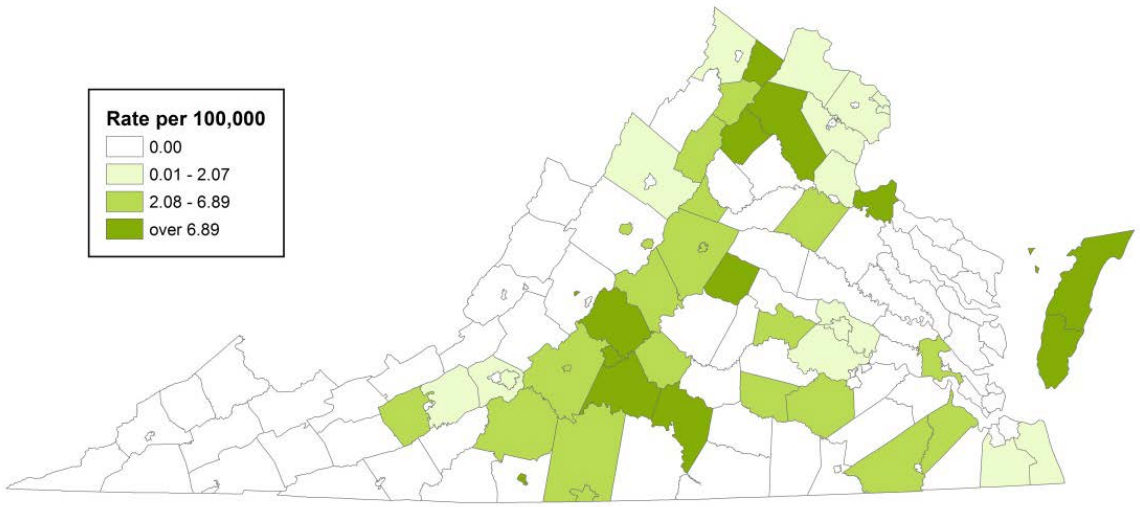
In 2015, 116 cases of ehrlichiosis/anaplasmosis were reported in Virginia. This represents a decrease from the 137 cases reported in 2014 and also represents an 11% decrease from the five-year average of 130.4 cases per year (Figure 12). The decline in reported cases over the past three years can partially be attributed to fewer cases of ehrlichiosis. The decrease in ehrlichiosis cases can further be explained by the recent unusually cold winters in Virginia and the subsequent effect on the lone star tick population, the natural carriers of the bacteria causing ehrlichiosis. Lone star ticks are normally found in the warmer southeast areas of the U.S., and are less tolerant of colder conditions. In contrast, the northern blacklegged tick is the natural carrier of the bacteria causing anaplasmosis in Virginia. This tick species migrated from the north and is resistant to cold weather, and therefore, the lower temperatures have had less impact on the blacklegged tick population and the number of anaplasmosis cases. Among ehrlichiosis/anaplasmosis cases reported in 2015, 96 (83%) were specified as HME, 10 (9%) were specified as HGA, and 10 (9%) were ehrlichiosis/anaplasmosis unspecified.

In 2015, ehrlichiosis/anaplasmosis incidence rates were highest in the 60 year and older age group, with 3.3 cases per 100,000, followed by the 50-59 year age group, with 2.0 cases per 100,000. Together, these two age groups accounted for 67% of all cases. The younger age groups had the lowest incidence rates. This predominance of illnesses among those over the age of 50 years is typical of what is observed for ehrlichiosis and anaplasmosis in other endemic areas in the U.S. Race was not reported for 50% of cases. Among patients of known race, incidence in the white population (0.9 per 100,000) was higher than the rate in the black and "other" race populations (0.2 per 100,000 each). Incidence was higher among males than females (1.6 and 1.2 per 100,000, respectively).

Cases were reported from all regions of the state. The highest incidence rate (3.0 per 100,000) was observed in the southwest region followed by the northwest region (2.7 per 100,000). Rates in the remaining three regions ranged from 0.6 to 0.9 per 100,000. While the incidence rate for the southwest region was highest among all regions, the map below shows reported cases occurred mostly along the eastern part of that region, and far fewer cases were reported from the far southwest. Likewise, for the northwest region,

reported cases occurred in localities located along the eastern edge of the region, and not from localities located along the western edge. In the eastern region of the state, the incidence rate was higher on the Eastern Shore than in any other locality in that region. The largest proportion of cases (59%) had symptom onset in the second quarter of the year, while 33% had symptom onset in the third quarter. The second and third quarters represent the spring and summer months, when ticks are most likely to feed.

Ehrlichiosis / Anaplasmosis Incidence Rate by Locality
Virginia, 2015



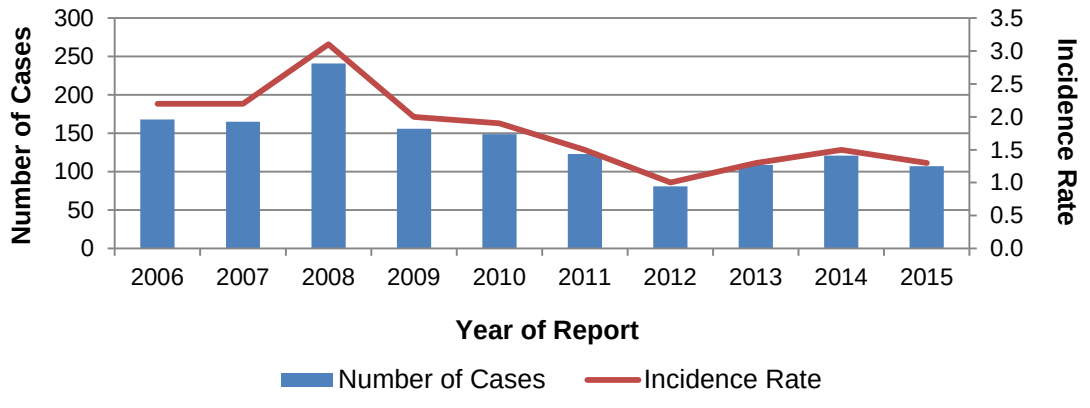
Escherichia coli Infection, Shiga Toxin-Producing

Agent: Shiga toxin-producing *Escherichia coli* (bacteria), also known as Verocytotoxin-producing *E. coli* (VTEC), enterohemorrhagic *E. coli* (EHEC), or STEC for short.
Mode of Transmission: Ingestion of food or water contaminated with human or animal feces, or direct transmission from infected persons or animals. Fomites and contaminated environments may also play a role in transmission.
Signs/Symptoms: Diarrhea, which may be bloody or non-bloody, and severe abdominal cramps with little or no fever. In some people, including children less than five years of age and older adults, the infection can cause a complication called hemolytic uremic syndrome (HUS), in which the red blood cells are destroyed and the kidneys fail.
Prevention: Hands should be washed carefully after using the bathroom, after changing diapers or cleaning a child who has used the bathroom, after handling animals or their feces, and before preparing and eating food. All ground beef should be cooked thoroughly to an internal temperature of at least 160°. All milk, other dairy products, and juices should be pasteurized before being consumed.
Other Important Information: The most virulent STEC is *E. coli* O157:H7. In the U.S., *E. coli* O157:H7 is the serotype most commonly associated with hemolytic uremic syndrome (HUS). See the section on Hemolytic Uremic Syndrome in this report for more information. Shiga toxin-producing *E. coli* infection has been a reportable condition in Virginia since 1999.

***Escherichia coli* Infection, Shiga Toxin-Producing: 2015 Data Summary**	
Number of Cases:	107
5-Year Average Number of Cases:	116.6
% Change from 5-Year Average:	-8%
Incidence Rate per 100,000:	1.3

In 2015, 107 cases of Shiga toxin-producing *Escherichia coli* (STEC) infection were reported in Virginia. This represents a 12% decrease from the 121 cases reported in 2014, and an 8% decrease from the five-year average of 116.6 cases per year (Figure 13).

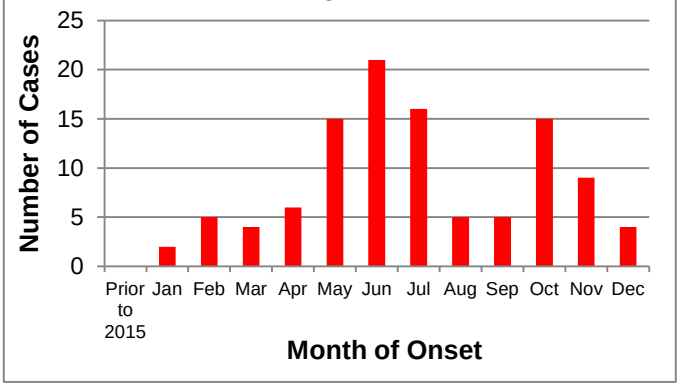
Figure 13. *Escherichia coli* Infection, Shiga Toxin-Producing: Ten-Year Trend for Number of Cases and Incidence Rate, Virginia, 2006-2015



STEC infection occurs among all age groups, but the majority of cases occur in children. Children and the elderly are also more likely to develop severe illness. The incidence rate was highest in the 1-9 year age group (3.4 per 100,000), followed by the 10-19 year age group (1.8 per 100,000). Other age groups had rates between 0.5 and 1.6 per 100,000. Race was reported for 79% of cases. Among those with a known race, incidence was highest in the white population (1.2 per 100,000) compared to the black and "other" race populations (0.4 and 0.5 per 100,000, respectively). Incidence was equal among females and males (1.3 per 100,000, each).

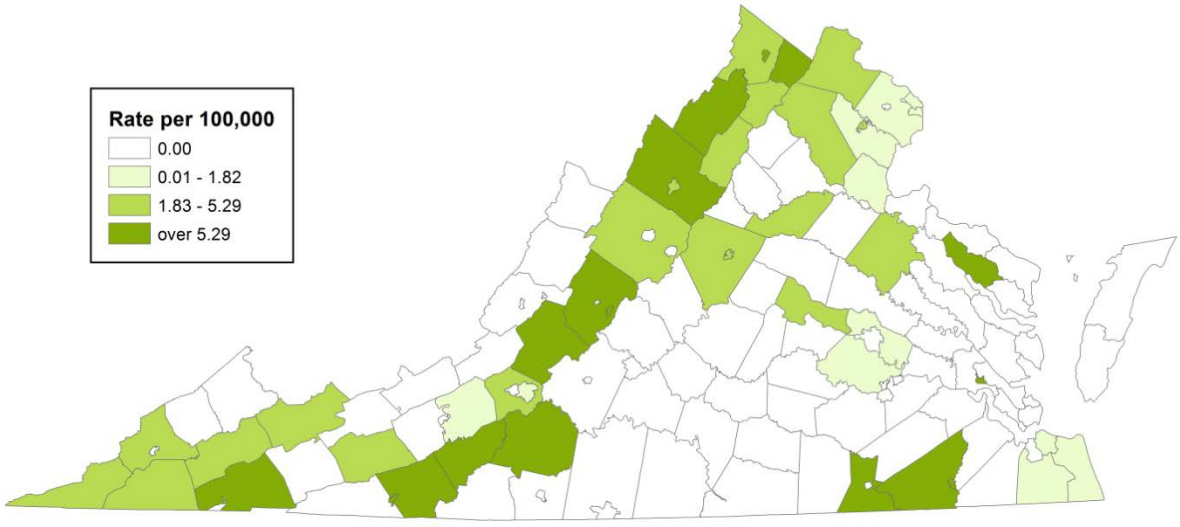
The northwest region experienced the highest incidence rate with 2.5 cases per 100,000 population, followed by the southwest region with 1.8 per 100,000. Incidence rates in the other regions were between 0.5 and 1.1 per 100,000. Incidence rates by locality can be seen in the map below.

Figure 14. *Escherichia coli* Infection, Shiga Toxin-Producing: Month of Onset, Virginia, 2015



While infections occurred throughout the year, reported cases peaked during late spring through mid-summer (Figure 14). Four outbreaks attributed to STEC were reported during 2015. Two of the outbreaks occurred in a private home, and one each occurred in a school and in a correctional facility. The number of cases ranged from one to eight per outbreak. The route of transmission was determined to be foodborne for three of the outbreaks, and person-to-person for the remaining outbreak.

Escherichia coli Infection, Shiga Toxin-Producing
Incidence Rate by Locality, Virginia, 2014

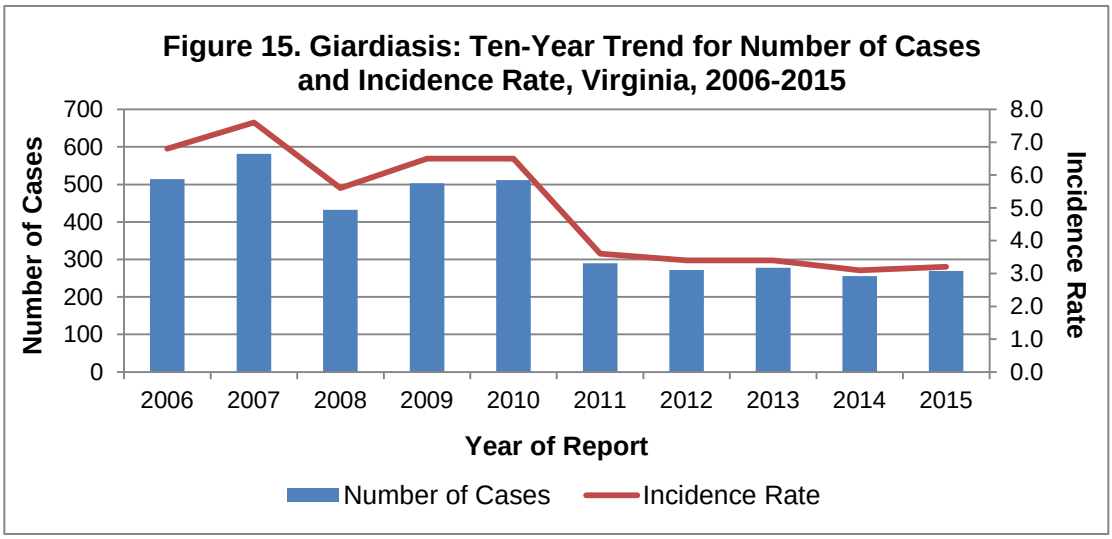


Giardiasis

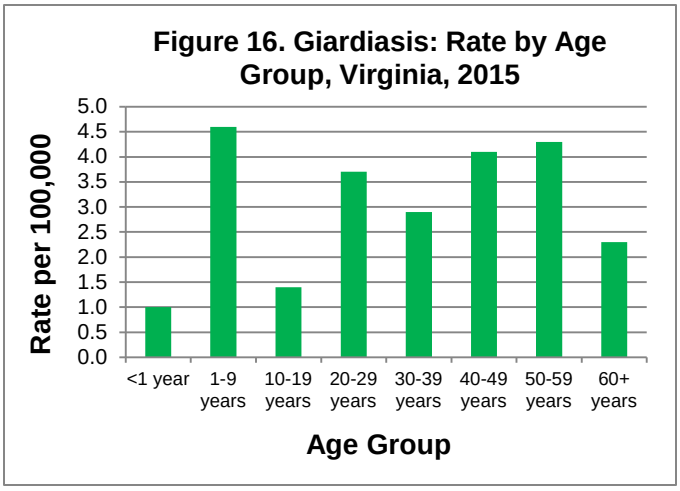
Agent: *Giardia intestinalis* (parasite)
Mode of Transmission: Person-to-person transmission by hand-to-mouth transfer of cysts from the feces of an infected person. Localized outbreaks are more often due to ingestion of cysts in fecally-contaminated drinking and recreational water (e.g., lakes, rivers, springs, ponds, and streams) than from fecally-contaminated food.
Signs/Symptoms: Symptoms may include diarrhea, abdominal pain, bloating, nausea and vomiting. A person may be asymptomatic or develop chronic illness.
Prevention: Hands should be washed carefully after using the bathroom, after changing diapers or cleaning a child who has used the bathroom, after handling animals or their feces, and before preparing and eating food. Recreational water or untreated water from shallow wells, lakes, rivers, springs, ponds or streams should not be consumed. Persons with diarrhea should not swim at recreational water venues.

Giardiasis: 2015 Data Summary	
Number of Cases:	269
5-Year Average Number of Cases:	321.6
% Change from 5-Year Average:	-16%
Incidence Rate per 100,000:	3.2

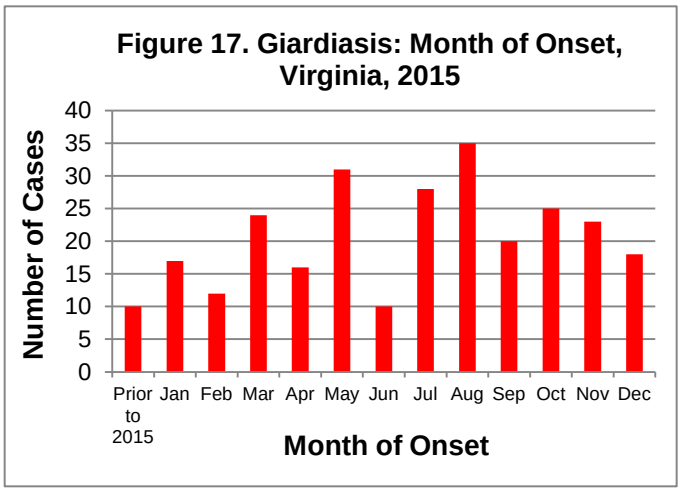
In 2015, 269 cases of giardiasis were reported in Virginia. This represents a 5% increase from the 256 cases reported in 2014, and a 16% decrease from the previous 5-year average of 321.6 cases per year. Including 2015 data, the number of giardiasis cases in Virginia has been fairly stable for the last five years, averaging 273 cases per year. When compared to the 5-year span from 2006 to 2010, this is 46% lower than the average of 509 cases per year reported from that time span (Figure 15). The lower number of reported cases from 2011-2015 can be attributed to a change in the national surveillance case definition. Prior to 2011, only a positive laboratory result for *Giardia* was required for inclusion in case counts. Beginning in 2011, documentation of clinically compatible illness was required in addition to a positive laboratory result to be considered a case for surveillance purposes.



By age, the highest incidence rate (4.6 per 100,000) occurred in the 1-9 year age group, closely followed by a rate of 4.3 per 100,000 in persons aged 50-59 years and 4.1 in those aged 40-49 years (Figure 16). Race was not reported for 48% of giardiasis cases in 2015. Among cases with a known race, little difference was seen in the incidence rates for the various race groups (1.8 per 100,000 in the white population, 1.7 in the "other" race population, and 1.3 in the black population). A much higher incidence rate was seen among males (4.6 per 100,000) than females (1.9 per 100,000).

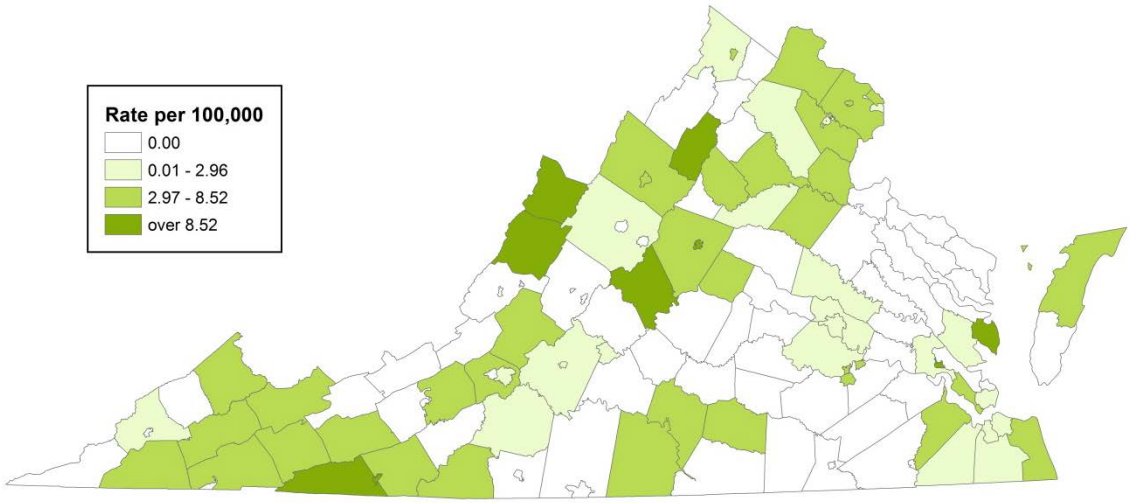


As in 2014, the northern region experienced the largest number of cases (116 cases) and the highest incidence rate (4.8 per 100,000), followed by a rate of 3.8 per 100,000 in the northwest region. The rate was the lowest (1.6 per 100,000) in the central region. Rates by locality can be seen in the map below. Cases occurred throughout the year, with a higher proportion (31%) of cases reported during the warmer months of the third quarter (Figure 17). During the third quarter, 88 cases were reported compared to 53-66 cases in each of the other quarters of the year.



While the source of exposure for sporadic cases cannot usually be determined, 94 (35%) of the persons with giardiasis in 2015 reported travel prior to illness onset, 90 (33%) reported contact with an animal, 62 (23%) reported recreational water exposure, 35 (13%) knew of similarly ill persons, and 31 (12%) reported consuming untreated water.

Giardiasis Incidence Rate by Locality
Virginia, 2015

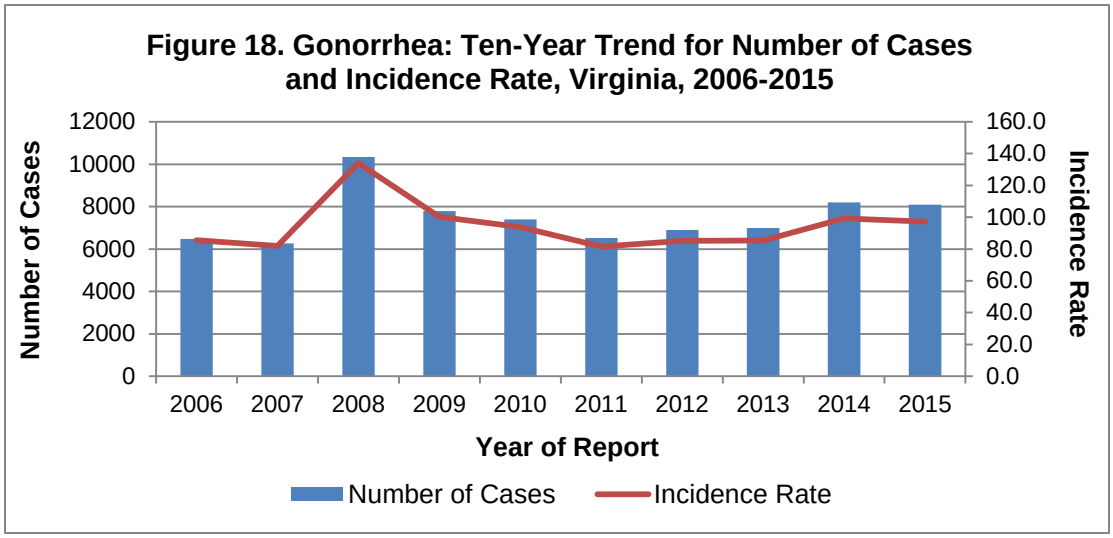


Gonorrhea

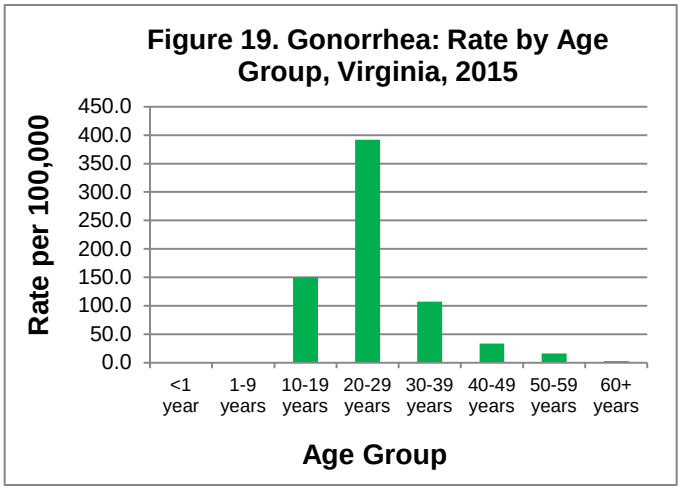
Agent: *Neisseria gonorrhoeae* (bacteria)
Mode of Transmission: Sexually transmitted through direct contact with secretions from an infected person.
Signs/Symptoms: Infected men may experience a burning sensation while urinating and a yellowish white discharge from the urethra. Infected women are usually asymptomatic, although vaginal discharge, burning while urinating, abdominal pain and/or bleeding after intercourse may occur. Symptoms usually appear within a week, but could take up to 30 days. Untreated gonorrhea among women can lead to pelvic inflammatory disease and infertility.
Prevention: Preventive measures include safe sexual practices and ensuring that infected sexual contacts are treated with antibiotics.
Other Important Information: The progressive development of antibiotic resistance continues to hinder gonorrhea prevention efforts. Antibiotic resistance undermines treatment success, heightens the risk of complications and facilitates transmission of infection. Drug resistant *N. gonorrhoeae* is one of only three organisms currently designated by CDC as an antimicrobial resistance "urgent threat." Since April 2007, CDC has advised against the use of fluoroquinolones for the treatment of gonorrhea, based on data indicating widespread drug resistance in the United States. As of August 2012, CDC no longer recommends cefixime (an oral cephalosporin) at any dose as a first-line regimen for treatment of gonococcal infections. The CDC now recommends combination therapy for gonorrhea with ceftriaxone administered intramuscularly and either azithromycin or doxycycline given orally for seven days.

Gonorrhea: 2015 Data Summary	
Number of Cases:	8,095
5-Year Average Number of Cases:	7,200.8
% Change from 5-Year Average:	+12%
Incidence Rate per 100,000:	97.2

In 2015, 8,095 cases of gonorrhea were reported in Virginia. This represents a 12% increase from the 5-year average of 7,200.8 cases per year (Figure 18). CDC estimates that up to 50% of gonorrhea infections are undiagnosed and remain unreported. In 2015 gonorrhea incidence rates remained relatively stable at 97.2 cases per 100,000.



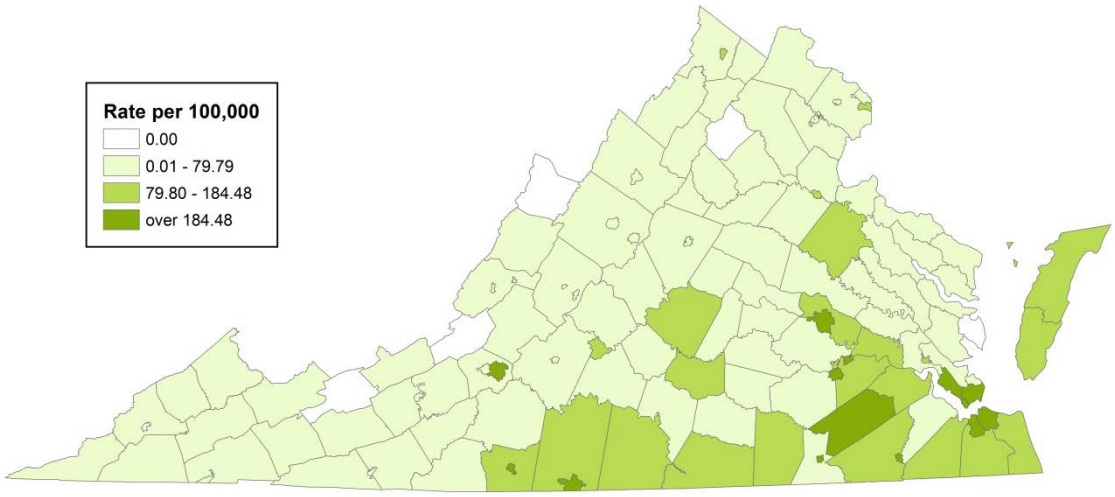
Gonorrhea incidence rates were highest in the 20-29 year age group (391.9 per 100,000), followed by the 10-19 year age group (150.2 per 100,000) (Figure 19). This age distribution is consistent with historical trends. Racial disparity in gonorrhea incidence is pronounced; in 2015, the incidence rate among the black population was 300.4 per 100,000, which is more than thirteen times higher than the rate seen in the white population (21.9 per 100,000), and more than nine times higher than the rate observed in the "other" race population (32.6 per 100,000). The incidence rate for gonorrhea has historically been higher in females than in males; however, in 2015, the incidence rate in males (100.5 per 100,000) surpassed that of females (94.7 per 100,000). This mirrors nationwide trends in gender distribution.



Since 2008, the eastern region has experienced the largest proportion of reported cases and the highest incidence rates of gonorrhea (see map below). In 2015, 3,418 cases were reported from the eastern region (42% of the statewide total), with an incidence rate of 185.1 per 100,000. The central region had the second highest incidence rate (168.0 per 100,000) with 2,371 cases and 29% of the statewide total, followed by the southwest region (67.4 per 100,000), the northwest region (37.7 per 100,000), and the northern region (37.4 per 100,000).

Ophthalmia in infants caused by *Neisseria gonorrhoeae* is reported separately as Ophthalmia Neonatorum; however, no cases of gonorrhea ophthalmia neonatorum were reported in 2015.

Gonorrhea Incidence Rate by Locality
Virginia, 2015



Granuloma Inguinale

Agent: *Klebsiella granulomatis* (bacteria; formerly *Calymmatobacterium granulomatis*)
Mode of Transmission: Presumably by sexual activity; specifically, exposure to the bacteria from an open lesion in the genital area. Young children can become infected by contact with infectious secretions.
Signs/Symptoms: Painless, slowly progressive ulcerative lesions in the genital area, which may become open sores. If left untreated, the bacteria can lead to the destruction of genital organs and spread to other parts of the body through autoinoculation.
Prevention: Sexual partners should be examined, counseled to practice safe sex, and offered antimicrobial therapy, when needed.

Although granuloma inguinale is endemic in certain developing tropical countries, it remains uncommon in the United States. No cases of granuloma inguinale were reported in Virginia in 2015. The last reported case occurred in 2001.

***Haemophilus influenzae* Infection, Invasive**

Agent: *Haemophilus influenzae* (bacteria)
Mode of Transmission: Person-to-person transmission by inhalation of respiratory droplets or direct contact with nose and throat secretions from an infected person or an asymptomatic carrier.
Signs/Symptoms: Inflammation of the lining of the brain and spinal cord (i.e., meningitis), inflammation of the epiglottis which may lead to blockage of upper airway and death, pneumonia, deep skin infection, arthritis, or bloodstream infection.
Prevention: Vaccination with a 3 or 4 dose series (depending on manufacturer) of conjugate *Haemophilus influenzae* type b (Hib) vaccine beginning at 2 months of age and concluding with a booster at 12 to 15 months of age. If vaccination is delayed, children 7 months of age and older may not require a full series of three or four doses. The total number of doses a child needs to complete the series depends on the child's age at the time the first dose is administered.
Other Important Information: *Haemophilus influenzae* is categorized into two major groupings: encapsulated and non-encapsulated. Encapsulated strains are more virulent and produce a polysaccharide capsule which is further characterized into six antigenically distinct serotypes (types a through f). Nontypable serotype results indicate a non-encapsulated strain. Vaccine is currently only available for one serotype, type b. In the pre-Hib vaccine era, type b organisms accounted for 95% of all strains that caused invasive disease. Since the licensure of conjugate Hib vaccine in the late 1980s, the incidence of invasive Hib disease in the U.S. has declined by more than 99% compared with the pre-vaccine era.

***Haemophilus influenzae* Infection, Invasive: 2015 Data Summary**	
Number of Cases:	121
5-Year Average Number of Cases:	96.0
% Change from 5-Year Average:	+26%
Incidence Rate per 100,000:	1.5

In 2015, 121 cases of invasive *H. influenzae* were reported, representing a 26% increase from the five-year average of 96.0 cases per year. This increase in cases may reflect a cyclical trend as depicted by the increase in cases in 2008 and 2011 illustrated in Figure 20. While there was an increase in reported cases, the incidence rate increased only slightly from 1.1 cases per 100,000 in 2014 to 1.5 cases per 100,000 in 2015.

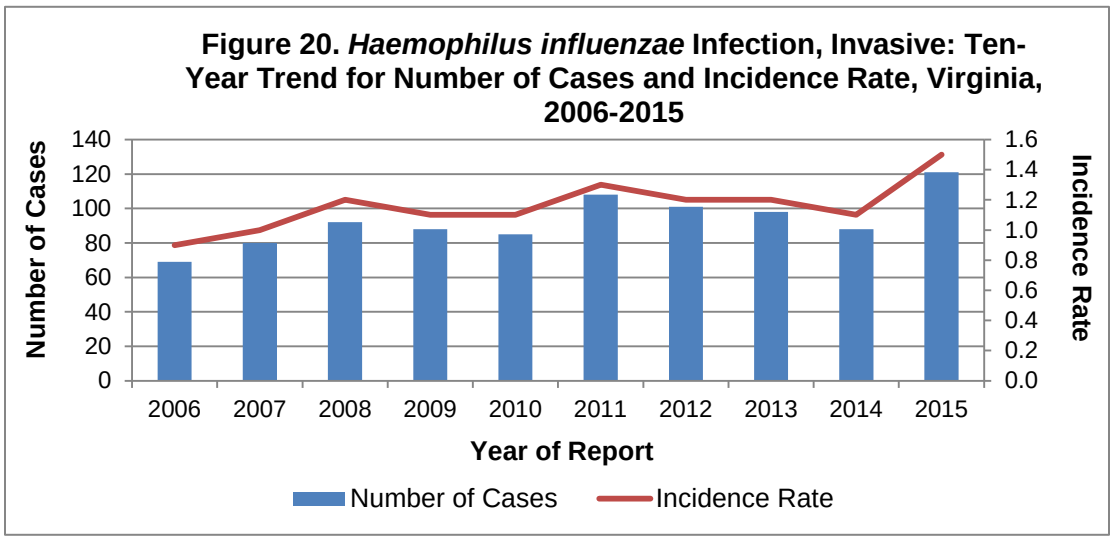


Figure 20. *Haemophilus influenzae* Infection, Invasive: Ten-Year Trend for Number of Cases and Incidence Rate, Virginia, 2006-2015

The oldest and youngest age groups had the highest incidence rates as depicted in Figure 21. Incidence for those 60 years and older was 5.1 cases per 100,000, followed by those less than one year of age (4.8 cases per 100,000). The incidence rate for all other age groups was less than 1 case per 100,000.

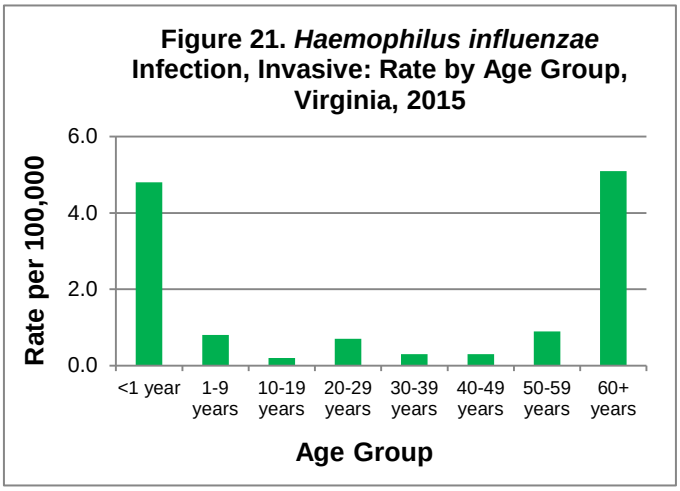


Figure 21. *Haemophilus influenzae* Infection, Invasive: Rate by Age Group, Virginia, 2015

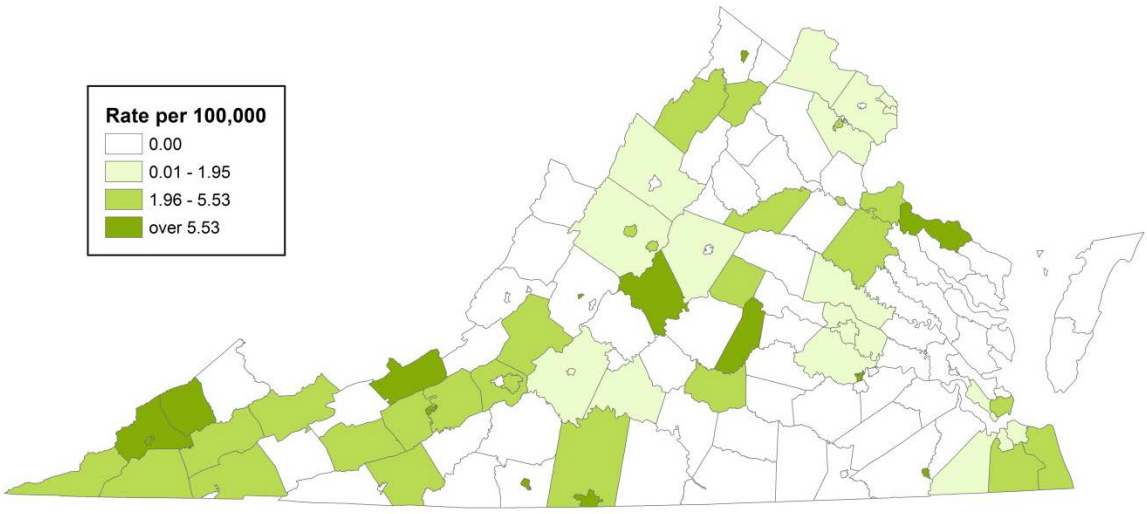
Race was reported for 85% of cases. Of cases with race information provided, incidence was highest for the "other" race population with 1.4 cases per 100,000, followed closely by the white population (1.3 cases per 100,000) and the black population (0.9 cases per 100,000). Sex was reported for all cases and there was no notable difference in incidence rates for males compared to females (1.5 and 1.4 cases per 100,000, respectively).

Cases occurred throughout the year with a noticeable increase (36%) during the fourth quarter. The southwest region had the highest incidence rate with 2.8 cases per 100,000 followed by the eastern region with 1.6 cases per 100,000. Incidence rates for all other regions were below the state incidence rate of 1.5 and ranged from 0.6 to 1.4 cases per 100,000. Incidence rates by locality can be seen in the map below.

No outbreaks of *H. influenzae* were reported in 2015. The number of deaths attributed to *H. influenzae* more than doubled from nine deaths in 2014 to 24 deaths in 2015. Of these deaths, two-thirds (16 cases) were identified as nontypable. A majority of the deaths (91%) were in those age 60 years and older. Two deaths were reported in other age groups; one in the 20-29 year age group and one in the 50-59 year age group.

Serotyping was reported for 113 (93%) of 121 cases. Of those with serotyping results, non-encapsulated strains were most common (81%). Type f was the most common encapsulated strain identified (12%). Other encapsulated strains were e (3%), b (2%), a (1%) and d (1%). Only two cases were identified as type b. Of these, one patient did not receive a fourth dose of Hib vaccine due to a vaccine shortage and the other patient was age appropriately vaccinated.

Haemophilus influenzae Infection, Invasive
Incidence Rate by Locality, Virginia, 2015



Hantavirus Pulmonary Syndrome

Agent: Hantavirus family
Mode of Transmission: Several different types of hantaviruses that can cause hantavirus pulmonary syndrome (HPS) have been identified in the United States and each is associated with a different rodent species. Rodents infected with hantavirus do not become ill, but they can transmit the virus to humans when their urine, feces, or saliva are aerosolized and inhaled. While uncommon, other ways in which people may be exposed to the virus are rodent bites and direct contact between contaminated materials and a person's nose or mouth. Person-to-person transmission does not occur.
Signs/Symptoms: Early symptoms include fever and muscle pain, and may also include gastrointestinal complaints, headaches and dizziness. These symptoms may be accompanied by or followed by an abrupt onset of respiratory distress and decreased blood pressure. Respiratory failure and shock follow quickly.
Prevention: Rodents should be excluded from houses and other buildings. Protective measures include disinfecting rodent-contaminated areas with a spray disinfectant solution prior to cleaning. Contaminated areas should be cleaned with a wet mop and not be vacuumed or swept so as to decrease the likelihood of creating an aerosol containing the virus. While routine use of respirators by farmers and homeowners in rural areas is not recommended, respirator use is recommended when cleaning up very heavy rodent infestations or cleaning homes associated with known cases of HPS. Professional pest control companies may be best suited for the cleaning that would be needed in these situations.
Other Important Information: Although most common in the southwestern part of the U.S., hantavirus infections can occur anywhere. In the United States, the Sin Nombre virus is responsible for the majority of cases of HPS. The host of the Sin Nombre virus is the deer mouse (*Peromyscus maniculatus*), which is present throughout the western and central United States.

No cases of hantavirus pulmonary syndrome were reported in Virginia during 2015. The only HPS case reported in Virginia occurred in 1993. In 2004, a resident of southwest Virginia died from HPS following an exposure that occurred in West Virginia. For surveillance purposes, that case was attributed to West Virginia.

Healthcare-Associated Infection (HAI)

Agent: Any infectious agent (e.g., bacteria, virus, or fungus)
Mode of transmission: Person-to-person transmission via direct contact with an infected person, or by indirect contact with contaminated medical devices or equipment, environmental surfaces, or the hands of healthcare workers. Medical devices may include central lines (can lead to central line-associated bloodstream infections or CLABSIs) and urinary catheters (can lead to catheter-associated urinary tract infections or CAUTIs). A *central line* is a flexible tube that is inserted into one of the large veins or arteries near the patient's heart that can be used to give fluids or medications or measure the amount of fluid in the body. Because a central line is located in a blood vessel, any introduction of bacteria, viruses, or fungi during central line insertion, maintenance, or removal may lead to a bloodstream infection. A *urinary catheter* is a tube that is inserted in the bladder and is used to drain urine. Similar to central lines, any introduction of an infectious agent during catheter insertion, maintenance, or removal may lead to a urinary tract infection.
Signs/symptoms: Varies depending on the type of healthcare-associated infection. May include symptoms such as fever, chills, low blood pressure, redness/tenderness at the device insertion or surgical site, or diarrhea. Most types of infections also require a positive laboratory result identifying an organism.
Prevention: To prevent HAIs, healthcare providers should follow CDC infection prevention guidelines, including: using antibiotics appropriately; removing unnecessary medical devices; complying with recommended practices for hand hygiene, device insertion, and device maintenance; using appropriate personal protective equipment; using evidence-based methods to clean, disinfect, and sterilize medical equipment and devices as well as clean and disinfect the healthcare environment; and following standard and transmission-based precautions meticulously.
Other important information: Hospitals are required to provide information on HAIs to the Virginia Department of Health (VDH) via the Centers for Disease Control and Prevention's online surveillance system, the National Healthcare Safety Network (NHSN). Hospitals first began reporting CLABSI data to VDH in July 2008. On September 25, 2015, the Virginia HAI reporting regulations were amended to expand the amount of HAI data that is shared with VDH. The updated regulations align reporting to the state health department with what hospitals are already reporting to the NHSN for the purposes of complying with the Centers for Medicare and Medicaid Services Hospital Inpatient Quality Reporting Program. Under the new regulations, the state reporting requirements now include: CLABSI in intensive care units and select inpatient wards; CAUTI in adult and pediatric intensive care units and select inpatient wards; surgical site infections (SSIs) following abdominal hysterectomy and colon procedures; *Clostridium difficile* laboratory-identified events; methicillin-resistant *Staphylococcus aureus* bacteremia laboratory-identified events; and healthcare personnel influenza vaccination summary data. More information about NHSN is available here: www.cdc.gov/nhsn. Data on healthcare personnel influenza vaccination are found in the Influenza chapter of this annual report.

In 2015, 81 hospitals reported HAI data to VDH for one or more types of infections. Reports of hospital-specific and statewide data are available on the VDH HAI Program's public reporting website: http://www.vdh.virginia.gov/surveillance-and-investigation/healthcare-associated-infections-hais/public-reporting-of-hai-data-in-virginia/. For more information about methods for analyzing HAI data, see the 2015 Virginia HAI Report for Healthcare Providers.

Table 8 shows the statewide summary of number of infections and standardized infection ratios (SIRs), and 95% confidence intervals (CIs) for all reportable HAIs in 2015. The SIR is a summary measure that adjusts for differences between hospitals, such as types of patients and procedures. It compares the number of infections reported in a given time period to the number of infections that would be predicted using national data from a baseline time period, which varies for different types of infections. An SIR equal to 1.0 indicates that the number of infections reported during the surveillance period is the same as the number of infections predicted given the baseline data. A lower SIR indicates better performance. A summary of the data reported by Virginia hospitals in 2015 is provided below:

- There were 48% fewer central line-associated bloodstream infections (CLABSIs) in Virginia hospitals than predicted based on the national experience from 2006-2008. This was a statistically significant reduction from the national baseline.
- There were 42% fewer catheter-associated urinary tract infections (CAUTIs) in Virginia hospitals than predicted based on the national experience from 2009. This was a statistically significant reduction from the national baseline.
- There were 24% more surgical site infections (SSIs) following abdominal hysterectomies and about the same number of SSIs following colon surgeries in Virginia hospitals based on the national experience from 2006-2008. The number of abdominal hysterectomy SSIs was significantly higher than the national baseline.
- There were 14% fewer hospital-onset methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia laboratory-identified events in Virginia hospitals than predicted based on the national experience from 2010-2011. This was a statistically significant reduction from the national baseline.
- There were about the same number of hospital-onset *Clostridium difficile* laboratory-identified events in Virginia hospitals as predicted based on the national experience from 2010-2011.

Outbreaks reported from healthcare settings are described in the Outbreaks chapter of this annual report. In 2015, 128 outbreaks were reported from healthcare settings, including 72 suspected or confirmed to be due to norovirus, 39 suspected or confirmed to be due to influenza, and 17 suspected or confirmed to have another pathogen as a causal agent.

Table 8. Statewide Standardized Infection Ratios (SIRs) for Central Line-Associated Bloodstream Infection (CLABSI), Catheter-Associated Urinary Tract Infection (CAUTI), Surgical Site Infection (SSI), and Laboratory-Identified Hospital-Onset Methicillin-Resistant *Staphylococcus aureus* (MRSA) Bacteremia and *Clostridium difficile* (CDI) Laboratory-Identified Events; Virginia Hospitals; 2015

				Number of Infections		Standardized Infection Ratio (SIR)* and 95% CI		
HAI	**Unit/Type**	**No. of Facilities**	**Device Days/ Procedures Performed/ Patient Days**	**Observed**	**Predicted**	**SIR**	**Lower**	**Upper**
CLABSI	**All ICUs and Wards** (total)**	81	447,204	411	783.62	0.52	0.48	0.58
	Adult and Pediatric ICUs (only)	78	197,508	203	394.00	0.52	0.45	0.59
	Adult and Pediatric Wards (only)**	81	218,643	177	318.83	0.56	0.48	0.64
	Neonatal ICUs (only)	25	31,053	31	70.80	0.44	0.30	0.61
CAUTI	**All ICUs and Wards** (total)**	81	464,584	510	877.65	0.58	0.53	0.63
	Adult and Pediatric ICUs (only)	78	231,684	319	472.65	0.68	0.60	0.75
	Adult and Pediatric Wards (only)**	81	232,900	191	404.99	0.47	0.41	0.54
SSI*	**Colon Surgery**	77	7,158	226	221.03	1.02	0.90	1.16
	Abdominal Hysterectomy	68	8,384	84	67.61	1.24	1.00	1.53
MRSA	**Facility-wide LabID**	81	3,475,556	178	207.84	0.86	0.74	0.99
CDI	**Facility-wide LabID**	81	3,153,506	2,542	2556.14	0.99	0.96	1.03

Green highlighting indicates an SIR significantly LOWER than the national baseline (Baseline periods: CLABSI, SSI - 2006-2008; CAUTI - 2009; MRSA, CDI - 2010-2011).
Red highlighting indicates an SIR significantly HIGHER than the national baseline.
* SSI SIRs are based on the complex admission/readmission model. For more information on this model, go to: http://www.cdc.gov/nhsn/pdfs/pscmanual/9pscssicurrent.pdf
** Inpatient ward locations included are adult and pediatric medical and medical/surgical wards, as well as adult surgical wards. Hospitals report data from pediatric surgical inpatient wards, but these data are not included in SIR calculations because data from these units are not part of the national baseline.

Hemolytic Uremic Syndrome (HUS)

Agent: Serious sequelae associated with infection from Shiga toxin-producing bacteria (*E. coli* or *Shigella). E. coli* O157:H7 is the bacterium most commonly associated with HUS.
Mode of Transmission: HUS is not transmitted from person to person. Infection with Shiga toxin-producing bacteria can result from ingestion of food or water contaminated with human or animal feces, or exposure to fomites or contaminated environments.
Signs/Symptoms: Classic signs of hemolytic uremic syndrome include red blood cell destruction (hemolytic anemia), low number of platelets (thrombocytopenia), and acute kidney failure. Symptoms include decreased frequency of urination, fatigue, progression to kidney failure often requiring dialysis, as well as neurological impairment (e.g., stroke or seizures). HUS, if it occurs, develops on average seven days after the first symptoms of infection.
Prevention: Since most cases of HUS result from infection with Shiga toxin-producing bacteria, initial preventive measures should include careful hand washing after using the bathroom, changing diapers, handling animals or their feces, and before preparing and eating food. All ground beef should be cooked thoroughly to an internal temperature of at least 160°. Raw milk, unpasteurized dairy products, and unpasteurized juices should not be consumed. People with proven or suspected *E. coli* infection should not use recreational water venues. Once infection with Shiga toxin-producing bacteria occurs, additional measures to prevent the infection further developing to HUS may include hospital admission and close monitoring of the patient, especially in children under five years and adults over 75 years. Family history of HUS should be obtained. Prompt rehydration of patient should begin. Possible development of HUS should be monitored using appropriate laboratory testing methods. Antimicrobial agents should not be administered. The case should be reported to local the local health department in order to initiate an epidemiologic investigation to identify the source of transmission and to prevent further spread.
Other Important Information: Five to ten percent of persons diagnosed with Shiga toxin-producing *E. coli* infection develop HUS. The syndrome occurs in up to 15% of children with *E. coli* O157:H7 infection. For more information, see the section of this report on *E. coli* Infection, Shiga Toxin-Producing.

Hemolytic Uremic Syndrome (HUS): 2015 Data Summary	
Number of Cases:	4
5-Year Average Number of Cases:	4.0
% Change from 5-Year Average:	0%
Incidence Rate per 100,000:	0.0

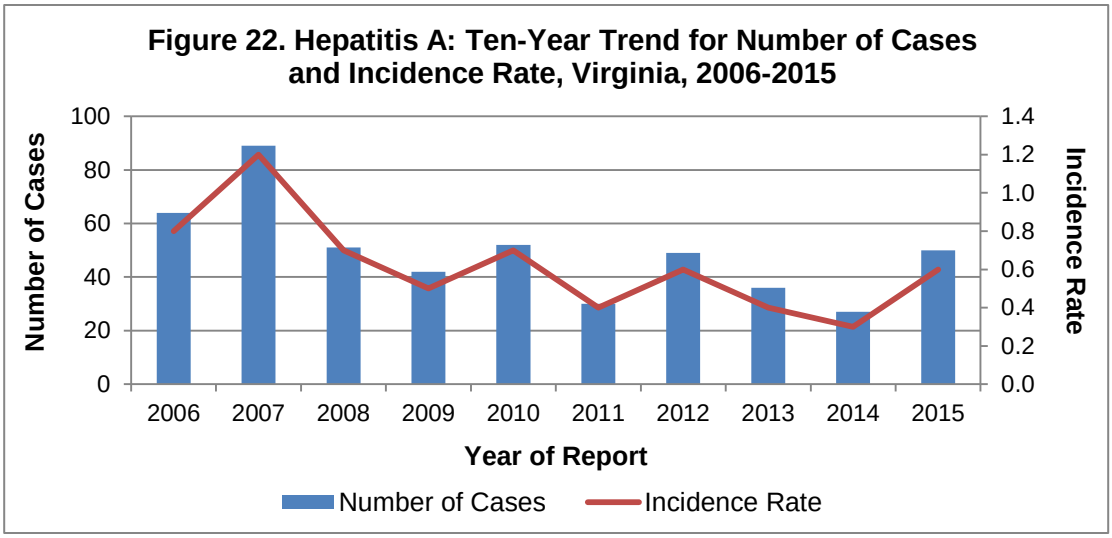
Four cases of HUS were reported in Virginia during 2015, compared to six cases reported in 2014. There was no change from the five-year average of 4.0 cases per year. One of the four HUS cases occurred following infection with Shiga toxin-producing *E. coli* O157:H7. Among the three remaining cases, one was Shiga toxin positive, one was Shiga toxin negative, and one case did not have Shiga toxin testing performed. One case occurred in the 60 year and older age group, while the remaining three cases occurred in the 1-9 year age group. All four cases occurred in the white population (0.1 per 100,000). Three individuals were female and one was male. Two cases each were reported from the northwest and southwest regions. All cases occurred between April and October. No deaths were attributed to HUS in 2015.

Hepatitis A

Agent: Hepatitis A virus (HAV), a member of the Picornavirus family
Mode of Transmission: Ingestion of food or water contaminated by fecal matter or through close contact with an infected household member or sex partner.
Signs/Symptoms: Fever, malaise, nausea, abdominal discomfort, dark urine, joint pain, and jaundice. In older children and adults, symptoms usually occur for several weeks, though prolonged or relapsing liver disease can last up to six months. Younger children often exhibit no symptoms.
Prevention: Preventive measures include immunization, safe food preparation, and good personal hygiene (e.g., washing hands with soap after using the bathroom, after changing diapers, and before preparing and eating food). Administration of immune globulin (IG) after exposure to hepatitis A can protect against symptomatic infection.
Other Important Information: This is an acute illness only; chronic infection does not occur. A vaccine was first introduced in 1995 and is currently recommended for all children at the age of one year, persons who are at increased risk of infection (i.e., international travelers), and persons who are at increased risk for developing complications from hepatitis A.

Hepatitis A: 2015 Data Summary	
Number of Cases:	50
5-Year Average Number of Cases:	38.8
% Change from 5-Year Average:	+29%
Incidence Rate per 100,000:	0.6

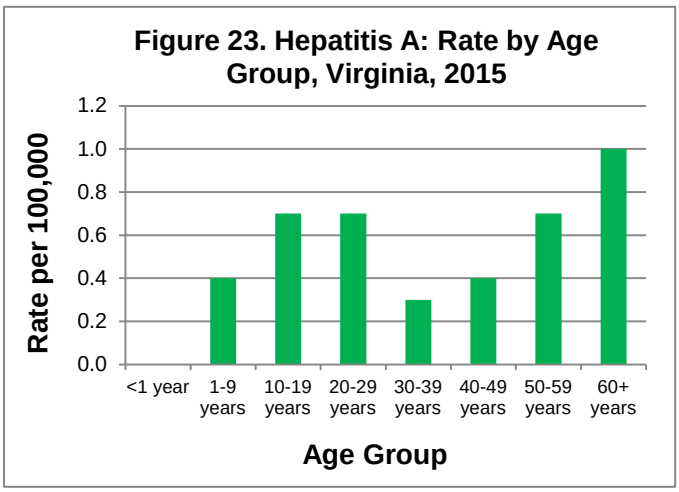
In 2015, 50 cases of hepatitis A were reported in Virginia. This represents an 85% increase from the 27 cases reported in 2014, and is 29% higher than the five-year average of 38.8 cases per year (Figure 22)

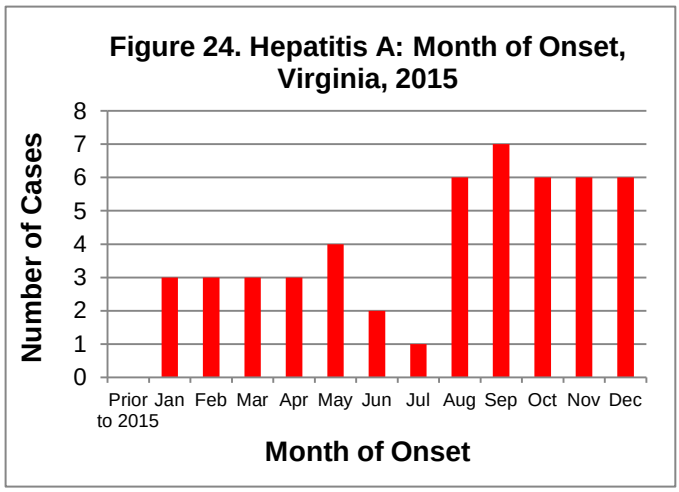


Cases were reported among people ranging in age from one to 94 years. The incidence rate was highest in the 60 years and older age group (1.0 per 100,000). Rates among the other affected age groups ranged from 0.3 to 0.7 per 100,000, with no cases reported in children less than one year of age (Figure 23). Race information was provided for 72% of cases. Among cases with a

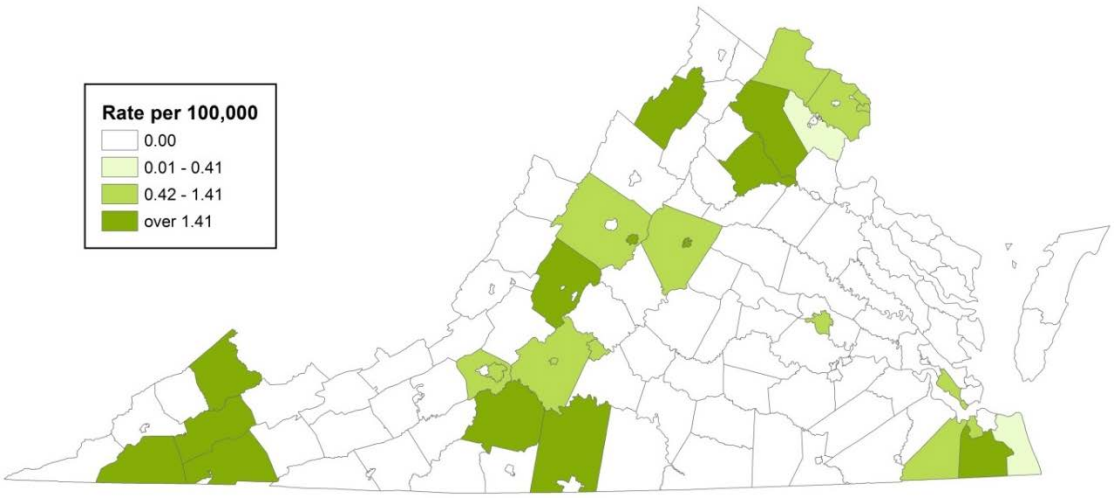
known race, the incidence rate seen in the white and "other" race populations (0.5 per 100,000, each) was higher than the rate observed in the black population (0.1 per 100,000). Incidence rates among males and females were the same (0.6 per 100,000).

By region, incidence was highest in the northern region (0.8 per 100,000) and lowest in the central region (0.1 per 100,000). Incidence by locality can be seen in the map below. Although cases occurred throughout the year, most cases (64%) had onset during the second half of the year (Figure 24). Risk factors were identified for 34% of cases, most of whom reported traveling outside of the country prior to illness, or were in close contact with someone who had hepatitis A and had traveled outside the country.





Hepatitis A Incidence Rate by Locality
Virginia, 2015

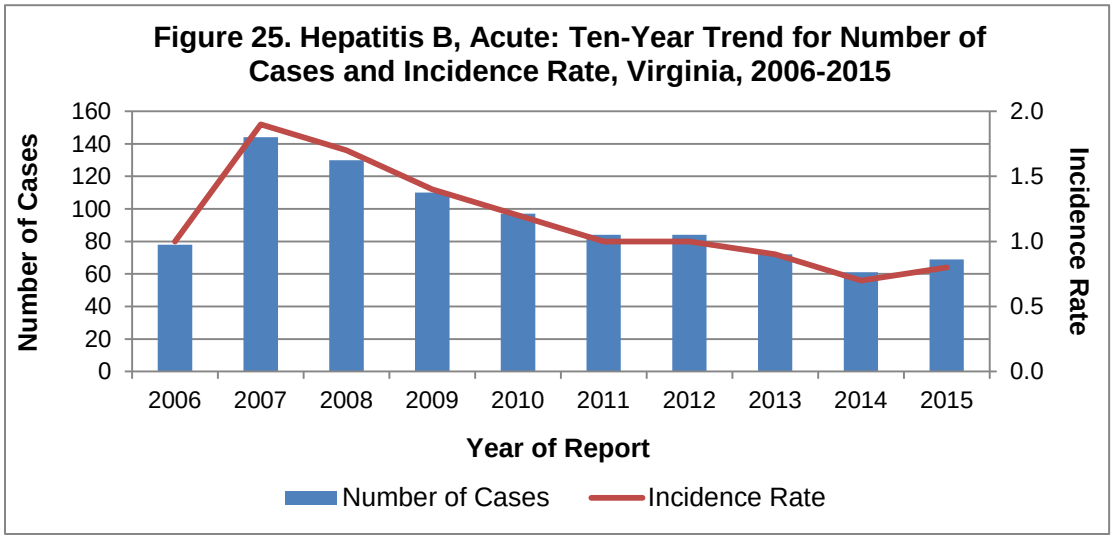


Hepatitis B, Acute

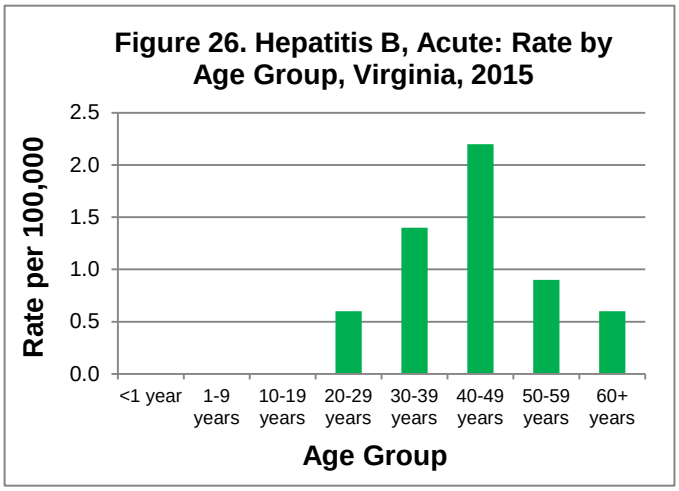
Agent: Hepatitis B virus (HBV), a hepadnavirus
Mode of Transmission: Person-to-person transmission through infected blood or body fluids (e.g., sexual, perinatal, or through the skin by nonsterilized needles or syringes).
Signs/Symptoms: Fever, fatigue, loss of appetite, nausea, abdominal pain, and jaundice. Infection can be asymptomatic. The likelihood of developing symptoms is age-dependent with adults and children over the age of five years being more likely to develop symptoms.
Prevention: Preventive strategies include immunization of people at increased risk of infection; screening of all pregnant women and treatment of children born to women who test positive; routine immunization of infants; routine immunization of adolescents who have not previously been immunized; and screening of donated blood and organs. Additional preventive measures include adherence to safe sexual practices, not sharing items contaminated with blood (i.e., needles, razors, and toothbrushes), and following standard precautions and infection control practices during all medical procedures.
Other Important Information: Infection with hepatitis B virus can lead to chronic (i.e., long-term) infection. Persons who become infected at a younger age are more likely to develop chronic infection. Death from liver disease occurs in 15-25% of those with chronic infection. A nationwide strategy to eliminate hepatitis B infection was initiated in 1991. It included vaccination of infants at birth, prevention of perinatal hepatitis B infections, vaccination of children and adolescents, and vaccination of adults at high risk of infection.

Hepatitis B, Acute: 2015 Data Summary	
Number of Cases:	69
5-Year Average Number of Cases:	79.6
% Change from 5-Year Average:	-13%
Incidence Rate per 100,000:	0.8

In 2015, 69 cases of acute hepatitis B infection were reported in Virginia, an increase from the 61 cases reported in 2014. Overall, there has been a 13% decrease from the five-year average of 79.6 cases per year (Figure 25). The decrease in reported cases in Virginia reflects a national



trend related to the availability of hepatitis B vaccine since 1981, and a strategy initiated in 1991 to eliminate hepatitis B transmission in the United States.

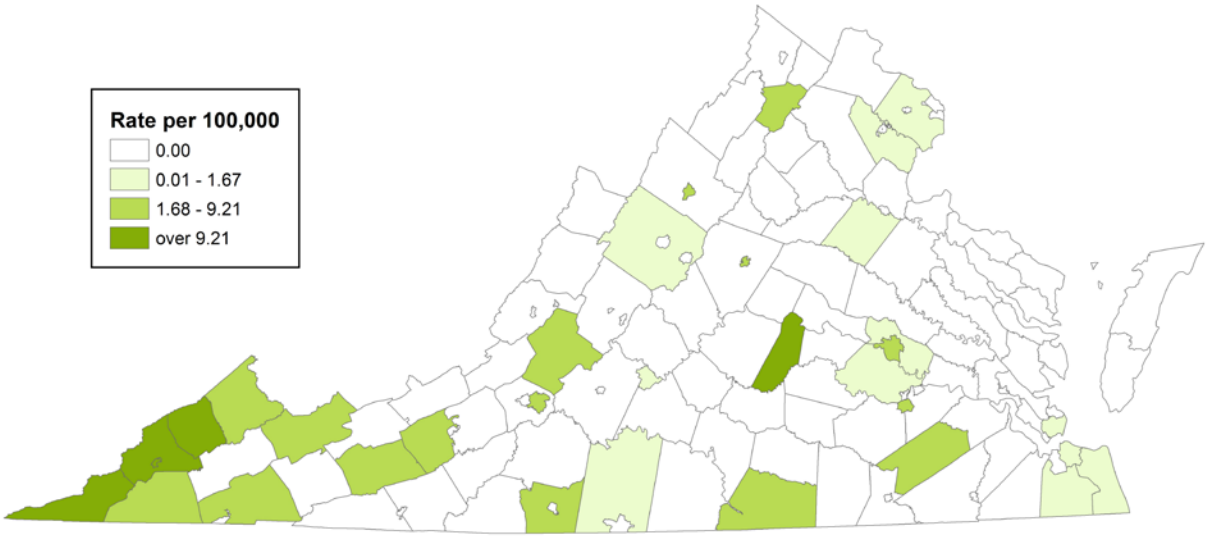


The highest incidence rate was observed in the 40-49 year age group (2.2 per 100,000), followed by the 30-39 year age group (1.4 per 100,000) (Figure 26). No cases were reported among individuals younger than 20 years of age. Race was not provided for 35% of cases. Among those with a known race, incidence was similar among the black and white populations (0.6 per 100,000, each), followed closely by those identified as being in the "other" race population (0.3 per 100,000). Incidence rates among males and females were also similar (0.9 and 0.8 per 100,000, respectively).

During 2015, the southwest region had a higher incidence rate for acute hepatitis B infections (2.8 per 100,000) than any other region in Virginia (range 0.2 to 1.3 per 100,000). Notably, incidence rates in the far southwest area of that region were among the highest (refer to map below). Disease onset occurred throughout the year. No acute hepatitis B outbreaks were reported in Virginia in 2015.

Certain behaviors can place a person at greater risk for infection with hepatitis B virus. These behaviors can include engaging in unsafe sexual practices, injecting drugs or sharing needles or other drug equipment, being exposed to blood while on the job, living or associating with a person who has hepatitis B, traveling to countries with high rates of hepatitis B, or practicing unregulated, unsafe or unclean body piercing or tattooing. During 2015, patient history information on potential risk factors was obtained for 68% of the reported cases. Among those reporting at least one potential risk factor in the 6 weeks to 6 months prior to onset of symptoms, 46% reported non-injected street drug use, 25% injected drugs not prescribed by a doctor, 25% had a blood exposure, 21% had contact with a person with confirmed or suspected acute or chronic hepatitis B virus infection, 18% were incarcerated, 11% received a tattoo, and 7% had a part of their body pierced. No deaths were attributed to acute hepatitis B infection in 2015.

Hepatitis B, Acute, Incidence Rate by Locality
Virginia, 2015

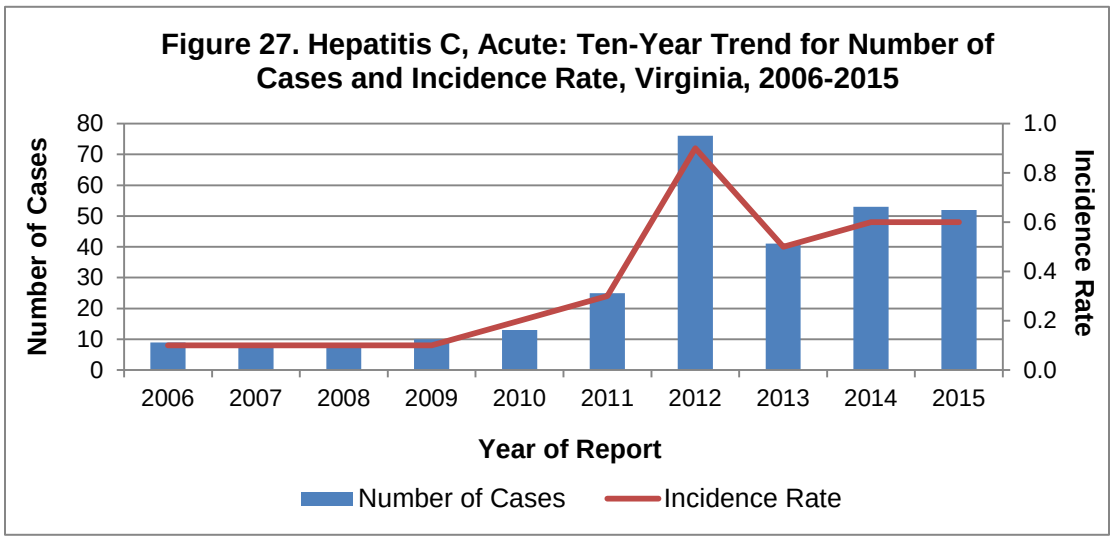


Hepatitis C, Acute

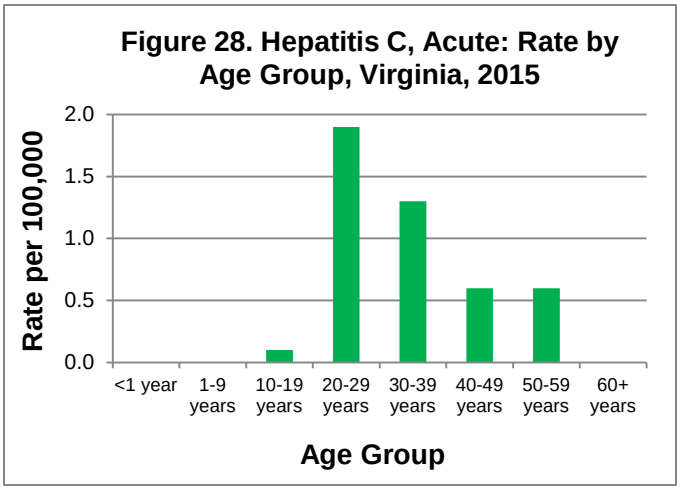
Agent: Hepatitis C virus (HCV), a member of the Flavivirus family
Mode of Transmission: Hepatitis C is primarily spread when blood from someone infected with HCV enters the body of someone not infected, usually by passing through the skin. The most common means of HCV infection in the U.S. is injection drug use, including the sharing of needles, syringes, or other equipment used to inject drugs. Infection can also occur from needlestick injuries in health care settings, or by being born to an HCV-infected mother. Infrequently, the virus can be spread by sharing personal items contaminated with infectious blood (razors or toothbrushes), or by having sexual contact with someone infected with HCV. Before 1992, when blood screening for HCV became available, receipt of donated blood, blood products, and organs was a common means of transmission. This is now a rare occurrence.
Signs/Symptoms: Often (70-80% of the time), no symptoms occur. Fever, fatigue, loss of appetite, nausea, abdominal discomfort, and jaundice are common symptoms when they do occur.
Prevention: Preventive measures include avoiding behaviors that can spread the disease, including sharing needles or other equipment used to inject drugs. Standard precautions and infection control practices should be followed during all medical and dental procedures. Any body piercing or tattooing should take place in a licensed facility. Sharing of personal items potentially contaminated with blood, such as razors and toothbrushes, should be avoided. Safe sexual practices and not donating blood if infected with HCV are also recommended.
Other Important Information: HCV infections become chronic in 75-85% of cases. As people with chronic HCV infection age, they are at higher risk for developing chronic liver disease, such as cirrhosis and liver cancer. No vaccine is available to prevent HCV.

Hepatitis C, Acute: 2015 Data Summary	
Number of Cases:	52
5-Year Average Number of Cases:	41.6
% Change from 5-Year Average:	+25%
Incidence Rate per 100,000:	0.6

In 2015, 52 cases of acute hepatitis C infection were reported in Virginia, compared to 53 cases reported in 2014. This is a 25% increase when compared to the 5-year average of 41.6 cases per year (Figure 27). The true incidence of this condition is likely to be increasing. However, incidence is difficult to assess because the data are also affected by changes that were made to the national surveillance case definition in 2012 (allowing cases to be counted based on laboratory criteria alone) leading to a higher number of reported cases, while also acknowledging that cases are undercounted due to the large percentage of infections that go undetected because of the absence of symptoms.



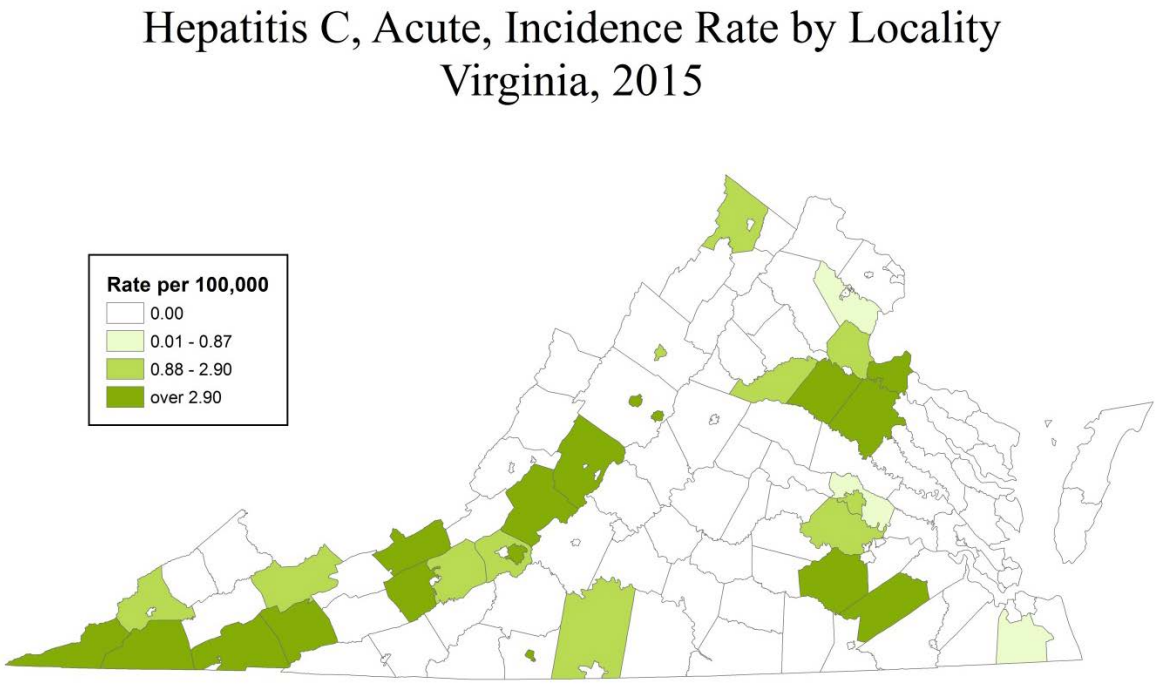
The highest incidence rate (1.9 per 100,000) occurred in the 20-29 year age group, followed by the 30-39 year age group (1.3 per 100,000). No cases of acute hepatitis C infection were reported in persons less than 10 years of age (Figure 28). Race was available for 71% of cases. Among those with a known race, 35 were among the white population resulting in an incidence rate of 0.6 per 100,000. The rate among both the black and "other" race populations was similar at 0.1 per 100,000. Incidence of acute hepatitis C infection among females was 0.7 per 100,000, while the incidence among males was 0.5 per 100,000.



In 2015, 79% percent of acute hepatitis C cases occurred in two regions in the state. The highest number of cases and incidence rate were both seen in the northwest region with 21 cases and an incidence rate of 1.6 per 100,000. This was followed closely in the southwest region with 20 cases being reported and a rate of 1.5 per 100,000. Nine cases were reported from the central region (0.6 per 100,000), and one case each were reported from the northern and eastern regions. Incidence rates by locality can be seen in the map below. Disease onset occurred throughout the year with 58% of cases having onset in the second and third quarters of the year. No acute hepatitis C outbreaks were reported in Virginia in 2015.

Certain behaviors can place a person at greater risk for infection with hepatitis C virus. Most people become infected with hepatitis C virus by sharing needles, syringes or other equipment while injecting drugs. Other at risk behaviors can include receiving needlestick injuries in health care settings, practicing unregulated, unsafe or unclean body piercing or tattooing, or being born to a mother infected with hepatitis C. Less common risks include engaging in unsafe sexual practices, or sharing personal items that may be contaminated with blood from an infected person (toothbrushes, razors). During 2015, patient history information on

potential risk factors was obtained for 40% of cases. Among those reporting at least one potential risk factor in the 2 weeks to 6 months prior to onset of symptoms, 38% injected drugs not prescribed by a doctor, 29% reported non-injected street drug use, 24% had received a tattoo, 14% were incarcerated, and 10% had a part of their body pierced. No deaths were attributed to acute hepatitis C infection in 2015.



Human Immunodeficiency Virus (HIV) Disease and Acquired Immunodeficiency Syndrome (AIDS)

Agent: Human Immunodeficiency Virus (retrovirus)
Mode of transmission: Person-to-person via unprotected sexual intercourse, use of contaminated needles, blood transfusions and transplants with organs from infected donors, from mother-to-child before or during birth or through breastfeeding, or contact of cut or abraded skin with body secretions carrying the virus.
Signs/Symptoms: Initial infection with HIV can cause an acute illness or fever, muscle pain, enlarged lymph nodes, and/or a rash which occurs approximately 2-4 weeks post-exposure; however, a person can be asymptomatic for several years. When the immune system is affected, the infection develops into AIDS.
Prevention: Preventive measures include safe sexual practices; screening of blood and plasma; and among infected mothers, antiretroviral prophylaxis, cesarean delivery before labor, and avoidance of breastfeeding.
Other Important Information: Data analysis methods for HIV/AIDS were changed in 2009. Statistics are now presented for HIV disease rather than HIV and AIDS as separate conditions, as explained below. Additional information regarding the changes in analytical methods is available on the following web address: http://www.vdh.virginia.gov/epidemiology/DiseasePrevention/DAta/documents/Technical%20Notes%20and%20Glossary%20of%20Terms_Revised_04-2010.pdf. More detailed epidemiologic analyses of HIV/AIDS, as well as other sexually transmitted infections, is located at http://www.vdh.virginia.gov/epidemiology/DiseasePrevention/DAta/. Rapid tests (which provide results within 30 minutes) are becoming more widely available and are used at various testing sites in Virginia. For more information, call your local health department, or contact the Virginia Department of Health HIV/STD/Viral Hepatitis Hotline at 1-800-533-4148.

HIV Disease: 2015 Data Summary	
Number of Cases:	1,062
5-Year Average Number of Cases:	1,125.0
% Change from 5-Year Average:	-6%
Incidence Rate per 100,000:	12.8

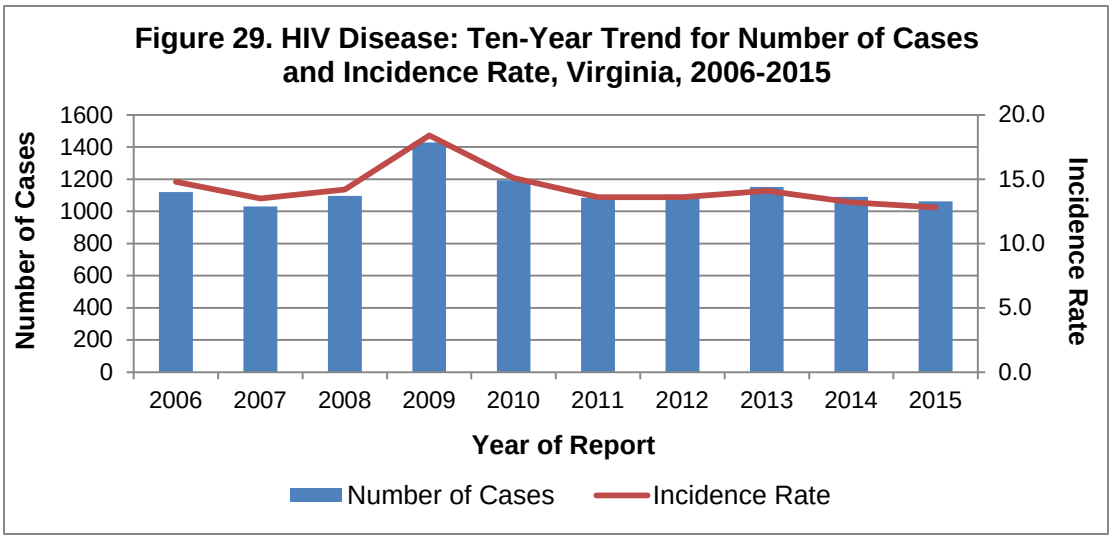
Change in Epidemiologic Analyses of HIV Disease

Beginning in 2009, VDH reassessed the way HIV and AIDS surveillance data were reported in order to better illustrate the epidemic in Virginia. Instead of approaching HIV and AIDS as two separate conditions of the same disease, it was found to be more helpful for epidemiologic and community planning purposes to evaluate all HIV and AIDS cases as one encompassing group: persons diagnosed or living with **HIV disease**. Before 2009, cases that were reported as having an AIDS-defining condition were excluded from the count of newly diagnosed HIV infections. Due to this change in methodology from previous years, those calculations pre-2009 are not comparable to calculations from 2009 and later, where HIV and AIDS are treated as one disease without considering disease

progression. Currently, any case that presents as having HIV or an AIDS-defining condition at the time of diagnosis is considered a newly diagnosed HIV disease case. It is not considered an incident case, however, as the person may have had HIV for a significant time prior to diagnosis. HIV incidence is measured through a separate surveillance process, which provides estimates for the state. The Serologic Testing Algorithm for Recent HIV Seroconversion (STARHS) method in combination with HIV testing and antiretroviral use history data are used to estimate HIV incidence. The STARHS method uses a laboratory test to classify newly diagnosed HIV cases as either recent (occurring approximately within the last five months) or long-standing HIV cases.

Figure 29 below displays the trend in new HIV diagnoses when the current methodology is applied to the entire 2006-2015 period. For a more thorough discussion of the changes in the analysis of HIV and AIDS surveillance data, please refer to the web site address listed in the "Other Important Information" section above.

Figure 29. HIV Disease: Ten-Year Trend for Number of Cases and Incidence Rate, Virginia, 2006-2015



HIV Disease

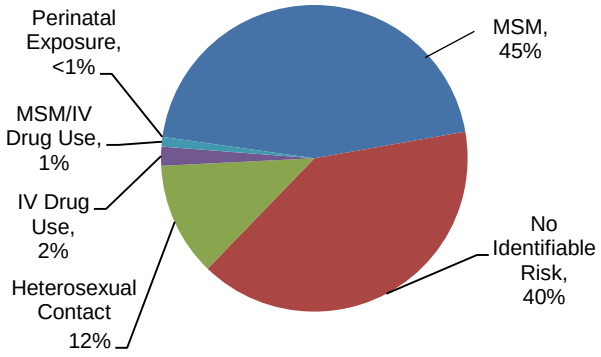
In 2015, 1,062 cases of HIV disease were reported in Virginia, as illustrated in Figure 29. Although this represents a slight decrease from the 1,090 reported cases in 2014, the number of cases reflects the stability of new HIV disease diagnoses over the last several years. The statewide incidence rate of new HIV diagnoses was 12.8 per 100,000 in 2015.

The highest HIV incidence rates in 2015 occurred in the 20-29 year age group (32.9 per 100,000), followed by the 30-39 year age groups (24.5 per 100,000). The 20-29 year age group has consistently experienced the highest incidence rate of new diagnoses since 2007 and represented 37% of all new diagnoses reported in 2015. Approximately 63% of all new HIV diagnoses in 2015 were among persons ages 20-39. Incidence rates among black, non-Hispanics and Hispanics were higher than their white, non-Hispanic counterparts in 2015. The black, non-Hispanic and Hispanic populations were eight and three times more likely than the white, non-Hispanic populations to be newly diagnosed with HIV in 2015. Overall, HIV incidence rates by race/ethnicity have remained

relatively stable over the past few years. Males have consistently shown higher incidence rates of HIV disease compared to females over time, and were over four times as likely as females to be diagnosed with HIV disease in 2015 (21.2 and 4.7 per 100,000, respectively).

Among the five health regions in Virginia, the highest incidence rate was observed in the central region, with 19.2 per 100,000, followed by the eastern region at 18.7 per 100,000. The region with the lowest HIV incidence rate was the southwest region with 5.3 per 100,000 population. Incidence by locality can be seen in the map below.

Figure 30. HIV Disease: Mode of Transmission, Virginia, 2015

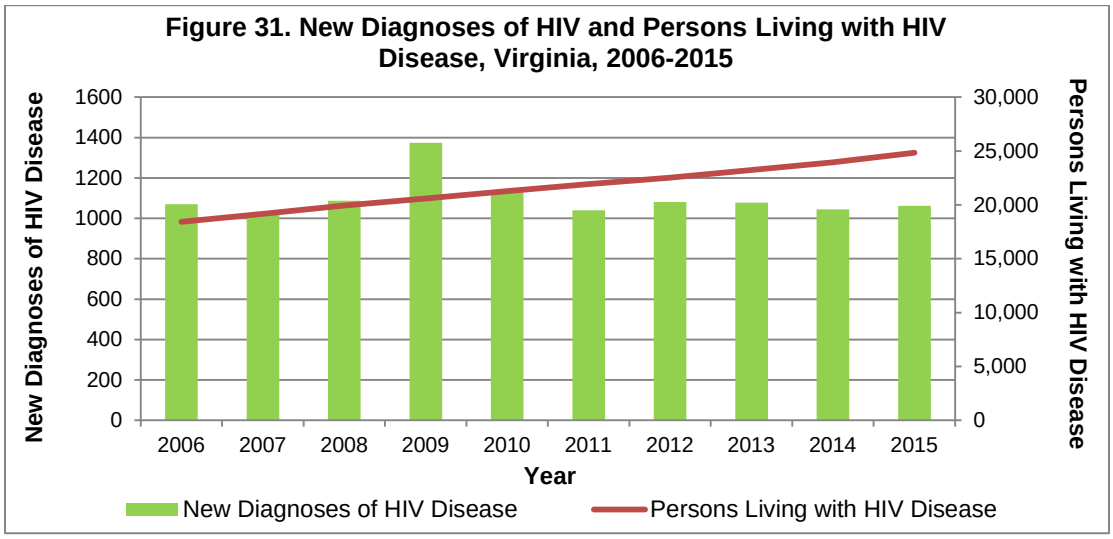


In 2015, the most frequently reported transmission category for HIV disease was men who have sex with men (MSM), which represented 45% of the new cases in Virginia (Figure 30). Among identified MSM cases, 53% were 20-29 years of age at diagnosis and 57% were black, non-Hispanic. Twelve percent of the newly diagnosed cases for 2015 were attributed to heterosexual contact, and 2% to intravenous (IV) drug use. No specific risk factors for transmission were identified for 40% of the new HIV diagnoses in 2015.

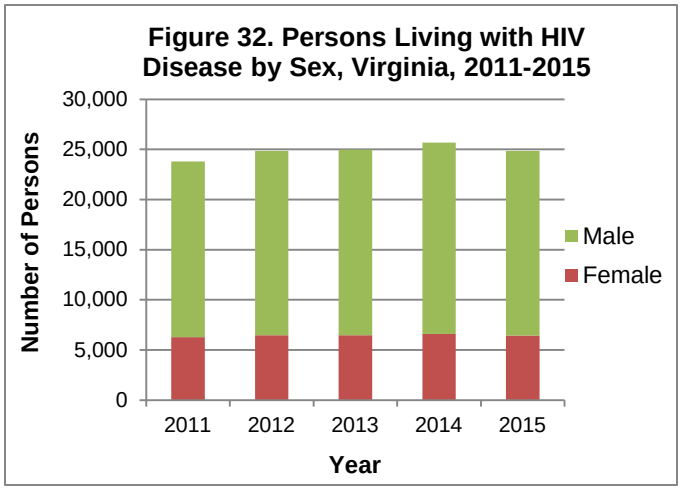
Persons Living with HIV Disease

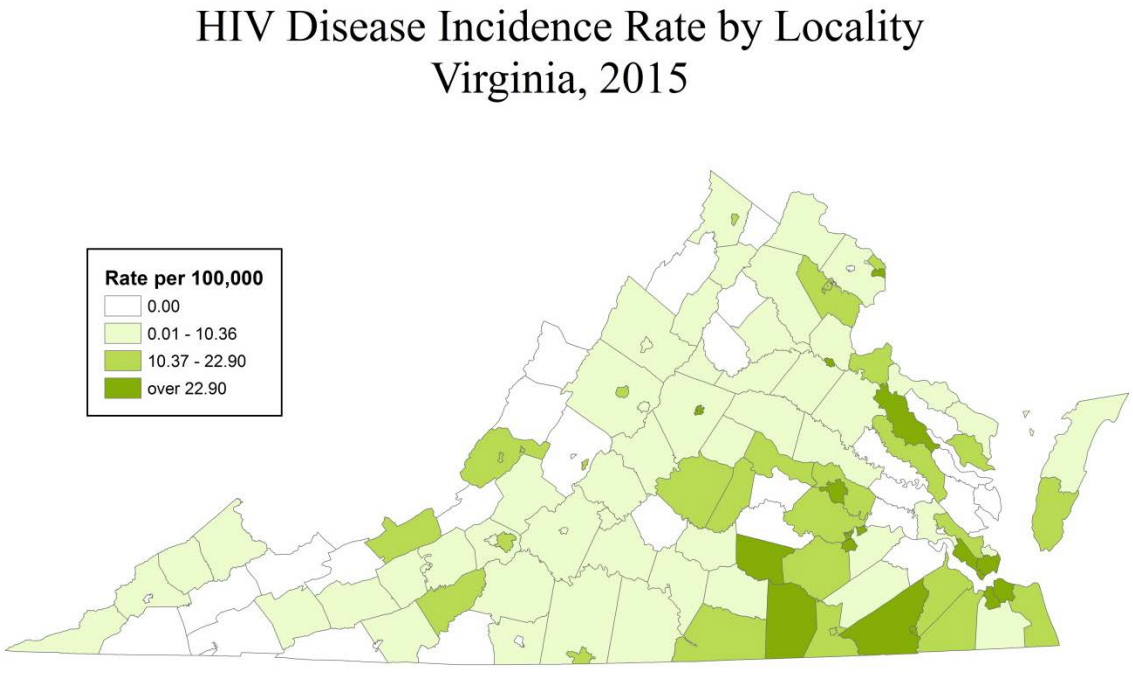
Due to advances in medical therapies and care strategies, the number of persons living with HIV disease (PLWHA) has continued to increase. As of December 31, 2015, there were 24,853 persons known to be living with HIV disease in Virginia (Figure 31).

Figure 31. New Diagnoses of HIV and Persons Living with HIV Disease, Virginia, 2006-2015



Approximately 75% of PLWHA are male (Figure 32). In addition, 57% of PLWHA were between 40-59 years of age. Among PLWHA in Virginia, 59% were black, non-Hispanic and 47% were attributed to male-to-male sexual contact, 19% to heterosexual contact, and 9% to IV drug use. The highest rates of PLHWA were in the central and eastern regions of Virginia with 419.6 and 416.8 per 100,000 population, respectively. The lowest rate of PLWHA was in the northwest region with 150.3 per 100,000 population. Approximately 50% of those living with HIV disease have also been diagnosed with an AIDS-defining condition.





Influenza

Agent: Influenza virus; Types A, B and (rarely) C cause human disease.
Mode of Transmission: Directly from person-to-person, primarily through inhalation of droplets released through coughing or sneezing. Less commonly, the influenza virus can be transmitted by contact with a contaminated object or surface and then touching one's mouth or nose.
Signs/Symptoms: Fever, headache, muscle pain, fatigue, sore throat and cough. Children may also have gastrointestinal symptoms, such as nausea, vomiting, or diarrhea. Complications of influenza can include lower respiratory tract involvement (e.g., bronchitis), viral or bacterial pneumonia, ear infections, sinus infections, dehydration, and worsening of chronic medical conditions, such as congestive heart failure, asthma, or diabetes.
Prevention: Annual vaccination is the primary prevention strategy; antiviral medications are supplemental to vaccine and may be used to prevent illness or lessen illness severity. Transmission may be reduced by washing hands frequently or using alcohol-based hand-sanitizers; avoiding touching the eyes, nose, and mouth with contaminated hands; and covering the nose and mouth with a tissue or the bend of the elbow when coughing or sneezing. Persons who are sick with influenza symptoms are encouraged to stay home to avoid spreading the disease to others.
Other Important Information: The influenza virus changes slightly from year to year (antigenic drift), making it necessary to prepare a new vaccine each year. Periodically, the virus will change to form a completely new subtype (antigenic shift), which can lead to pandemics.

Influenza Surveillance

In Virginia, influenza surveillance is conducted throughout the year. However, efforts are most intensively focused during the period of highest influenza activity, which normally begins in early October (week 40) and ends in late May (week 20). Surveillance efforts in Virginia do not count every individual case of influenza, but instead monitor indicators of illness within the community. For the 2015-2016 influenza season, data sources included visits for influenza-like illness to hospital emergency departments and urgent care centers, confirmed laboratory reports, evaluations of outbreak investigations, influenza-associated pediatric deaths, and school absenteeism. These data sources are used to determine weekly influenza levels, provide insight on the severity of illness, and characterize influenza virus subtypes circulating in the community.

National Overview of 2015-2016 Influenza Season

According to the Centers for Disease Control and Prevention (CDC), during the 2015-2016 influenza season, influenza A (2009 H1N1) viruses predominated. Smaller numbers of influenza A (H3N2) and influenza B viruses were also identified. Compared with past influenza seasons, this season there was a lower percentage of outpatient visits for influenza-like illness, lower rates of hospitalization, and a lower percentage of deaths related to influenza and pneumonia. However, there were reports of hospitalizations and deaths in young, otherwise healthy individuals who were infected with influenza A (2009 H1N1) viruses and who were not vaccinated.

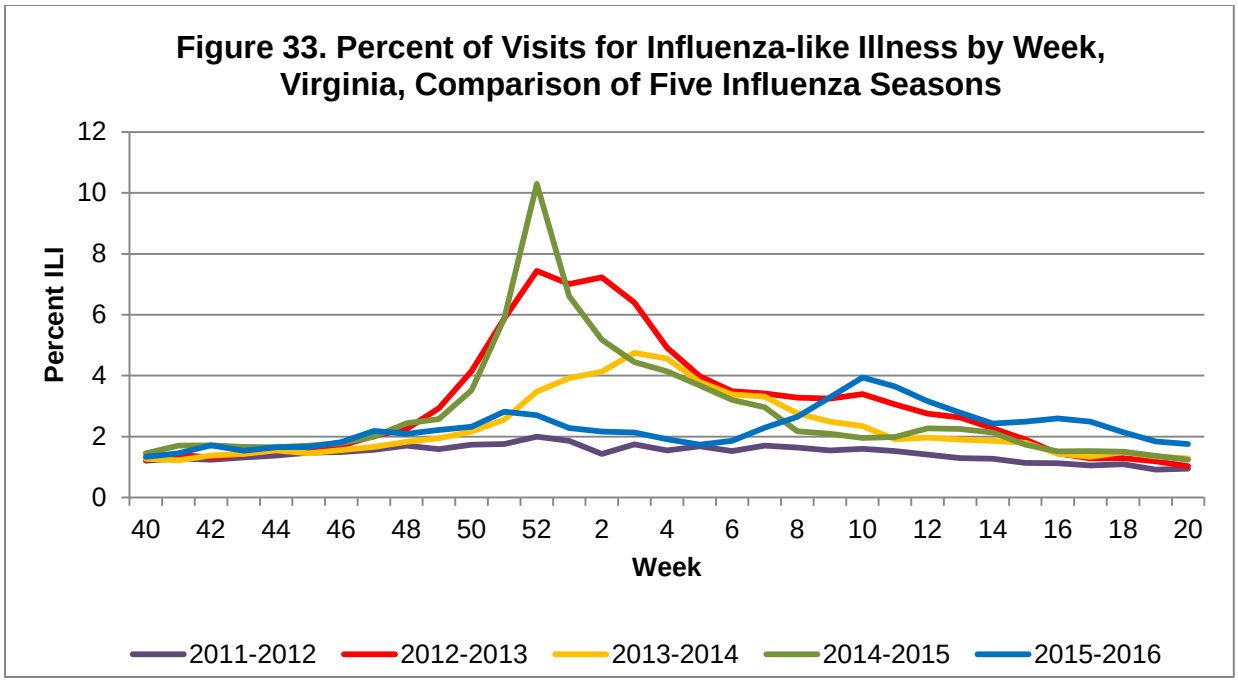
Almost all of the influenza A (2009 H1N1) circulating viruses were similar to the strain contained in the 2015-2016 influenza vaccine. Nationally, of the influenza A (2009 H1N1) viruses tested by the CDC, 99% were antigenically similar to the strain contained in the vaccine. Further, 97% of the influenza A (H3N2) viruses, 98% of the influenza B (Victoria lineage) viruses, and all of the influenza B (Yamagata lineage) viruses tested by the CDC were antigenically similar to the 2015-2016 vaccine components.

Since the vaccine was well-matched to the circulating viruses this season, the 2015-2016 influenza vaccine offered substantial protection against illness. Based on data collected November 2, 2015 through February 12, 2016, CDC reported overall influenza vaccine effectiveness (VE) of 59% this season. This means that getting the influenza vaccine reduced the risk of having to see a healthcare provider due to influenza by nearly 60%. More specific VE estimates are as follows: 51% VE against the influenza A (2009 H1N1) viruses most predominant during the season, 76% VE against all influenza B viruses, and 79% VE against influenza B (Yamagata lineage) viruses. Estimates of VE against influenza A (H3N2) viruses and influenza B (Victoria lineage) viruses are not available due to the small number of infections with those viruses during the season.

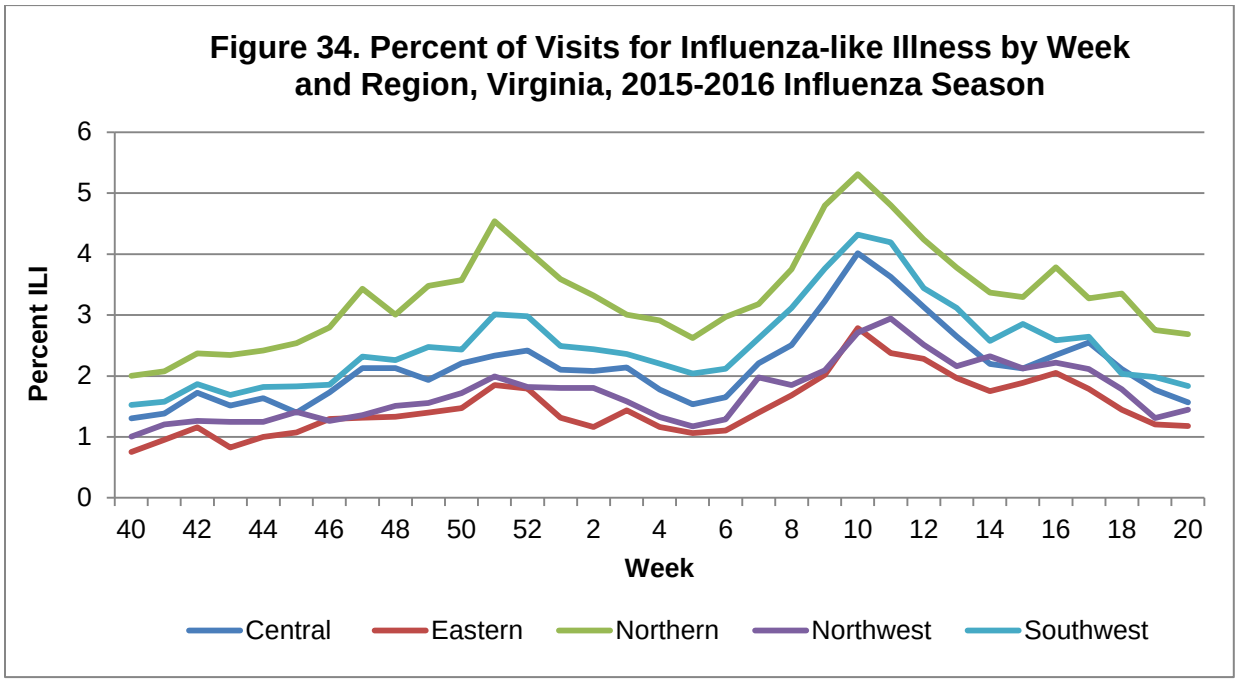
Influenza-like Illness Surveillance

The Virginia Department of Health (VDH) receives information regarding patient visits to emergency departments and urgent care facilities for influenza-like illness (ILI) symptoms. ILI symptoms include a complaint of fever with cough and/or sore throat. Other illnesses may show similar symptoms, but the strategy has proven to be a reliable indicator of influenza activity during flu season. During the 2015-2016 influenza season, 157 emergency departments and urgent care facilities provided data to VDH for surveillance monitoring.

Nationally, the weekly percentage of outpatient visits for ILI to healthcare providers participating in the Outpatient Influenza-Like Illness Surveillance Network (ILINet) was at or above the national baseline level of 2.1% for 17 consecutive weeks during the 2015-2016 influenza season. Across the United States, the peak percentage of outpatient visits for ILI was 4%, and occurred in mid-March (week 10). In Virginia, the proportion of patient visits for ILI during the 2015-2016 season peaked at 4%, also during week 10 (week ending March 12, 2016) (Figure 33).

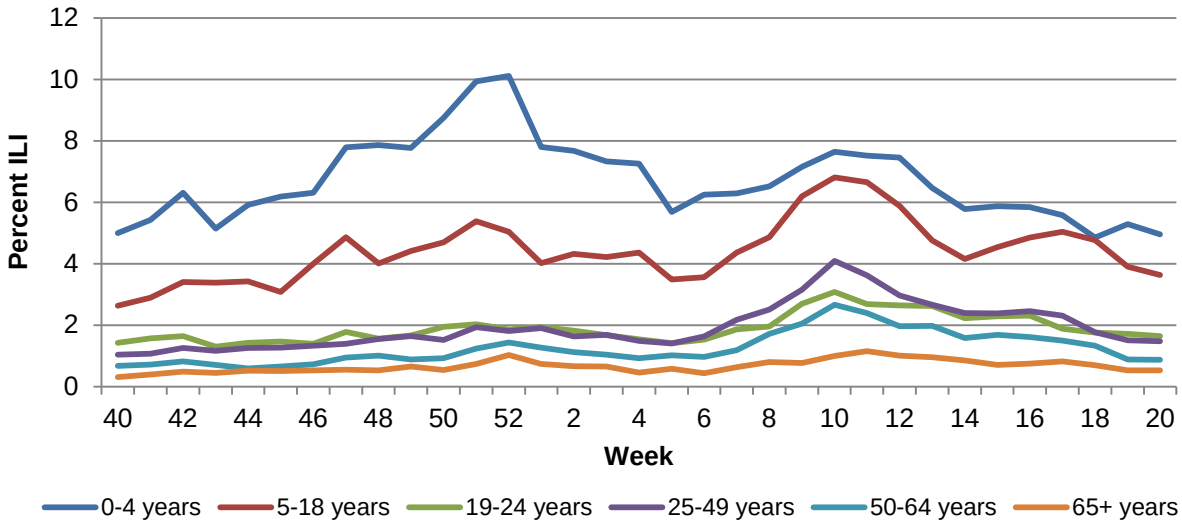


ILI activity in each of the health planning regions peaked in mid-March (week 10), with the northern region experiencing the highest proportion of visits for ILI (5.3%) (Figure 34). The peak ILI proportions in the other regions were as follows: eastern, 2.7%; northwest, 2.9%; central, 4.0%; and southwest, 4.3%.



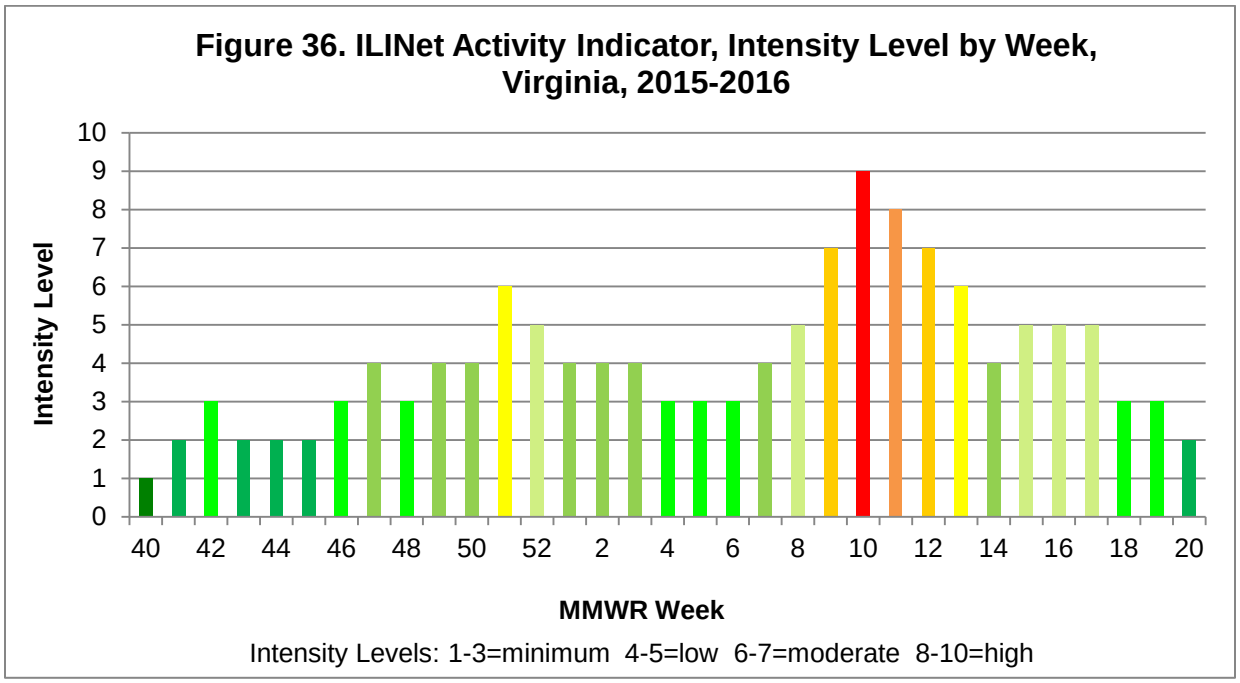
Analyzing ILI activity by age provides additional insight into disease patterns. While influenza vaccination efforts have historically often targeted the elderly due to concerns over complications of infection, the youngest age groups show the largest proportions of healthcare visits to emergency departments and urgent care facilities for ILI. Specifically, the largest proportion of visits due to ILI occurred in the 0-4 year age group during week 52 (10.1%). For all other weeks during the influenza season, the 0-4 year age group continued to experience the largest proportion of visits due to ILI. The smallest proportion of visits for ILI occurred in the 65 years and older age group (Figure 35).

Figure 35. Percent of Visits for Influenza-like Illness by Week and Age Group, Virginia, 2015-2016 Influenza Season



Influenza Intensity Levels

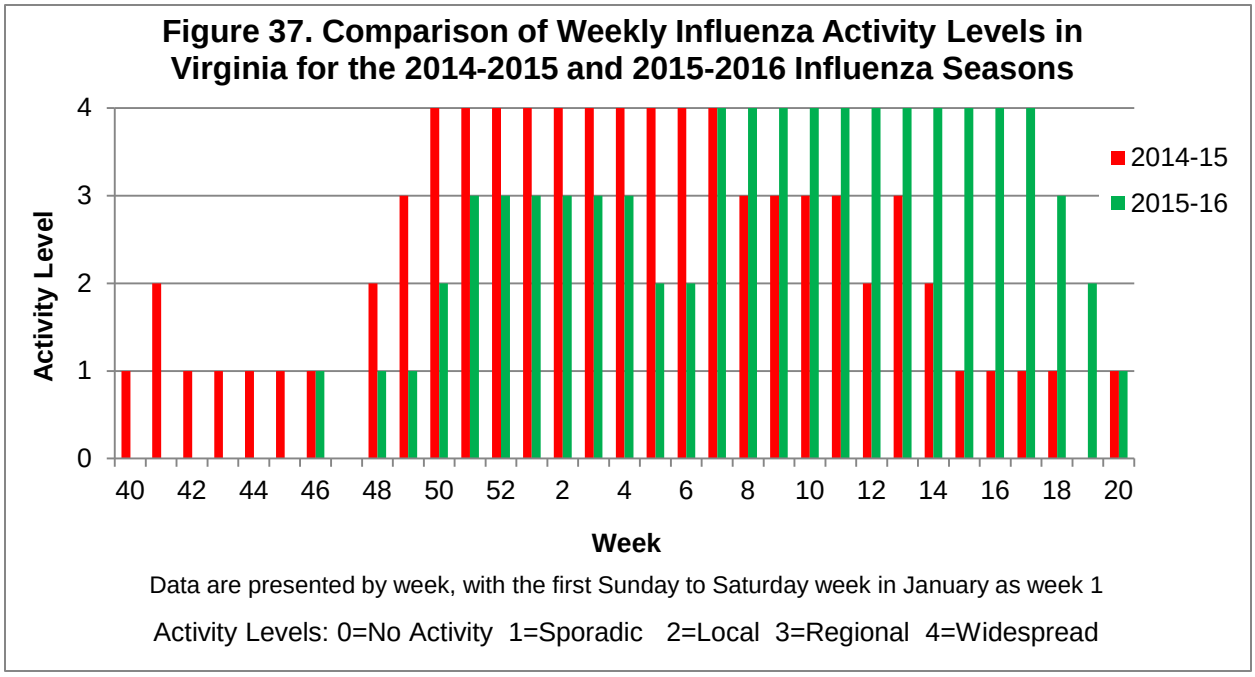
CDC reported weekly influenza intensity levels (ranging from 1 to 10) by state. This measure, first introduced during the 2010-2011 season, is calculated by comparing the percent of patient visits due to ILI for that week to the average proportion of ILI visits that occurred during a designated baseline period for which there is minimal or no influenza virus circulation. During the 2015-2016 season, influenza intensity levels in Virginia slowly increased during the winter, reaching moderate intensity levels for one week in late December (week 51), and peak intensity level in mid-March (week 10). The level then gradually dropped, rising only slightly before reaching minimal levels. During the previous 2014-2015 season, influenza activity gradually increased during the fall and reached high intensity levels in mid to late December. The level remained at 10 throughout the month of January that season. In early February, the intensity level decreased to moderate, and then reached low intensity by the middle of the month. Influenza intensity levels for Virginia for the 2015-2016 season are presented by week in Figure 36.



Influenza Activity Levels

Virginia follows CDC guidelines to describe the geographic distribution of influenza activity. The weekly activity level is based on ILI data, laboratory findings, and outbreak occurrences. The activity level is classified into the following categories: no activity, sporadic, local, regional, or widespread. The levels are not indicators of the severity of influenza illness but instead serve as a gauge for the geographic distribution of influenza activity around the state. Six weeks of ILI data, collected during the summer months of July through September, are used to establish baseline thresholds for the five Virginia health planning regions. ILI activity is considered elevated when visits in a region exceed the regional threshold.

The 2015-2016 influenza season began with no activity in October through November, and then jumped to sporadic activity level in late November (week 46). The activity level climbed again in late December (week 51) and remained at sporadic for six weeks. Virginia reached widespread activity in late February (week 7), and remained widespread for 11 consecutive weeks until the end of April (Figure 37). Although the 2015-2016 influenza season peaked much later than the 2014-2015 season, the number of weeks of widespread activity in both seasons was similar and also similar to the average of the past five influenza seasons (10 weeks).

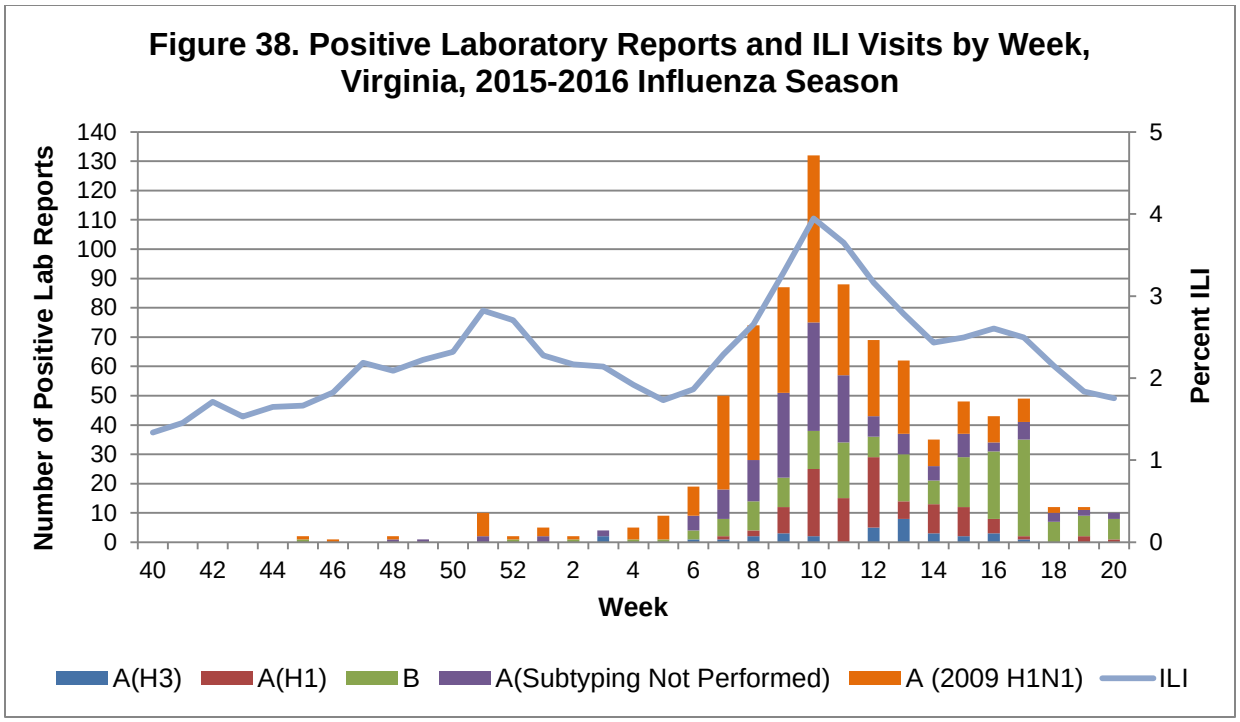


Laboratory Surveillance

Laboratory surveillance for influenza uses findings from three diagnostic testing procedures: DFA (direct fluorescent antibody), PCR (polymerase chain reaction), and viral culture. Rapid antigen tests are not included. Information is obtained from specimens submitted by sentinel providers, specimens obtained during outbreaks, influenza reporting by private laboratories, and laboratory findings from Virginia facilities participating in the National Respiratory and Enteric Virus Surveillance System (NREVSS).

Sentinel providers include private physicians and medical facilities located throughout Virginia. Statewide representation is achieved through the efforts of health districts to enlist providers from their area. During the influenza season, sentinel providers submit specimens from patients with ILI to the Virginia Division of Consolidated Laboratory Services (DCLS), the state public health laboratory, for analysis. Regular sentinel providers were asked to submit up to five specimens per week from patients exhibiting influenza-like illness.

During the 2015-2016 season, influenza A (subtyping not performed), A (H3), A (H1), A (2009 H1N1), and B viruses were all circulating in the state, as shown in Figure 38. Influenza A (2009 H1N1) viruses predominated during the 2015-2016 influenza season. Laboratory tests indicate that 77% of positive influenza findings were influenza A (all subtypes) and 23% were influenza B. For the 2014-2015 season, 91% of positive influenza findings were influenza A (all subtypes) and 9% were influenza B. As more providers have gained access to quicker, more reliable diagnostic testing methods such as PCR, the volume of confirmatory testing has increased substantially. During the 2015-2016 season, Virginia received 833 unique confirmatory influenza laboratory reports.

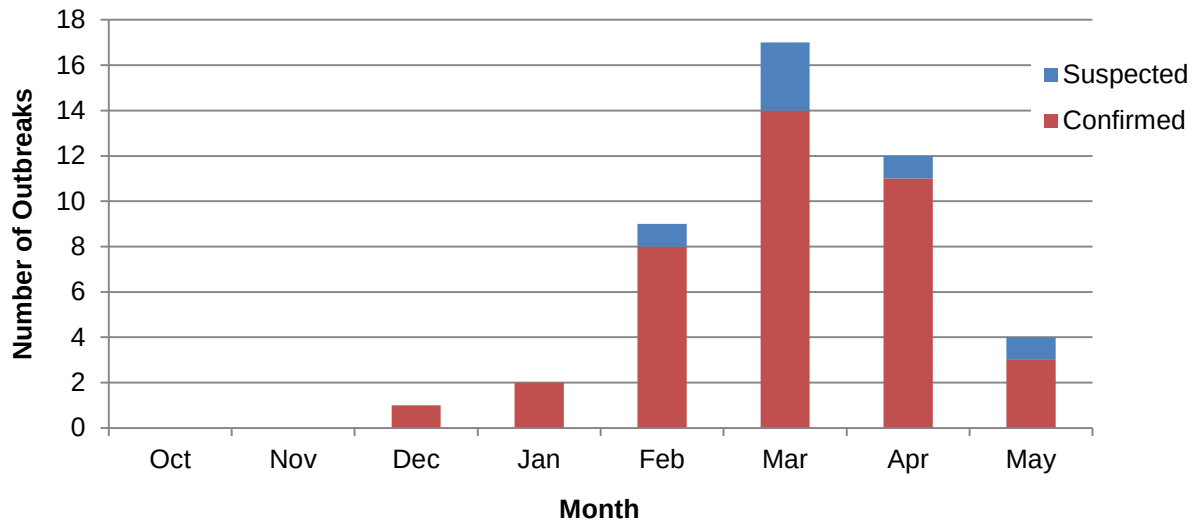


Influenza Outbreaks

During the 2015-2016 season, 45 influenza outbreaks were reported to VDH. In comparison, 152 outbreaks of influenza were reported during the 2014-2015 season and 30 reported during the 2013-2014 season. Outbreaks reported by month of occurrence are shown in Figure 39. Specimens from 39 influenza outbreaks tested positive for influenza virus (by rapid test or confirmatory laboratory report), confirming 5 (13%) as influenza A-associated (2009 H1N1), 2 (5%) as influenza A-associated (H3), 8 (21%) as influenza A-associated (subtyping not performed), 13 (33%) as influenza B-associated, and 11 (28%) as unspecified subtype. The first confirmed outbreak was reported in late December 2015 and occurred in a nursing home in the southwest region. During the previous season (2014-2015), the first confirmed outbreak occurred much earlier in the season (early October). During the 2015-2016 season, confirmed influenza outbreaks were reported from 11 nursing homes, 16 schools (K-12), 5 daycare/pre-school facilities, 4 assisted living facilities, 1 residential behavioral health facility, 1 business/workplace, and 1 medical facility (not long-term care related).

By region, the largest percentage of outbreaks (31%, 14 outbreaks) were reported from the northern region, followed by the central region (24%, 11 outbreaks), northwest region (18%, 8 outbreaks), southwest region (16%, 7 outbreaks), and eastern region (11%, 5 outbreaks). An average of 29 cases was associated with each influenza outbreak, with a range of 3 to 192 cases per outbreak. A total of 20 hospitalizations were associated with these outbreaks.

Figure 39. Suspected and Confirmed Influenza Outbreaks by Month, Virginia, 2015-2016 Influenza Season



Influenza-associated Deaths

Virginia disease reporting regulations require physicians and directors of medical care facilities to report suspected or confirmed influenza-associated deaths in children less than 18 years of age to allow monitoring of this severe outcome of influenza illness. One pediatric influenza-associated death was reported during the 2015-2016 influenza season. The death occurred in a pre-school age child (0-4 years) from the central region. Influenza B was identified by rapid test. During the 2014-2015 influenza season, five pediatric influenza-associated deaths were reported in Virginia. Nationally, a total of 74 influenza-associated pediatric deaths were reported during the 2015-2016 season. Of note, Table 2a of this report lists two influenza-associated deaths for Virginia in 2015. Those deaths are reported for calendar year 2015, while the information in this narrative is representative of the 2015-2016 influenza season.

School Absenteeism

School absenteeism surveillance was added to influenza surveillance in Virginia during the 2009-2010 pandemic season, and continues because of the valuable insights it provides. Information on absenteeism is voluntarily submitted by school divisions daily and made available to health districts to identify emerging problems and monitor potential influenza activity in their communities. Centrally, it is evaluated by region and school level (elementary, middle, and high school) for unusual patterns. During the 2015-2016 season, school divisions provided absenteeism data for 536 schools. While school absenteeism provides a general, but not influenza-specific measure of illness, school absenteeism data are useful for monitoring illness activity and identifying schools with possible outbreaks during the influenza season.

Influenza Vaccination among Healthcare Personnel

The best way to prevent influenza infection is by getting a flu vaccine every year. CDC recommends that all healthcare personnel who work in a healthcare setting receive the flu vaccine each year to help prevent the spread of influenza within the workplace. Healthcare personnel include all facility employees, licensed independent practitioners, adult students/trainees, and volunteers regardless of full time/part time status, clinical responsibility or patient contact. Numerous studies have shown that patients benefit when healthcare workers get vaccinated. Many hospitals choose to provide the flu vaccine to their employees, and some hospitals even have policies requiring mandatory vaccination. Currently, there are no state regulations requiring vaccination of healthcare workers in Virginia, and healthcare workers are able to decline the flu vaccine.

VDH receives healthcare personnel influenza vaccination summary data from the National Healthcare Safety Network. In accordance with disease reporting regulations, acute care and critical access hospitals report the percentage of all healthcare workers in their hospital who received the flu vaccine for each season. The Department of Health and Human Services (HHS) Healthy People 2020 goal is to have 90% of healthcare personnel vaccinated against seasonal influenza. For the 2015-2016 season, Virginia's overall influenza vaccination percentage was 86.3%, which is lower than the Healthy People 2020 goal. Of the 81 hospitals reporting vaccination data, 42 hospitals (52%) met this goal for the 2015-2016 season.

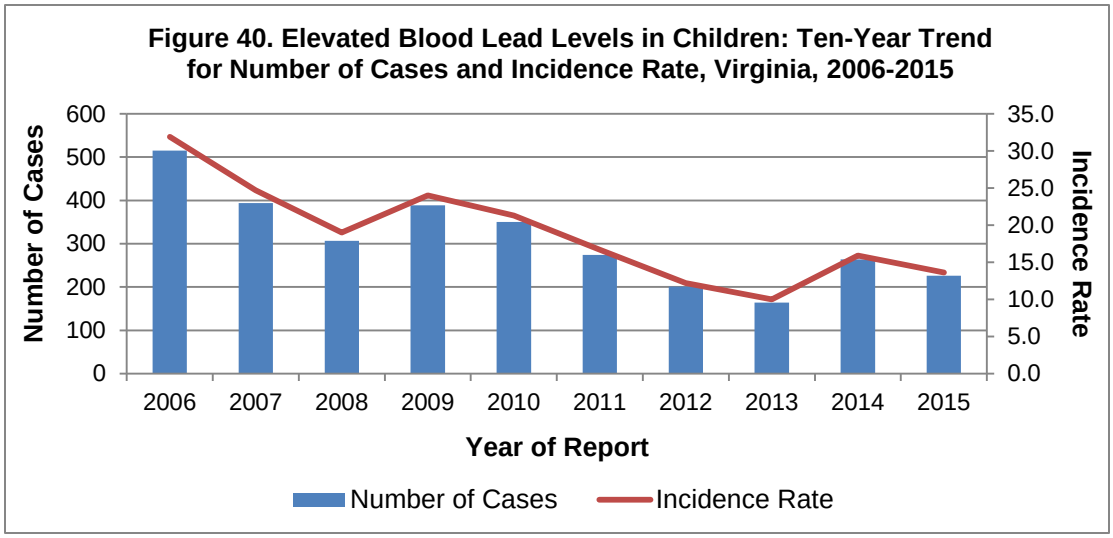
Reports of hospital-specific and statewide data for the prior season (2014-2015) are available on the VDH Healthcare-associated Infections (HAI) Program's public reporting website: http://www.vdh.virginia.gov/surveillance-and-investigation/healthcare-associated-infections-hais/public-reporting-of-hai-data-in-virginia/. For more information about methods for analyzing the data, see the 2015 Virginia HAI Report for Healthcare Providers.

Lead - Elevated Blood Levels in Children

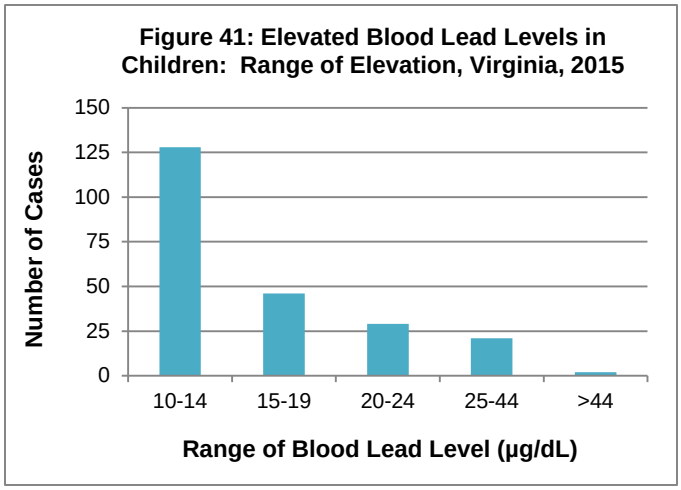
Agent: Lead (soft, dense metal)
Mode of Transmission: The primary source of lead poisoning in children is flaking, dusting lead paint found in buildings built before 1978. Lead intake can happen through chewing objects painted with lead paint; ingesting contaminated soil, food, or water; inhaling contaminated air or dust; or using glassware, healthcare products or folk remedies containing lead.
Signs/Symptoms: Even at low levels, lead in children can cause reduced Intelligence Quotient (IQ), hyperactivity, reduced stature, reduced hearing, and headaches. Nervous system damage, learning disabilities (e.g. attention deficit hyperactivity disorder), behavior problems (withdrawn behavior, issues with sociability), muscle weakness, decreased growth, delayed puberty, and anemia can also be attributed to elevated blood lead levels. Children who ingest large amounts of lead can develop kidney and brain damage. Furthermore, children can appear healthy despite having elevated levels of lead in their blood.
Prevention: Ingestion of lead-contaminated materials and use of lead-containing objects should be avoided. Education of healthcare professionals and parents is important in detecting and reducing lead exposure. Some recommendations for parents include testing your home and water for lead, precautionary lead testing in young children, and washing children's hands, faces and toys often in order to eliminate lead dust and soil. Parents who have an occupation or hobby that might involve lead should wear personal protective equipment, shower after working with lead, and avoid bringing lead-contaminated materials into the home. Children should be kept away from any home renovations involving the sanding or scraping of paint.
Other Important Information: Children are more sensitive than adults to the toxic effects of lead. There is no proven safe level of lead in blood. In 2015, elevated blood lead levels at or above 10 micrograms per deciliter (μg/dL) were reportable in children aged 15 years or younger in Virginia. There is a need for increased awareness of additional sources of lead exposures, including improper renovation of older homes; imported toys manufactured with lead paints or components; candies popular among some ethnic groups; traditional folk remedies used in some cultures; and ceramics from foreign countries that use lead glazes.

Lead – Elevated Levels in Children: 2015 Data Summary	
Number of Cases:	226
5-Year Average Number of Cases:	250.6
% Change from 5-Year Average:	-10%
Incidence Rate per 100,000:	13.6

In 2015, 226 newly reported cases of elevated blood lead levels in children were reported in Virginia. This represents a 14% decrease from the 264 cases reported in 2014, and a 10% decrease from the five-year average of 250.6 cases per year (Figure 40). All incidence rates for children with elevated blood lead levels are based on population



figures for children age 0-15 years. Blood lead results on approximately 74,000 children were received by VDH in 2015. Continued improvement in reporting of specimen type (e.g., capillary or venous) by physicians and laboratories has enhanced interpretation of test findings, reduced ambiguity, and yielded more accurate information on the number of children with confirmed elevated blood lead levels.

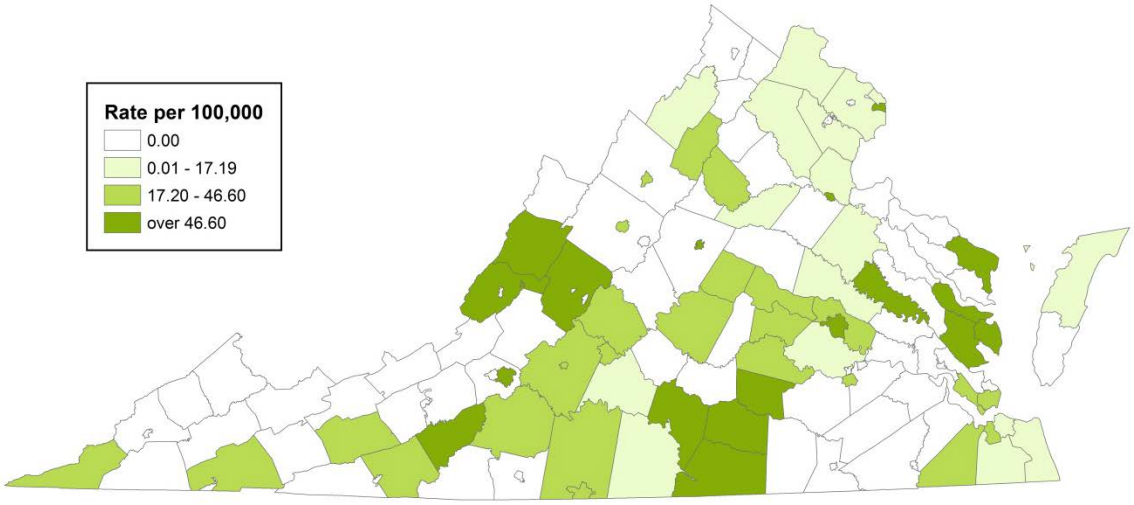


Based on guidance in place in 2015, blood lead levels in the 10-14 µg/dL range were considered above normal, but only required lead awareness education and follow-up monitoring. Blood lead levels in the 15-19 µg/dL range required nutritional and environmental education, as well as additional testing to ascertain if the blood lead level was increasing or persistently elevated. Blood lead levels equal to or greater than 20 µg/dL required greater degrees of case management, the initiation of an environmental investigation to identify and eliminate lead hazards, and the possibility of medical intervention. Among the 226 children reported with elevated blood lead levels in 2015, 128 (57%) had confirmed blood lead levels in the 10-14 µg/dL range, 46 (20%) had levels in the 15-19 µg/dL range, 29 (13%) had levels in the 20-24 µg/dL range, 21 (9%) had levels in the 25-44 µg/dL range, and 2 (<1%) had a level above 44 µg/dL (Figure 41).

By age group, the majority (91%) of elevated blood lead levels and the highest incidence rate occurred in those aged 1-9 years (205 cases, 22.0 per 100,000), followed by infants (18 cases, 17.5 per 100,000). Rates were lowest among those 10-15 years of age (0.5 per 100,000). Race was not provided for 45% of the cases. Among those with a known race,

incidence among the "other" race population was the highest (18.8 per 100,000), followed by the black population (13.0 per 100,000). The white population had the lowest incidence rate (4.2 per 100,000). Incidence rates among males and females were similar (14.0 and 13.2 per 100,000, respectively). Geographically, incidence rates ranged from 19.5 per 100,000 in the central region to 10.2 per 100,000 in the northwest region, resulting in a statewide incidence rate of 13.6 per 100,000 in children less than sixteen years of age. Incidence rates by locality can be seen in the map below.

Lead - Elevated Blood Levels in Children
Incidence Rate by Locality, Virginia, 2015

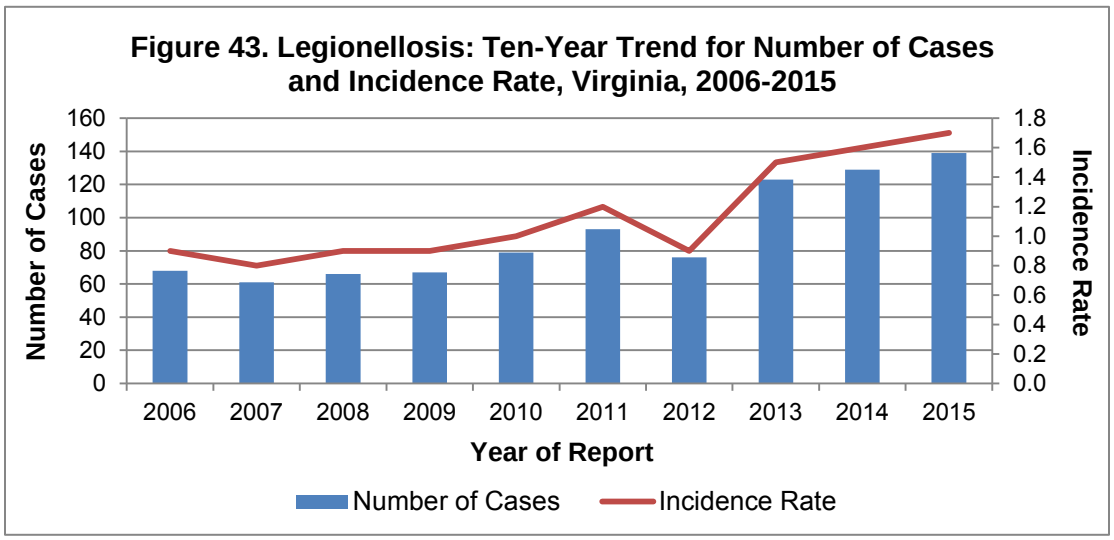


Legionellosis

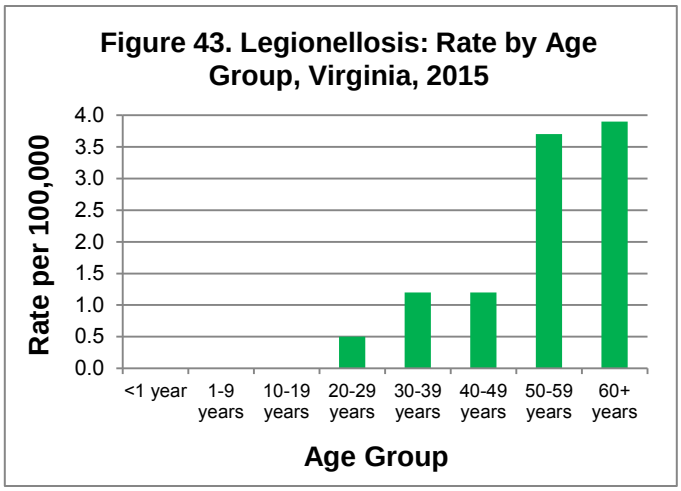
Agent: *Legionella* species (bacteria); most infections in the United States are caused by *Legionella pneumophila*
Mode of Transmission: Inhalation of contaminated aerosolized water (e.g., sprays, mists).
Signs/Symptoms: Infection with *L. pneumophila* causes two distinct illnesses: Legionnaires' disease, characterized by fever, muscle aches, headaches, malaise, cough, and pneumonia with progressive respiratory distress; or Pontiac fever, a milder influenza-like illness without pneumonia characterized by quick onset. Pontiac fever and Legionnaires' disease are referred to as "legionellosis", separately or together.
Prevention: Ensuring that water systems in buildings (i.e., hot tubs, cooling water systems, hot water tanks, decorative fountains) are maintained properly in order to reduce the growth and spread of *Legionella*. For outbreaks, control measures include disinfection of contaminated water sources by chlorination or superheating of water from 160° to 170°F, and appropriate mechanical cleaning.
Other Important Information: Legionellosis is more common among people who are elderly, are immunocompromised, or have underlying lung disease. Virginia has experienced a pattern, also seen nationally, in which there was an increase in legionellosis cases in 2003, followed by a higher incidence in the post-2003 period than in the pre-2003 period. The cause of this increase is not clearly understood. Factors that may have contributed to the higher number of cases in 2003 and later include an increasing population of older persons and persons at high risk for infection, as well as improved diagnosis and reporting of the condition. Additional factors may include CDC's call for more active and timely surveillance of travel-associated legionellosis and changing weather patterns.

Legionellosis: 2015 Data Summary	
Number of Cases:	139
5-Year Average Number of Cases:	100.0
% Change from 5-Year Average:	+39%
Incidence Rate per 100,000:	1.7

In 2015, 139 cases of legionellosis were reported in Virginia, which is the highest number of cases reported in the state during a reporting year. This represents an 8% increase from the 129 cases reported in 2014, and a 39% increase from the five-year average of 100.0 cases per year (Figure 42). Generally, there has been an increasing trend of reported cases over the last decade. National data from the CDC indicate that several other states in the U.S. have seen a similar increase in legionellosis cases, especially in the mid-Atlantic region. One reason for this rise in incidence could be the unusually warm and humid weather experienced during the summer by many states throughout the country, as there is some evidence that legionellosis incidence may be influenced by certain weather conditions.



Legionellosis incidence rates were closely associated with age. In 2015, the highest incidence occurred in the 60 year and older age group (3.9 per 100,000), followed by the 50-59 year age group (3.7 per 100,000) (Figure 43). Of the 139 cases reported in 2015, 106 (76%) were reported among persons age 50 years or older. No cases of legionellosis were reported in persons younger than 20 years. Race was reported for 91% of cases. Among those with a known race, incidence was higher in the black population (2.7 per 100,000) when compared to the white and "other" race populations (1.3 and 0.3 per 100,000, respectively). Additionally, the incidence rate among males was more than twice the rate among females (2.3 and 1.1 per 100,000, respectively).

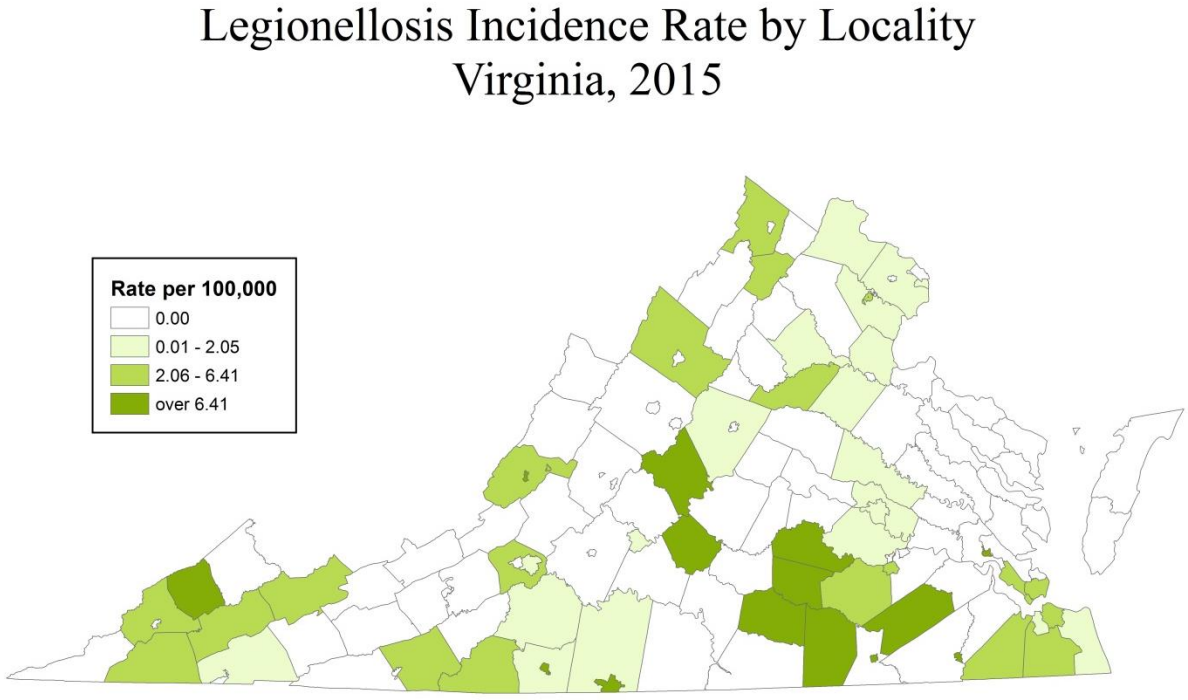


Incidence rates were highest in the southwest region (2.3 per 100,000), followed closely by the eastern region (2.2 per 100,000). Incidence rates ranged from 1.2 to 1.7 per 100,000 among the remaining regions. Geographically, cases were dispersed among localities throughout Virginia (refer to map below). While cases occurred throughout the year, seasonality was apparent with 35% of cases occurring in the third quarter of the year.

Information on overnight travel was obtained for 124 (89%) cases reported in 2015. Of those, 25 (20%) reported spending at least one night away from home in the 10 days prior to symptom onset, including 10 who reported staying in a hotel. Information on exposure to a healthcare setting was obtained for 121 (87%) cases. Of those, 23 (19%) reported spending time in a healthcare setting in the 10 days prior to symptom onset. Healthcare settings include hospitals, long-term care facilities, clinics, or other healthcare settings. Individuals with possible exposure include inpatients, outpatients, visitors, volunteers, or employees of a healthcare setting. Among those reporting a healthcare exposure, 20 (87%) were considered possible exposures, defined as healthcare exposure for only a portion of the 10 days prior to

symptoms, and 3 (13%) were definite exposures, defined as being an inpatient (hospital or long-term care facility) during the entire 10 days prior to symptom onset. All three definite healthcare exposure cases occurred in residents at three different long-term care facilities.

Eight deaths (6%) were attributed to legionellosis in 2015. The deaths occurred in five females and three males and ranged in age from 39 to 92 years. Three deaths each occurred in the central and southwest regions, while one death each occurred in the northern and northwest regions.



Leprosy (Hansen Disease)

Agent: *Mycobacterium leprae* (bacteria)
Mode of Transmission: Person-to-person transmission, probably through inhaling respiratory droplets that are released when a person with the disease coughs or sneezes. Transmission can also occur from exposure to nasal secretions from an infected person.
Signs/Symptoms: A chronic disease with varying symptoms, including skin lesions (tuberculoid leprosy); discolored, flat spots on the skin (lepromatous leprosy); numbness on affected areas of the skin; eye problems; nasal congestion; nosebleeds; and nerve damage. The bacteria that cause this condition grow very slowly and signs and symptoms may take 2-10 years to appear.
Prevention: Early diagnosis and treatment is important. Hand washing when in contact with patients with lepromatous leprosy and disinfection of surfaces contaminated with infectious nasal secretions should be performed until treatment is established.

Two cases of leprosy were reported in Virginia during 2015. Both cases were adult females. One case was a refugee who acquired leprosy while residing in Africa. The second case is thought to have acquired leprosy while residing in India. Both cases were reported from the northwest region of the state. Since 2000, eight cases have been diagnosed in Virginia, averaging less than one case per year for the last five years.

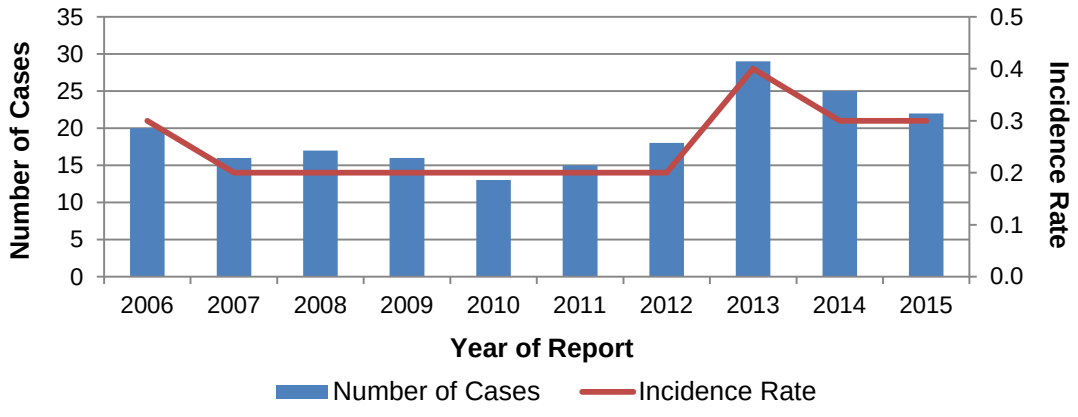
Listeriosis

Agent: *Listeria monocytogenes* (bacteria)
Mode of Transmission: Ingestion of contaminated foods or beverages (e.g., sprouts, soft cheese, unpasteurized milk). Transmission can also occur from mother to fetus if the mother consumes a contaminated food item/beverage during pregnancy.
Signs/Symptoms: Typically, fever, headache, muscle aches, and sometimes gastrointestinal symptoms, such as nausea, diarrhea, and vomiting. Infection can lead to serious disease, including shock and inflammation of the brain and the fluid surrounding the brain and spinal cord (i.e., meningitis). Among infected pregnant women, miscarriage, stillbirth, premature delivery, or neonatal infection may occur.
Prevention: Preventive measures include safe food preparation (e.g., thoroughly cooking or reheating food from animal sources and washing raw fruits and vegetables) and avoiding raw (unpasteurized) milk and milk products. Persons at higher risk for disease should avoid soft cheeses (unless labeled as made with pasteurized milk), refrigerated smoked seafood (unless contained in a cooked dish), and hot dogs and other deli/luncheon meats (unless heated until steaming hot just before serving).
Other Important Information: Persons at higher risk include pregnant women and their unborn babies and newborns, older adults, and persons with weakened immune systems.

Listeriosis: 2015 Data Summary	
Number of Cases:	22
5-Year Average Number of Cases:	20.0
% Change from 5-Year Average:	+10%
Incidence Rate per 100,000:	0.3

Twenty-two cases of listeriosis were reported in Virginia during 2015. This is slightly less than the 25 cases reported in 2014, but higher than the 5-year average of 20.0 cases per year. The statewide incidence rate was 0.3 cases per 100,000, which remained unchanged from 2014 (Figure 44). Incidence rates in Virginia are similar to rates observed nationally, with a U.S. rate of 0.2 cases per 100,000 reported by CDC in 2014.

Figure 44. Listeriosis: Ten-Year Trend for Number of Cases and Incidence Rate, Virginia, 2006-2015



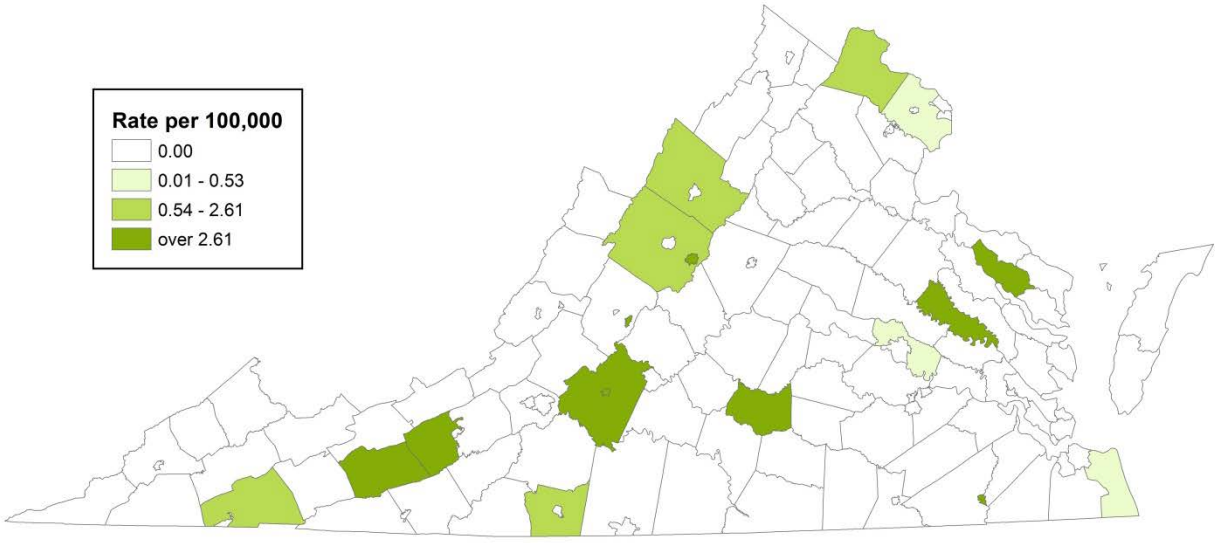
Consistent with the national trend, the 60 year and older age group had the highest number of listeriosis cases in 2015, with 14 cases and an incidence rate of 0.9 per 100,000 population. However, the highest incidence rate reported among all age groups occurred among infants (2 cases, 1.9 per 100,000). The 30-39, 40-49, and 50-59 year age groups had between one and three cases each; no cases were reported in any other age group.

Race was reported for all cases. Incidence rates were similar across all race populations, with 0.3 per 100,000 in the white and "other" race populations, and 0.2 per 100,000 in the black population. Incidence was slightly higher among females compared to males (0.3 and 0.2 per 100,000, respectively).

Geographically, the southwest region had the highest incidence rate at 0.4 per 100,000. The remaining regions had similar rates, ranging from 0.1 to 0.3 per 100,000. Incidence rates by locality can be viewed in the map below. Although cases occurred throughout the year, 41% of cases occurred in the fourth quarter of 2015.

During 2015, all 22 listeriosis cases resulted in hospitalization, including two adult females who died. Two infant cases of listeriosis were associated with pregnancy in 2015.[i]

Listeriosis Incidence Rate by Locality
Virginia, 2015



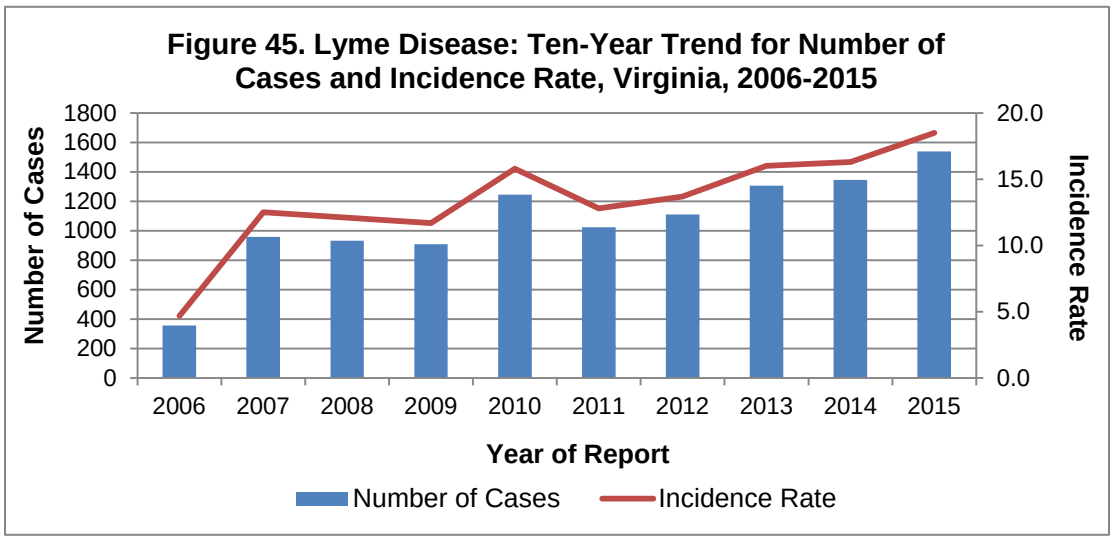
[i] Per case definitions established by the Council of State and Territorial Epidemiologists, confirmed listeriosis cases must be positive for *Listeria monocytogenes* by laboratory testing. For each mother-infant pair reported in Virginia during 2015, the illness in the infant was counted as a listeriosis case, as lab specimens from each infant were positive for *Listeria monocytogenes*. Presumably the infection in each infant resulted from a contaminated food or beverage item the mother consumed; however, specimens were not collected from either mother and the mothers' illnesses were not counted as cases. Conversely, the Centers for Disease Control and Prevention *Listeria* Initiative Program counts the mother's illness as the case for mother-infant pairs, in recognition that the exposure likely occurred in the mother.

Lyme Disease

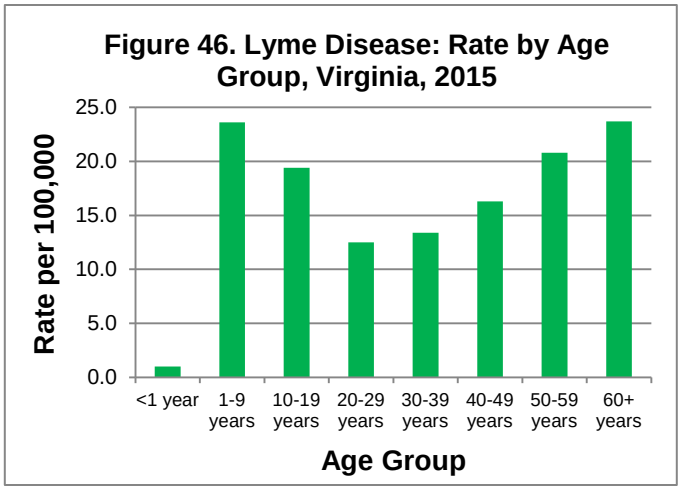
Agent: *Borrelia burgdorferi* (spirochete bacteria)
Mode of Transmission: Transmitted to humans through the bite of infected nymph or adult blacklegged ticks (formerly known as deer ticks). No other tick species plays a role in Lyme disease transmission to humans in the eastern United States. Infected ticks must bite a person and remain attached for a minimum of 30 to 36 hours to be able to transmit the bacteria.
Signs/Symptoms: Initial symptoms include fever, headache, fatigue, joint pains, swollen glands, chills and a characteristic "bulls-eye" skin rash called erythema migrans, or EM rash. If untreated, infection can progress to affect a person's joints, heart or nervous system.
Prevention: Minimize tick bites by avoiding tick habitats such as humid forest environments with dense undergrowth or heavy forest leaf litter, as well as low vegetative ground cover along shady forest margins, tree lines, forest trails and forest clearings. Repellents containing DEET, Picaridin, BioUD, IR3535, or oil of lemon eucalyptus as active ingredients are effective against ticks and should be applied to exposed areas of skin before entering tick habitats. When in tick-prone habitats, light-colored clothing should be worn with pants legs tucked into socks and shirts tucked into pants, and permethrin-based repellants should be applied to clothing, socks and shoes. After visiting tick-prone habitats, a person should thoroughly check all body surfaces for ticks and, if found, attached ticks should be removed carefully as soon as possible. Pets should also be examined for ticks; pets can bring ticks into the home and are also susceptible to disease.
Other Important Information: Lyme disease is diagnosed based on symptoms, physical findings (e.g., rash), and laboratory evidence of infection. The EM rash is the only physical manifestation/symptom that is distinctive enough to allow a diagnosis in the absence of laboratory testing. The EM rash causes little or no sensation, and may be missed or overlooked in up to 30% of persons with Lyme disease, particularly if it occurs on a part of the body that is difficult to observe.

Lyme Disease: 2015 Data Summary	
Number of Cases:	1,539
5-Year Average Number of Cases:	1,206.2
% Change from 5-Year Average:	+28%
Incidence Rate per 100,000:	18.5

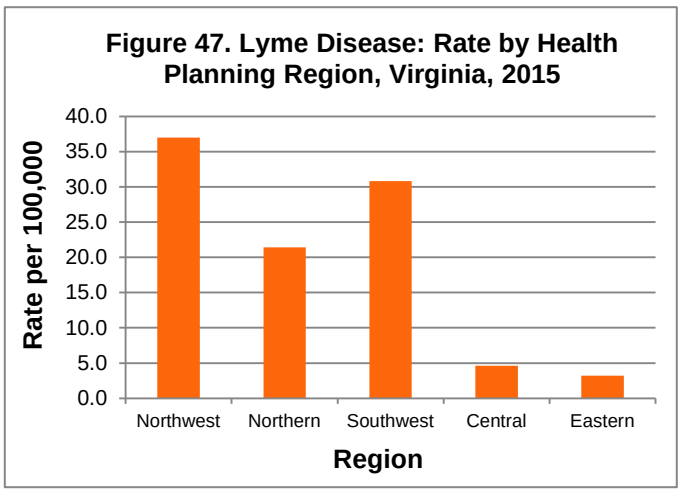
During 2015, 1,539 cases of Lyme disease were reported in Virginia, which represented a 14% increase from the 1,346 cases reported in 2014, and a 28% increase from the five-year average of 1,206.2 cases per year (Figure 45). The dramatic increase in the number of reported Lyme disease cases since 2006 is attributable to an increase in Lyme disease occurrence, increased case follow-up by local health departments, and a change from voluntary to mandatory reporting of Lyme-positive findings by laboratories. The increase in incidence beginning in 2007 appears to be linked mainly to suburbanized areas around towns and cities. Suburbanization can enhance the environment for white-tailed deer, which are crucial for tick reproduction, and suburban forests appear to favor populations of white-footed mice, which play an important role in transmission of the Lyme disease agent to ticks. As land becomes suburbanized, deer hunting activities decrease and deer populations increase. Suburban developments may also bring the human population into more frequent contact with forested tick habitats.



In 2015, there was a bimodal distribution of cases by age group, with the highest incidence rate in the 60 year and older and 1-9 year age groups (23.7 and 23.6 per 100,000, respectively), followed by the 50-59 age group (20.8 per 100,000) (Figure 46). This bimodal age distribution for Lyme disease is typical of what is observed in other Lyme-endemic regions of the United States.

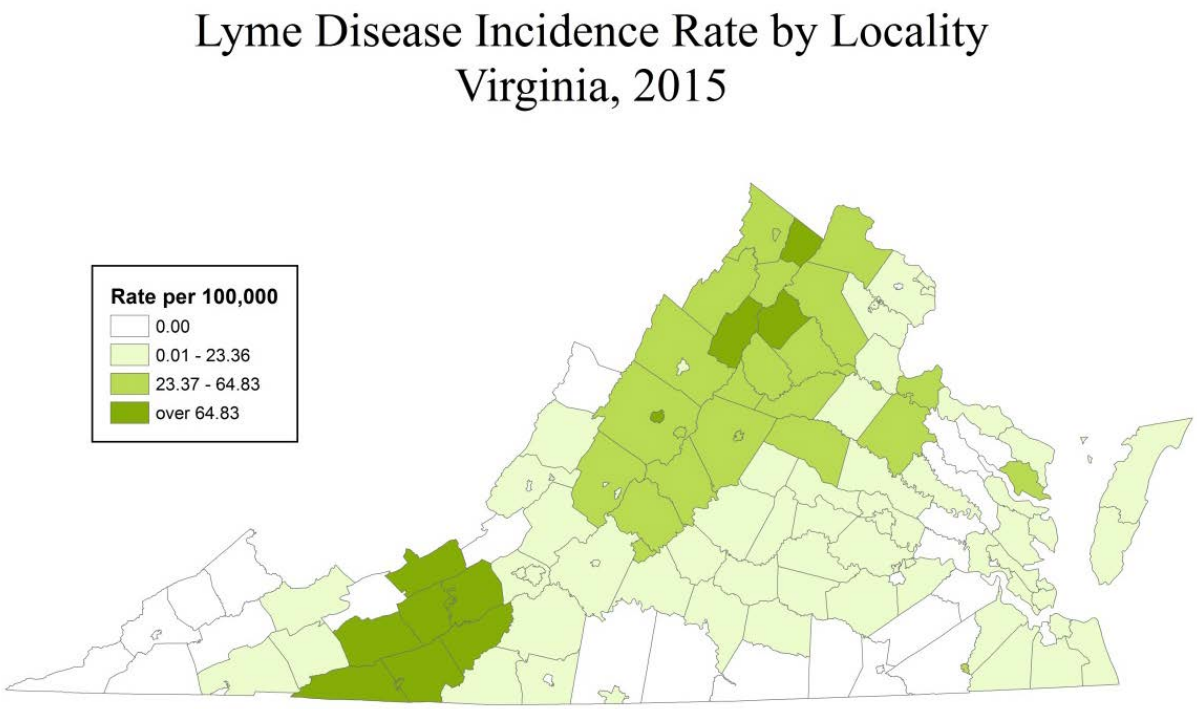


Race was provided for 51% of reported cases. Among those with a known race, the white population had the highest incidence rate (12.1 cases per 100,000), followed by the "other" race population (4.9 per 100,000), and the black population (1.4 per 100,000). Racial differences may be related in part to differences in access to healthcare for diagnosis, variation in exposure to suburban and rural tick habitats, and potentially easier detection of the EM rash in individuals with lighter skin pigmentation. Incidence was higher in males than females (20.7 and 16.4 per 100,000, respectively).



Cases were reported from all regions of the state; however, the highest incidence rate occurred in the northwest region (37.0 per 100,000), followed by the southwest region (30.8 per 100,000) and the northern region (21.4 per 100,000) (Figure 47). Incidence rates in the eastern and

central regions were much lower, with the eastern region having the lowest incidence of Lyme disease in Virginia. A comparison of incidence rates by locality can be viewed in the map below. Although Lyme disease cases were reported in every quarter during 2015, there was a seasonal pattern, with 38% of cases occurring in the second quarter and 37% in the third quarter. This pattern is correlated with the period when the majority of nymph stage blacklegged ticks, the primary vectors of Lyme disease, are actively feeding.



Lymphogranuloma Venereum

Agent: Specific strains of the bacterium *Chlamydia trachomatis*
Mode of Transmission: Sexually transmitted through direct contact with the lesions of an infected person.
Signs/Symptoms: Ulcerative lesions on the penis or vulva, inflammation of the lymph nodes in the genital area, or rectal ulcers. Fever, chills, headache, anorexia, and joint pain may also be present. Some infections are asymptomatic, especially in females.
Prevention: Preventive measures include adhering to safe sexual practices.
Other Important Information: Lymphogranuloma venereum has historically been rare in developed countries. Recent outbreaks have occurred in Europe and North America, primarily among men who have sex with men.

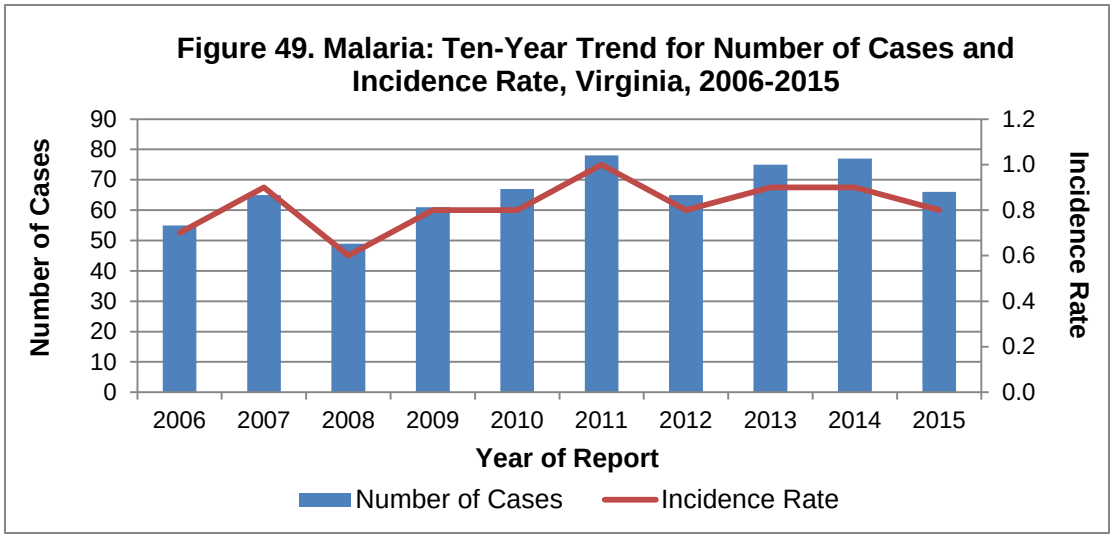
No cases of lymphogranuloma venereum were reported in Virginia in 2015. The last two reported cases occurred in 2005.

Malaria

Agent(s): Four different species of protozoan parasites: *Plasmodium falciparum*, *Plasmodium vivax, Plasmodium ovale,* and *Plasmodium malariae*
Mode of Transmission: Transmission through the bite of an infected female *Anopheles* mosquito. Transmission might also occur from infected mother to child during pregnancy or delivery, by blood product transfusion or through transplanted organs from infected donors. Humans and certain *Anopheles* mosquito species are the only natural reservoirs for malaria.
Signs/Symptoms: Typically, high fever, chills, sweats, severe headache, muscle and joint pain, anorexia, nausea, flu-like illness, anemia and an enlarged spleen. *P. falciparum* infections may progress to severe malaria if not treated promptly; symptoms include acute alteration of brain structure and function (i.e., cerebral malaria), severe anemia, jaundice, renal failure and coma.
Prevention: Appropriate medication for malaria prophylaxis should be taken by travelers when traveling to malaria-endemic countries. Anopheline mosquitoes bite only at dusk, dawn or during night-time hours and tend to enter buildings. Control measures include staying in structures with adequate screening and bed nets, and when outdoors, wearing long-sleeved, loose-fitting, light-colored clothing and mosquito repellents.
Other Important Information: Almost all infections reported in Virginia occur in persons who were infected in other countries. Although malaria is not endemic to Virginia, it may be brought to this region by travelers or immigrants with dormant or inapparent infections. Malaria might also arrive in Virginia with infected mosquitoes transported in aircraft or ships arriving from foreign destinations. Two potential mosquito vectors for malaria are present in Virginia: *Anopheles quadrimaculatus* and *An. punctipennis*.

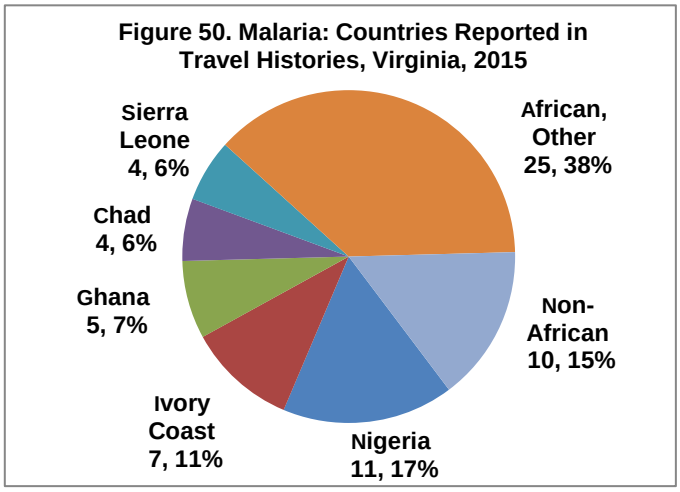
Malaria: 2015 Data Summary	
Number of Cases:	66
5-Year Average Number of Cases:	72.4
% Change from 5-Year Average:	-9%
Incidence Rate per 100,000:	0.8

In 2015, 66 cases of malaria were reported in Virginia. This represents a 14% decrease from the 77 cases reported in 2014, and a 9% decrease from the five-year average of 72.4 cases per year (Figure 49). Incidence rates were highest in the 30-39 year age group (1.3 per 100,000), followed by the 10-19, 40-49 and 50-59 year age groups (0.9 per 100,000 each). Incidence among the remaining age groups ranged from 0.2 to 0.7 per 100,000, with no cases occurring in infants. Race was reported for 88% of cases. For cases with a known race, the incidence rate in the black population (2.5 per 100,000) was higher than the rate for the "other" race population (1.4 per 100,000) and the white population (0.1 per 100,000). Males had a higher incidence rate than females (1.1 and 0.5 per 100,000, respectively).



The majority of cases (65%) and the highest incidence rate (1.8 per 100,000) were reported from the northern region, which is more than twice the statewide rate of 0.8 per 100,000. Incidence by locality can be viewed in the map below. Cases occurred throughout the year. Malaria is almost always acquired outside the U.S.; therefore, any observed temporal patterns are related to patterns of travel to endemic countries.

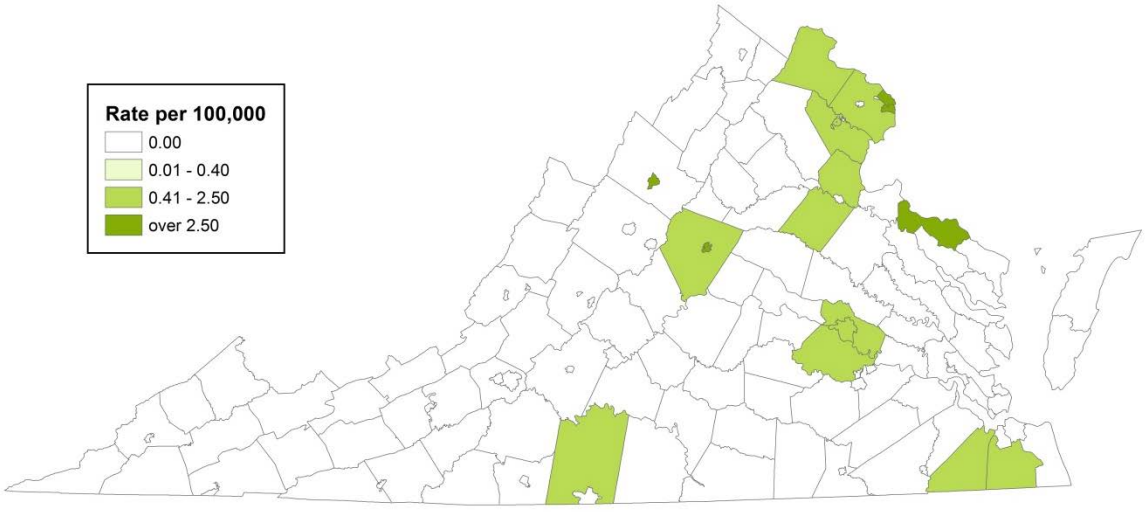
All cases were associated with a history of travel outside the U.S. within the two years prior to disease onset. The majority (85%) had visited countries on the African continent. The African countries most frequently referenced include Nigeria (11 cases), Ivory Coast (7 cases), Ghana (5 cases) and Chad and Sierra Leone (4 cases, each) (Figure 50). The non-African countries most frequently mentioned in travel histories include India (4 cases) and Guatemala (2 cases).



The parasitic species of *Plasmodium* was identified in 52 cases reported with malaria in 2015. Specifically, 67% were infected with *P. falciparum*, 11% with *P. vivax*, and 2% with *P. ovale.* Species was not reported for the remaining 14 cases.

Information on malaria prophylaxis usage was obtained for 51 cases. Of these, 25% (13 individuals) reported receiving prophylaxis for malaria, and 8 of the 13 reported missing at least one dose. No deaths occurred from malaria in 2015.

Malaria Incidence Rate by Locality
Virginia, 2015



Measles

Agent: Measles virus
Mode of Transmission: Primarily person-to-person transmission by inhalation of respiratory droplets or direct contact with nasal or throat secretions of infected people; however, airborne transmission via aerosolized droplet nuclei has been documented.
Signs/Symptoms: Fever, cough, conjunctivitis, coryza (inflammation of the mucous membrane inside the nose), and a typical rash on the third to seventh day after onset of symptoms.
Prevention: Measles vaccine should be given as part of the measles, mumps, and rubella (MMR) series beginning at 12-15 months of age followed by a second dose at age 4-6 years. Infants <12 months of age traveling internationally should be vaccinated with an additional dose if at least 6 months of age.
Other Important Information: Measles is highly communicable, with secondary attack rates greater than 90% among susceptible people who have close contact with the infected person. Measles elimination has been maintained in the United States since it was declared no longer endemic in 2000. Measles remains endemic in parts of the world, but progress is being made toward elimination as demonstrated by a 67% decrease in reported cases from 2000-2013. Imported cases, many that originate in Asia and Europe, continue to occur in U.S. residents who were exposed while traveling abroad and by persons visiting the United States. As cases are imported and can be costly to control, it is important for individuals planning international travel to be aware of their immune status and obtain a vaccination if necessary.

Measles: 2015 Data Summary	
Number of Cases:	1
5-Year Average Number of Cases:	2.4
% Change from 5-Year Average:	-58%
Incidence Rate per 100,000:	0.0

In 2015, one case of measles was reported in Virginia. This represents the second consecutive year measles has been reported in the state. In the previous five years, cases were reported in 2014 (two cases), 2011 (seven cases), and 2010 (three cases).

The one reported case in 2015 occurred in an adult male following international travel. Vaccination status was unknown for this individual. The case was reported from the northern region and resulted in a multi-jurisdictional response including other states.

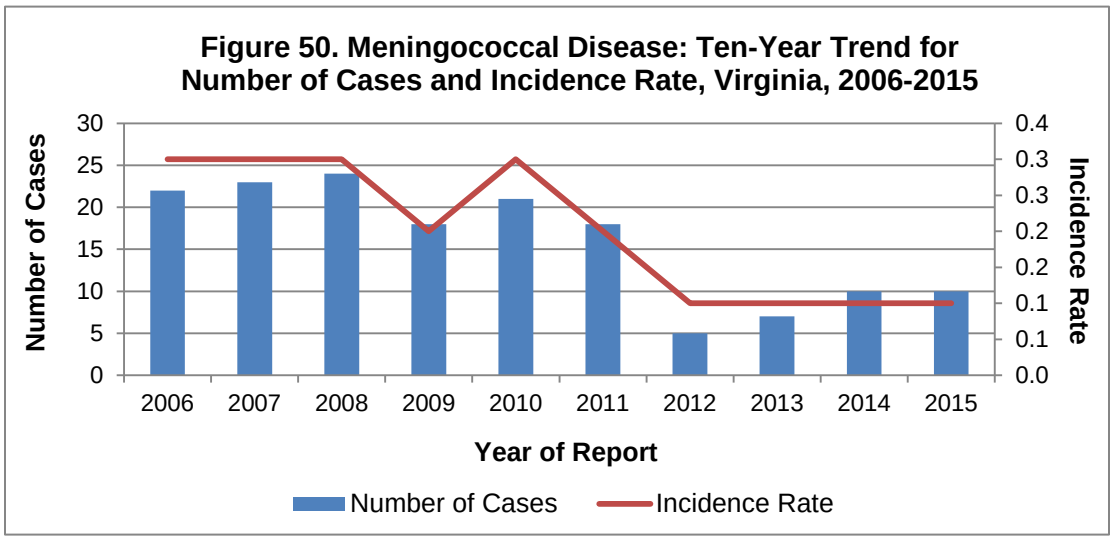
Nationally, 189 cases of measles were reported in 2015 from 24 states. Over half of these cases were linked to a large outbreak that began in 2014 at an amusement park in California. This outbreak continued through April of 2015 and included epidemiologically linked cases in six other states (Arizona, Colorado, Nebraska, Oregon, Utah, and Washington) and two other countries (Canada and Mexico). The multi-jurisdictional spread of this outbreak emphasized the importance of maintaining high immunization rates with MMR vaccine and how vaccine coverage can vary at a local level.

Meningococcal Disease

Agent: *Neisseria meningitidis* (bacteria)
Mode of Transmission: Transmission occurs through contact with respiratory droplets from the nose or throat of an infected person (e.g., through coughing or kissing).
Signs/Symptoms: Meningitis is the most common presentation of invasive disease and includes sudden onset of fever, headache, and stiff neck, and often nausea, vomiting, sensitivity to light, and confusion. A rash may be present. A bloodstream infection may also occur (without meningitis), leading to abrupt onset of fever and a rash; it is often associated with shock and multi-organ failure. Less commonly, meningococcal disease can lead to pneumonia, arthritis, middle ear infections, or inflammation of the epiglottis.
Prevention: Almost all invasive disease is caused by one of five serogroups (A, B, C, W, and Y), with serogroups B, C and Y causing the majority of meningococcal disease cases in the United States. The Advisory Committee on Immunization Practices (ACIP) recommends routine vaccination with a quadrivalent (protects against serogroups A, C, W, and Y) meningococcal conjugate vaccine for adolescents 11-12 years of age, with a booster dose at 16 years. Vaccination is also recommended for certain other groups at increased risk for meningococcal disease. In October 2014, the FDA approved the first serogroup B vaccine as a three-dose series. ACIP recommends use of a serogroup B meningococcal vaccine in certain persons aged 10 years or older who are at increased risk for meningococcal disease. Vaccination is also recommended to control outbreaks.
Other Important Information: Crowding, exposure to tobacco smoke, and concurrent upper respiratory tract infections increase the risk of disease. Individuals with certain medical conditions, such as complement component deficiency (immunodeficiency disorders) and asplenia (no spleen), are also at increased risk for disease. Meningococcal disease is more commonly diagnosed among infants, adolescents, and young adults than other age groups. Five to ten percent of people carry *N. meningitidis* in their nose without having any symptoms of disease; those who develop the disease are usually infected by a carrier who does not have symptoms. The case-fatality for meningococcal disease is eight to fifteen percent, even with appropriate antibiotic therapy.

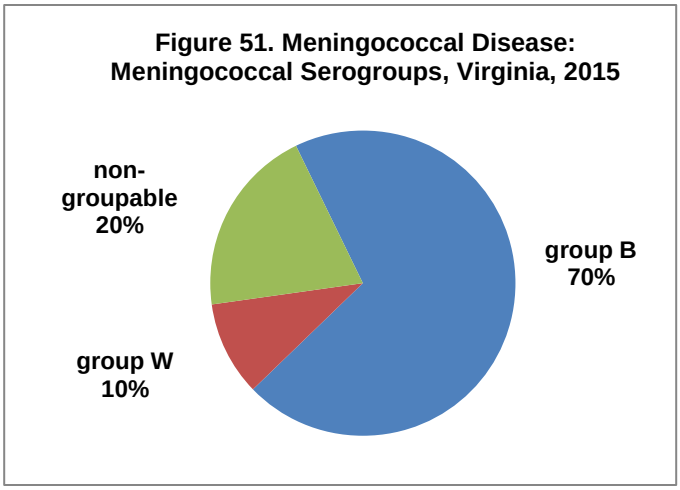
Meningococcal Disease: 2015 Data Summary	
Number of Cases:	10
5-Year Average Number of Cases:	12.2
% Change from 5-Year Average:	-18%
Incidence Rate per 100,000:	0.1

During 2015, ten cases of meningococcal disease were reported in Virginia, with a statewide incidence rate of 0.1 per 100,000 population (Figure 50). The number of cases reported in 2015 remained unchanged from 2014, and represents an 18% decrease from the five-year average of 12.2 cases per year. Rates of meningococcal disease have been declining in the U.S. and Virginia over the last two decades.



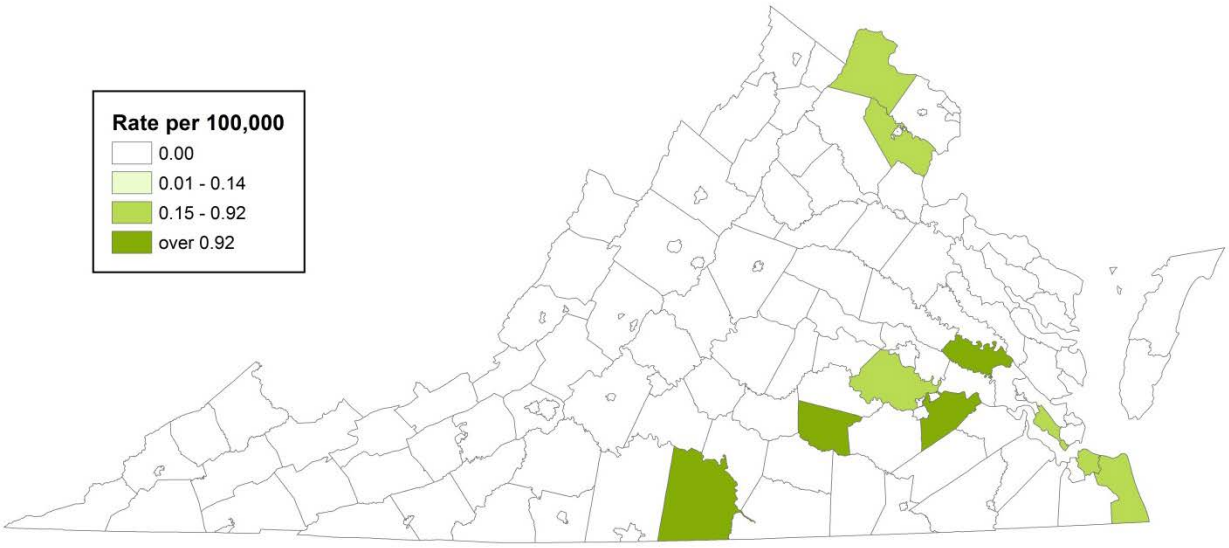
In Virginia, the 10-19 year age group accounted for three cases and an incidence rate of 0.3 cases per 100,000 persons. The 30-39 and 60 year and older age groups each accounted for two cases and incidence rates of 0.2 and 0.1 per 100,000, respectively. The remaining three cases occurred in the less than 1 year, 1-9 and 50-59 year age groups. Race information was provided for 90% of the reported cases. Eight cases occurred in the white population, resulting in an incidence rate of 0.1 per 100,000. One case was reported in the black population, and one case was reported with unknown race. The incidence rate among males and females was similar (0.1 per 100,000, respectively).

Five cases were reported from the central region (0.4 per 100,000), three cases from the eastern region (0.2 per 100,000) and two cases from the northern region (0.1 per 100,000). No cases were reported from the northwest or southwest regions. See the map below for incidence rates by locality; the ten cases were all reported from different localities. While cases occurred throughout the year, 40% were reported during the third quarter.



Serogroup was reported for eight of the ten (80%) cases. Group B was the most common serogroup identified (seven cases, 70%). One case (10%) was serogroup W, and two (20%) cases were non-groupable (Figure 51). Vaccination with a quadrivalent meningococcal vaccine was reported for one individual, and the case was linked to disease caused by serogroup B. Of the remaining nine cases, vaccination status was reported as unknown except for one which was reported as receiving no vaccine. Three deaths were attributed to meningococcal disease in 2015, including one death each in the following age groups: 1-9 years, 10-19 years, and 50-59 years. No outbreaks attributed to meningococcal disease were reported in 2015 in Virginia.

Meningococcal Disease Incidence Rate by Locality
Virginia, 2015



Monkeypox

Agent: Monkeypox virus (genus *Orthopoxvirus*)
Mode of Transmission: Transmission to humans from an infected animal by bite or direct contact with lesions or body fluids. Though less common, infection can be transmitted directly from person to person by respiratory droplets or contact with body fluids of an infected person, or indirectly by contact with virus-contaminated objects, such as bedding.
Signs/Symptoms: Similar to smallpox, though more mild. Initial symptoms include fever, headache, backache, sore throat, cough and swollen lymph nodes. Three days after fever onset, a rash develops.
Prevention: Contact with exotic or wild mammals that originate from areas where monkeypox has occurred should be avoided.
Other Important Information: Monkeypox is a rare disease that occurs primarily in central and western Africa. The condition was first discovered in 1958 when two outbreaks of a pox-like disease occurred in monkeys being kept for research in a facility in Denmark. The first case recorded in humans occurred in the Democratic Republic of Congo in 1970. Monkeypox has been reported in humans in other African countries. In 2003, a monkeypox outbreak in the United States was identified among persons exposed to native prairie dogs that had contact with imported African rodents previously infected with the virus.

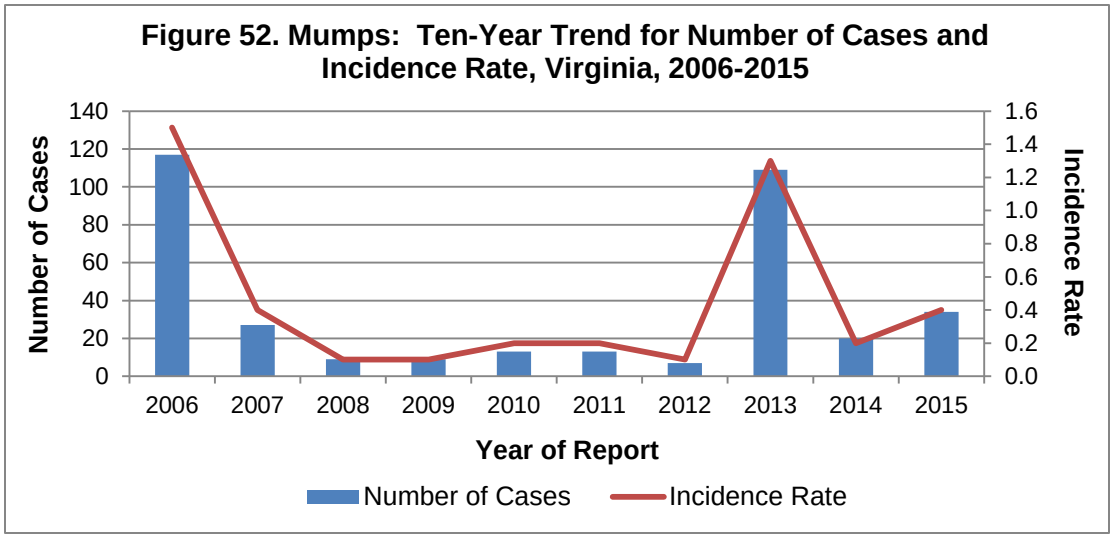
Monkeypox became a reportable disease in Virginia in 2004. No cases of monkeypox have ever been reported in Virginia.

Mumps

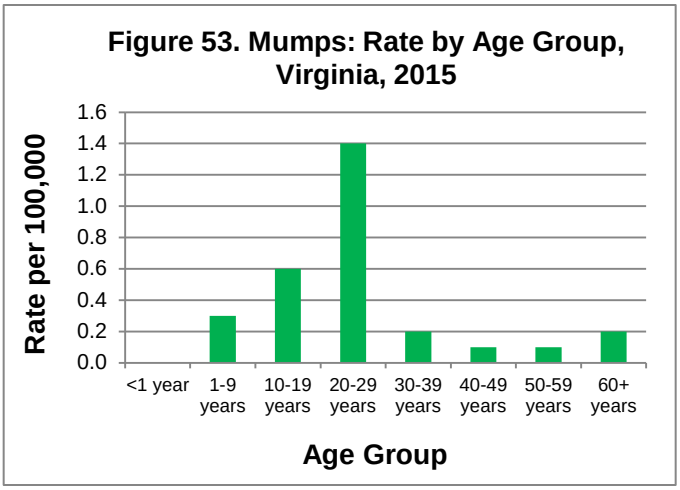
Agent: Mumps (virus)
Mode of Transmission: Person-to-person transmission through respiratory droplets, as well as through direct contact with saliva of an infected person.
Signs/Symptoms: Fever, swelling and tenderness of one or more salivary glands. Mumps infection may present with only nonspecific or primarily respiratory symptoms and as many as 20% of mumps infections are asymptomatic. Serious complications are rare but can occur in the absence of parotitis (inflammation of salivary glands).
Prevention: Vaccination, preferably as measles-mumps-rubella (MMR) vaccine, should be administered beginning at age 12 months. Two doses of mumps-containing vaccine are recommended for school-aged children, healthcare workers, international travelers, and college students. Although MMR vaccine is very effective, it does not provide complete protection against mumps. Two doses are 88% effective at protecting against mumps; one dose is 78% effective. Outbreaks can still occur in highly vaccinated U.S. communities, particularly in close-contact settings. However, high vaccination coverage helps limit the size, duration, and spread of mumps outbreaks.
Other Important Information: In 2006, the United States experienced a multi-state mumps outbreak involving more than 6,500 reported cases. This resurgence predominantly affected college-aged students living in the Midwest, but led to college outbreaks in other states. This included Virginia, with cases occurring on multiple college campuses across the state. Between 2011 and 2013, several smaller mumps outbreaks were reported on campuses with high two-dose vaccination coverage in California, Maryland and Virginia. However, these outbreaks had limited spread, and national case counts for these years were at usual levels. The number of mumps cases increased nationally in 2014 with 949 cases reported from 30 states and two cities. Notably, Ohio reported 506 cases in 2014 from a community outbreak that lasted for over nine months.

Mumps: 2015 Data Summary	
Number of Cases:	34
5-Year Average Number of Cases:	32.4
% Change from 5-Year Average:	+5%
Incidence Rate per 100,000:	0.4

Thirty-four cases of mumps were reported in 2015 in Virginia. This is a 5% increase from the previous five-year average, and resulted in a slight increase in the incidence rate to 0.4 cases per 100,000 (Figure 52).

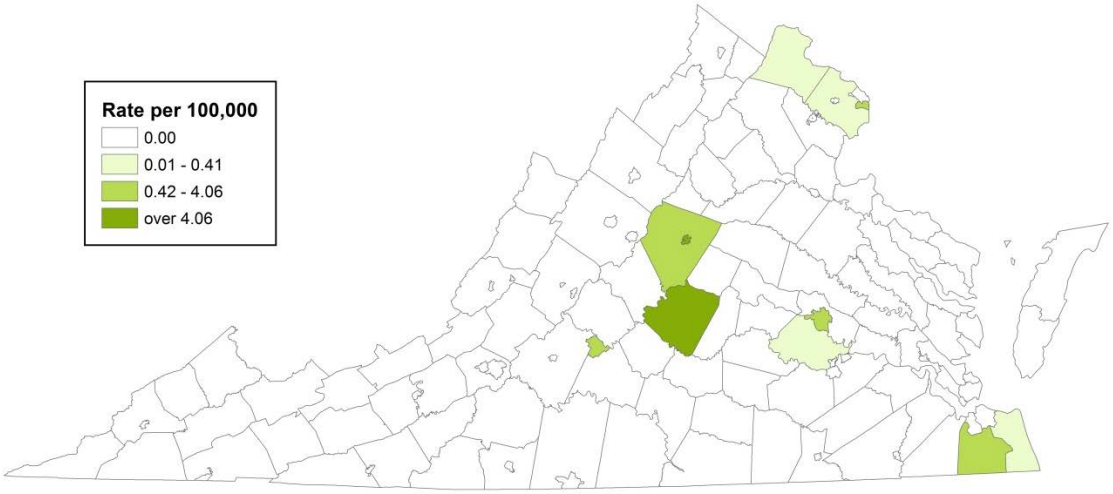


Incidence of mumps was highest among those age 20-29 years with 1.4 cases per 100,000, followed by the 10-19 and 1-9 year age groups (0.6 and 0.3 cases per 100,000, respectively) (Figure 53). Race was reported for 82% of cases. Among those with a known race, incidence was highest among the "other" race population (0.6 cases per 100,000) followed by the white population (0.4 cases per 100,000) and black population (0.1 cases per 100,000). Incidence rates were similar for males and females (0.4 per 100,000, each).



Cases were reported in each region of the state, but were clustered geographically (see map below). The northwest region had the highest incidence rate with 1.7 cases per 100,000. The four remaining regions had incidence rates ranging from 0.1 to 0.2 per 100,000. The increased incidence rate for the northwest region was partially due to an outbreak that occurred in the Charlottesville area, resulting in an incidence rate of 41.7 cases per 100,000 for that locality. Cases were reported throughout the year; however, a majority (68%) had onset during the first quarter, with a peak of 12 cases reported in February.

Mumps Incidence Rate by Locality
Virginia, 2015



Ophthalmia Neonatorum

Agent: *Chlamydia trachomatis* (bacteria) or *Neisseria gonorrhoeae* (bacteria). *C. trachomatis* is more common.
Mode of Transmission: Infants are typically exposed to the organism in the birth canal during childbirth. Rarely, infection during cesarean delivery or in utero may occur.
Signs/Symptoms: Redness or swelling of one or both eyes beginning five to fourteen days after birth.
Prevention: All pregnant women should be screened for chlamydia and gonorrhea. Women who were infected with *C. trachomatis* or *N. gonorrhoeae* in the first trimester of pregnancy should be retested during the third trimester to prevent postnatal infection in the infant. Topical prophylactic agents applied to newborns' eyes are highly effective at preventing development of gonorrhea ophthalmia, but do not always effectively prevent chlamydia ophthalmia.

Ophthalmia Neonatorum: 2015 Data Summary	
Number of Cases:	4
5-Year Average Number of Cases:	7.2
% Change from 5-Year Average:	-44%
Incidence Rate per 100,000:	0.0

In 2015, four infants were reported with ophthalmia neonatorum in Virginia. All four were caused by *C. trachomatis*. Since 2006, 74 cases of ophthalmia neonatorum have been reported in Virginia; eight were caused by *N. gonorrhoeae*, and 66 by *C. trachomatis.*

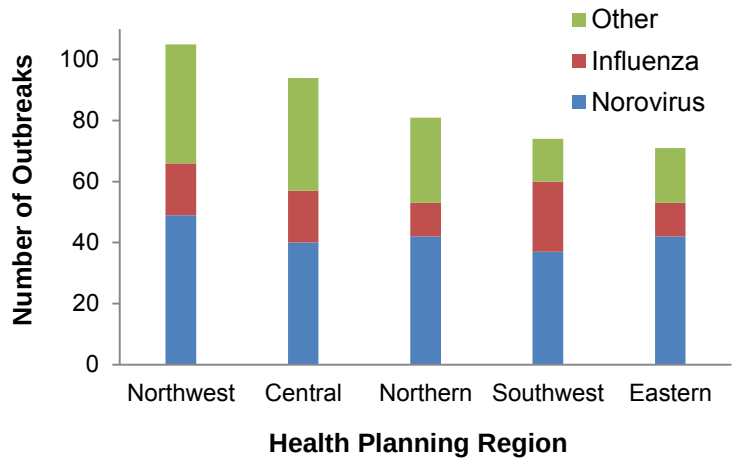
Outbreaks

Introduction

In 2015, a total of 435 outbreaks were reported to the Virginia Department of Health (VDH). Approximately two-thirds of the outbreaks (289, 66%) were suspected or confirmed to be caused by norovirus (210, 48%) or influenza (79, 18%). Other etiologic agents were suspected or confirmed to have contributed to the remaining outbreaks (146, 34%).

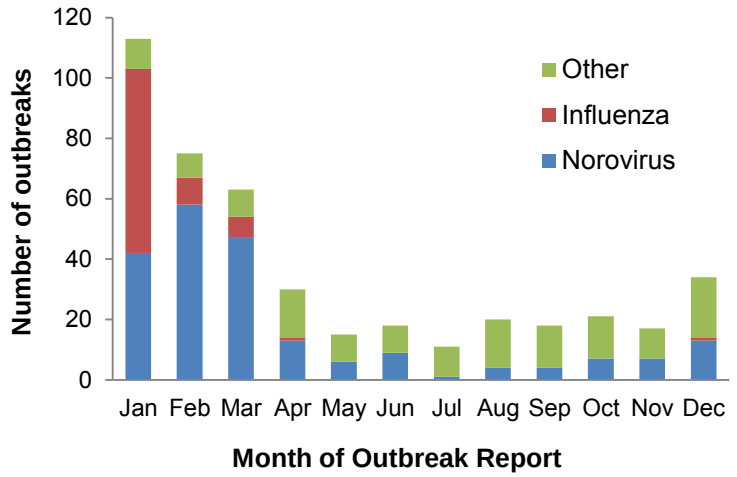
Geographically, 105 (24%) outbreaks were reported from the northwest region, followed in frequency by the central (94 outbreaks, 22%), northern (81 outbreaks, 19%), southwest (74 outbreaks, 17%), and eastern (71 outbreaks, 16%) regions (Figure 54). The VDH Central Office led investigations in 10 multi-state or multi-jurisdictional outbreaks (2%). In addition, VDH provided assistance to the investigations of three out-of-state outbreaks. These three outbreaks were not counted in the 435 Virginia outbreaks for 2015.

Figure 54. Outbreaks by Health Planning Region, Virginia, 2015



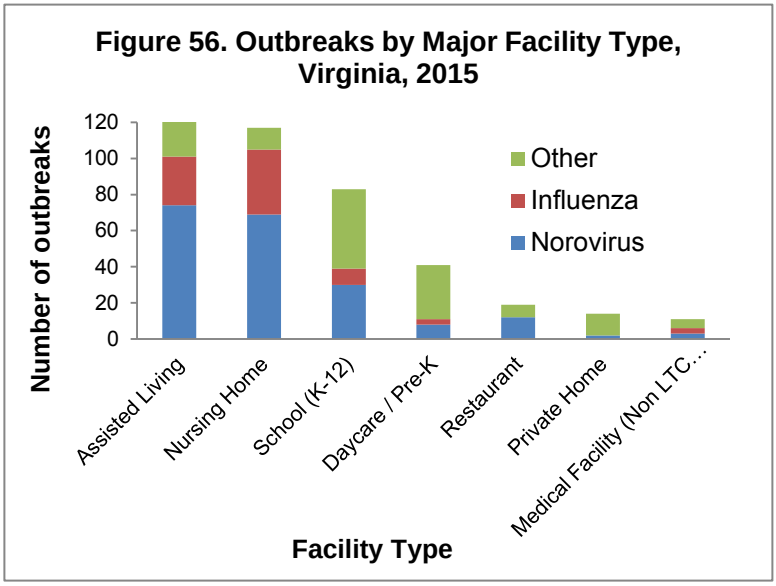
Outbreaks were reported throughout the year in 2015, but more outbreaks were reported in the colder months. Close to three-quarters of outbreaks occurred in January, February, March, April, or December of 2015 (314, 72%). Consistent with previous years, the majority of outbreaks during the colder months were confirmed or suspected to be caused by norovirus or influenza, reflecting the active circulation of these pathogens in colder months (Figure 55).

Figure 55. Outbreaks by Month of Outbreak Report, Virginia, 2015



Senior living facilities reported more than half of all outbreaks in 2015. These outbreaks included 121 (28%) in assisted living facilities and 117 (27%) in nursing homes, followed by 83 (19%) outbreaks in schools (K-12) and 41 (9%) outbreaks

in daycare centers. Outbreaks were also reported from restaurants (19, 4%), private homes (14, 3%), medical facilities (11, 3%), colleges (9, 2%), correctional facilities (8, 2%), camps (3, 1%), independent living facilities (2, 1%), and parks (2, 1%). One outbreak was reported from each of the following settings: adult daycare center, workplace, community event, hotel, and international learning center (Figure 56).



The following sections describe norovirus outbreaks that were transmitted through person-to-person contact, influenza outbreaks, outbreaks transmitted through foodborne, waterborne, or zoonotic mechanisms, vaccine-preventable disease outbreaks, outbreaks that occurred in healthcare facilities, and outbreaks related to other types of illnesses.

Person-to-person Norovirus Outbreaks

Please see the Foodborne Outbreaks section below for a description of norovirus outbreaks that had a foodborne route of transmission.

Norovirus was suspected or confirmed as the cause of 210 (48%) outbreaks in Virginia in 2015. Among these, 195 were transmitted through person-to-person contact and 13 through food. The mode of transmission could not be determined in two outbreaks. The average number of persons who became ill in person-to-person norovirus outbreaks was 34, with a range of 3 to 289 persons.

Person-to-person norovirus outbreaks were reported from all regions of Virginia in 2015. Overall, the most person-to-person norovirus outbreaks were reported from the northwest region (46, 24%), followed by the eastern region (41, 21%), northern region (38, 19%), southwest region (37, 19%), and central region (33, 17%).

The most frequent settings for person-to-person norovirus outbreaks were assisted living facilities (73, 37%), nursing homes (69, 35%) and schools (K-12) (29, 15%). Outbreaks from these three settings accounted for the majority (171, 88%) of all person-to-person norovirus outbreaks in 2015. This distribution pattern was similar to that of 2014, in which 38%, 29%, and 15% of person-to-person norovirus outbreaks occurred at assisted living facilities, nursing homes, and schools (K-12), respectively. Person-to-person norovirus outbreaks also occurred in other types of settings, including daycare facilities (8, 4%), colleges (4, 2%), medical facilities (3, 2%), correctional facilities (2, 1%), and independent living facilities (2, 1%). In addition, a restaurant, camp, hotel, learning center, and private home each reported one person-to-person norovirus outbreak.

Although person-to-person norovirus outbreaks occurred throughout the year in 2015, the majority of these outbreaks occurred in the colder months of January (38, 19%), February (54, 28%), March (45, 23%), April (12, 6%), and December (11, 6%).

Norovirus was confirmed by laboratory testing in over half (109, 56%) of the 195 person-to-person norovirus outbreaks. Sequencing analysis was performed for 65 (60%) of 109 confirmed outbreaks, which revealed that norovirus genotype *Sydney* (55, 85%) predominated among all norovirus with sequencing data in 2015. Other strains identified included *Miami* (4, 6%), *Ascension* (2, 3%), *Southampton* (1, 2%), *Musgrove* (1, 2%), *Kawasaki* (1, 2%), and *Vaals* (1, 2%). Sequencing data were not available for 44 (40%) of the confirmed outbreaks.

In addition to the 195 person-to-person norovirus outbreaks, there were two norovirus outbreaks in 2015 for which the transmission route could not be determined. These two outbreaks occurred in the northern region. One was associated with a restaurant and the other was associated with a school (K–12).

Influenza Outbreaks

After norovirus, influenza (79, 18%) was the most common suspected or confirmed etiologic agent responsible for causing outbreaks in Virginia in 2015. An average of 20 people became ill in each influenza outbreak, with a range of 2 to 91 people.

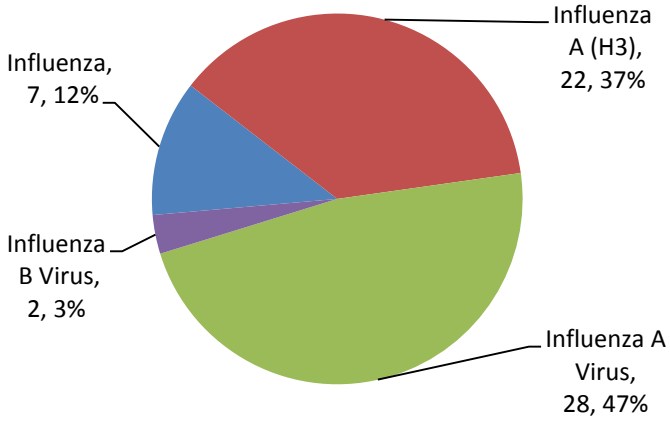
Influenza outbreaks were reported from all regions in Virginia in 2015. The southwest region had 23 (29%) influenza outbreaks, followed by the central (17, 22%), northwest (17, 22%), northern (11, 14%), and eastern (11, 14%) regions.

The majority of influenza outbreaks was reported from nursing home (36, 46%) or assisted living facility (27, 34%) settings in 2015. Schools (K-12) reported 9 (11%) influenza outbreaks, which was a decrease from 2014, during which schools (K-12) reported approximately one-third of all influenza outbreaks. Influenza outbreaks were also occasionally reported by other facilities, including child daycare centers (3, 4%), medical facilities (3, 4%), and an adult daycare center (1, 1%).

The majority of influenza outbreaks (61, 77%) were reported in January 2015. The remaining outbreaks were scattered throughout the following months of 2015: February (9, 11%), March (7, 9%), April (1, 1%), and December (1, 1%).

Among the 79 influenza outbreaks occurring in 2015, 59 (75%) were confirmed by laboratory testing. Influenza A virus predominated in 50 (85%) of these confirmed outbreaks. Specifically, among laboratory-confirmed influenza outbreaks, influenza A (H3) was identified in 22 (37%)

Figure 57. Strain of Influenza Virus in Confirmed Influenza Outbreaks, Virginia 2015



outbreaks, influenza A (not further specified) was identified in 28 (47%) outbreaks, and influenza B was identified in 2 (3%) outbreaks. In addition, influenza was identified by rapid test in another 7 (12%) outbreaks but information on the virus subtype was not available (Figure 57).

For information on influenza outbreaks that occurred in the 2015-2016 influenza season (rather than calendar year 2015, as described above), please see the "Outbreaks" section of the "Influenza" chapter of this annual report.

Foodborne Outbreaks

During 2015, 26 foodborne outbreaks were reported and investigated in Virginia (Table 9). This is similar to the 23 outbreaks reported in 2014. The average number of ill persons per outbreak was 26 and ranged from one to 181. VDH provided assistance in specimen testing for an out-of-state foodborne outbreak in 2015.

Foodborne outbreaks occurred throughout the year from January to December in 2015. Geographically, nine (35%) outbreaks occurred in the central health planning region, followed by five (19%) in the northern, three (12%) in the northwest, two (8%) in the eastern, and 1 (4%) in the southwest regions. In addition, six (23%) outbreaks were multi-state outbreaks that involved cases from Virginia and other states, which doubled the three multi-state outbreaks reported in 2014.

Etiologic agents were confirmed by laboratory testing in 23 (88%) of the 26 foodborne outbreaks. Among the 23 confirmed outbreaks, 12 (52%) were due to bacterial agents, higher than 38% of foodborne outbreaks caused by bacteria in 2014. The remaining 11 (48%) outbreaks were caused by viral agents. Specifically, the 23 confirmed etiologic agents included norovirus (11, 48%), *Salmonella* (5, 22%), *Escherichia coli* (3, 13%), *Campylobacter* (2, 9%), *Clostridium perfringens* (1, 4%), and *Listeria monocytogenes* (1, 4%). Norovirus was suspected in two outbreaks and the etiologic agent was unknown in one outbreak.

Most foodborne outbreaks were associated with food prepared in restaurant (16, 62%) or private home (6, 23%) settings. The remaining outbreak settings included two colleges, one assisted living facility, and one school (K-12). Etiologic agent was detected in bean sprouts in the *Listeria monocytogenes* outbreak. The following food items were suspected in eight outbreaks: green pea salad and salad each were suspected in two norovirus outbreaks; imported frozen raw tuna, imported cucumbers, and chicken each were suspected in three *Salmonella* outbreaks; leafy green vegetables and chicken salad each were suspected in two *Escherichia coli* outbreaks; and pork barbecue was suspected in one *Clostridium perfringens* outbreak. Food items could not be determined in 17 outbreaks.

As generally documented, contributing factors for foodborne outbreaks usually included bare-hand or glove-hand contact by an infected food handler, foods contaminated by a non-food handler who was suspected to be infectious, contaminated raw product that was consumed without undergoing the intended kill step (such as cooking to the required temperature), food intended to be served raw was contaminated, failure to control food temperature or the length of time food was out of temperature control, improper cold holding or hot holding due to improper procedure or protocol, improper/slow cooling, and insufficient time and/or temperature control during initial cooking/heat processing or during reheating.

Table 9. Foodborne Outbreaks Reported in Virginia, 2015

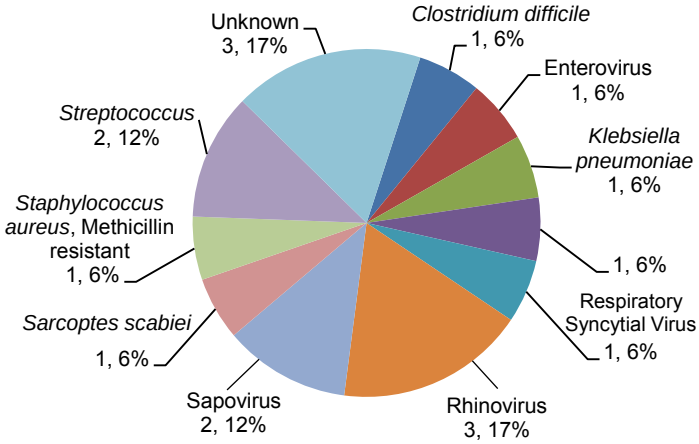
Onset Date	Health District	Number of Cases	Etiologic Agent	Vehicle	Facility Type
Unknown	Multi-state	11 VA 81 US	*Salmonella* Enteritidis	Unknown	Restaurant
6/16/2014	Fairfax and Virginia Beach	2	*Listeria monocytogenes*	Bean sprouts	Private Home
1/4/2015	Southside	20	Norovirus suspected	Unknown	Restaurant
1/10/2015	Virginia Beach	9	Norovirus GII.4 Sydney	Unknown	Restaurant
1/25/2015	Piedmont	181	Norovirus GII.4 Sydney	Unknown	College
1/25/2015	Thomas Jefferson	21	Norovirus suspected	Unknown	Restaurant
1/27/2015	Rappahannock	106	Norovirus GII.4 Sydney	Unknown	Assisted Living
2/2/2015	Henrico	13	Norovirus GII.4 Sydney	Unknown	Restaurant
2/3/2015	Chesterfield	5	Norovirus GII	Unknown	Restaurant
2/8/2015	Fairfax	26	Norovirus GII.4 Sydney	Green pea salad suspected	Private Home
3/1/2015	Henrico	25	Norovirus GII		Restaurant
3/3/2015	Alexandria	9	Unknown	Unknown	Restaurant
3/15/2015	Richmond	34	Norovirus GII.4 Sydney	Unknown	Restaurant
3/31/2015	Multi-state	1 VA 69 US	*Salmonella*	Imported frozen raw tuna suspected	Private Home
4/15/2015	Multi-state	1 VA 7 US	*Escherichia coli*	Leafy green vegetables suspected	Private Home
4/20/2015	Alexandria	7	Norovirus GII.17 CS-E1	Unknown	Restaurant
4/27/2015	Rappahannock	19	*Campylobacter*	Unknown	Restaurant
5/13/2015	Southside	13	Norovirus GII	Salad suspected	Restaurant
6/11/2015	Chesterfield	8	*Escherichia coli*	Unknown	School (K-12)
7/6/2015	Fairfax	3	*Campylobacter*	Unknown	Restaurant
8/5/2015	Chesterfield	7	*Salmonella* Enteritidis	Unknown	Restaurant
8/14/2015	Multi-state	1 VA 907 US	*Salmonella* Poona	Imported cucumbers suspected	Private Home
10/6/2015	Multi-state	1 VA 19 US	*Escherichia coli* O157	Chicken salad suspected	Private Home
10/7/2015	New River	121	*Clostridium perfringens*	Pork barbecue suspected.	College
11/1/2015	Three Rivers	10	*Salmonella* Enteritidis	Chicken suspected	Restaurant
12/27/2015	Alexandria	9	Norovirus	Unknown	Restaurant

Healthcare-Associated Outbreaks

A healthcare-associated outbreak is a group of illnesses with a common etiology among patients, residents, or staff in a healthcare setting (e.g., hospital, medical center, nursing home, physician's office, dialysis center, or other healthcare facility), where the illness is associated with that setting. Note that prior to 2008, only outbreaks that occurred in hospitals and nursing homes (facilities meeting the definition of a medical care facility in 12VAC5-90-10) were included in these statistics.

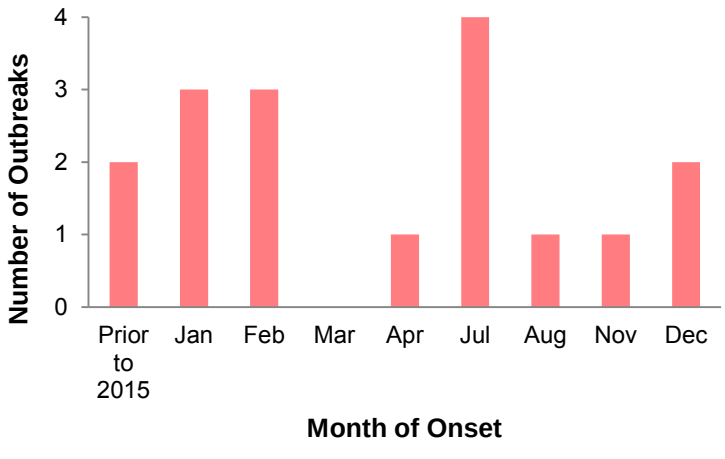
During 2015, 17 healthcare-associated outbreaks with suspected or confirmed etiologic agents other than norovirus or influenza were reported in Virginia. This is 37% lower than the 27 non-norovirus, non-influenza outbreaks reported from healthcare facilities in 2014. The average number of ill persons per healthcare-associated outbreak in 2015 was 25, and ranged from two to 41 persons. The majority of healthcare-associated outbreaks occurred in nursing homes (12, 71%) and the remaining outbreaks (5, 29%) occurred in medical facilities, including three hospitals, a dialysis center, and a treatment center for youth.

Figure 58. Healthcare-Associated Outbreaks: Etiologic Agent Confirmed or Suspected, Virginia, 2015



The majority of the healthcare-associated outbreaks (15, 88%) were attributed to person-to-person transmission. The route of transmission could not be determined in two outbreaks (11%). Etiologic agents were confirmed in 10 (59%) of the outbreaks, suspected in 4 (24%) and unknown in 3 (18%). Specifically, rhinovirus was confirmed in three outbreaks and sapovirus in two outbreaks, respectively. *Clostridium difficile*, *Klebsiella pneumoniae*, respiratory syncytial virus, methicillin resistant *Staphylococcus aureus*, and *Streptococcus* were each responsible for one confirmed outbreak (Figure 58). In addition, *Sarcoptes scabiei* (scabies), *Streptococcus*, and enterovirus were each suspected in one outbreak, and in another outbreak, multiple organisms were suspected but none was confirmed.

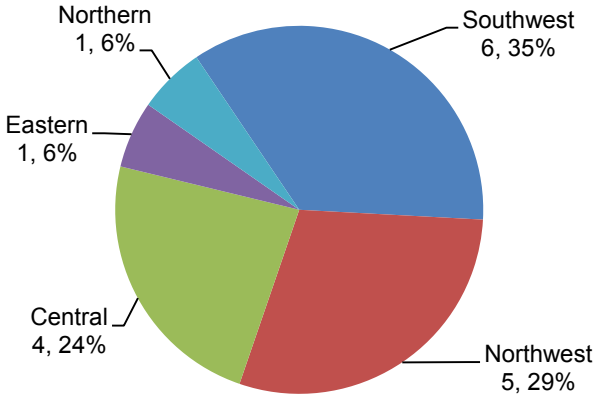
Figure 59. Healthcare-Associated Outbreaks: Month of Onset, Virginia, 2015



Healthcare-associated outbreaks were reported throughout the year and did not show particular seasonality in 2015 (Figure 59), while in 2014 more than half (59%) of healthcare-associated outbreaks had onsets in the summer time between May and September.

In 2015, healthcare-associated outbreaks were reported most frequently from the southwest (6, 35%), northwest (5, 29%) and central (4, 24%) regions. The eastern (1, 6%) and northern (1, 6%) regions each reported one healthcare-associated outbreak from their respective regions (Figure 60).

Figure 60. Healthcare-Associated Outbreaks: Region of Occurrence, Virginia, 2015



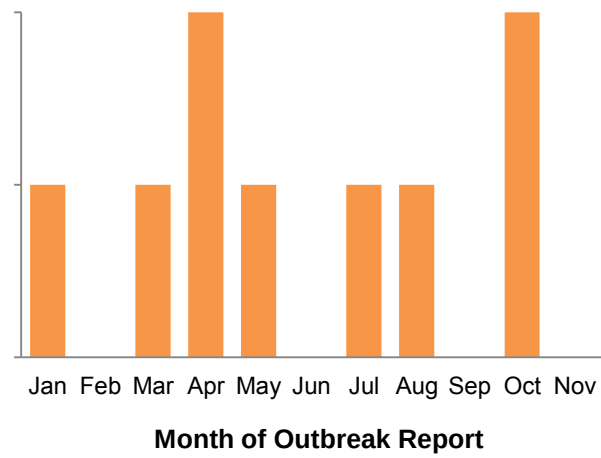
Vaccine-Preventable Disease Outbreaks

During 2015, a total of 15 vaccine-preventable disease outbreaks were reported in Virginia. This is similar to 2014, when 17 outbreaks were reported. Of these 15 outbreaks, pertussis was confirmed in 10 outbreaks, mumps and varicella each was confirmed in one outbreak, and varicella was suspected in three outbreaks.

The average number of ill persons per outbreak in the 10 pertussis outbreaks was 13, with a range from two to 78 persons. Nine (90%) of the 10 pertussis outbreaks occurred in schools (K-12) and one (10%) occurred in a daycare center.

Pertussis outbreaks occurred fairly evenly throughout the year, with one outbreak in each of the following months: January, March, May, July, August, and December. April and October each had two pertussis outbreaks (Figure 61).

Figure 61. Pertussis Outbreaks: Month of Onset, Virginia, 2015



In 2015, the northern and northwest regions of the state had substantially more pertussis outbreaks (9, 90%) than other regions. This is similar to 2014, in which 13 (81%) outbreaks occurred in these two regions. In 2015, the northwest region reported the most pertussis outbreaks (8, 80%) while the northern region reported one pertussis outbreak (1, 10%). In addition, the eastern region reported one pertussis outbreak (1, 10%). Pertussis outbreaks were not reported in the central and the southwest regions in 2015.

Four chickenpox outbreaks, one confirmed and three suspected, were reported in 2015. This is higher than the one chickenpox outbreak in 2014. Chickenpox outbreaks occurred in two separate correctional facilities, one in the eastern region (confirmed) and the other in the northwest region (suspected). In addition, one suspected chickenpox outbreak occurred in a school (K-12) in the northwest region and another suspected chickenpox outbreak occurred in a daycare center in the southwest region. On average, six people were affected per chickenpox outbreak, with a range from five to seven persons.

One suspected mumps outbreak was reported in a college in the northwest region in 2015. Twenty-one people were affected in this outbreak.

Lack of compliance with the recommended immunization schedule usually contributes to vaccine-preventable disease outbreaks. For the 15 pertussis outbreaks, up-to-date immunizations were reported among all case-patients in only five outbreaks (33%). In the other 10 outbreaks, the affected persons were either unvaccinated, had not received all recommended doses of vaccine, or had no documentation to confirm that all recommended doses had been received. No other outbreaks caused by vaccine-preventable diseases such as measles, rubella, or *Haemophilus influenzae* type B were reported in 2015.

Waterborne Outbreaks

In 2015, four waterborne outbreaks were reported in Virginia (Table 10), compared to one outbreak reported in 2014. All of these outbreaks occurred in warmer months and were associated with outdoor water. Two of the four outbreaks were associated with spray parks, which had previously not been widely documented. In addition, one outbreak was associated with drinking improperly treated water from streams at a camp, and another was associated with a swimming pool at a campground. Three outbreaks were reported in the northern region and one was reported in the northwest region. All four outbreaks have been confirmed, two with *Cryptosporidium,* one with *Campylobacter jejuni,* and one with *Giardia lamblia.*

Table 10. Waterborne Outbreaks Reported in Virginia, 2015

Onset Date	Health District	Number of Cases	Etiologic Agent	Suspected Vehicle	Place Where Outbreak Occurred
5/27/2015	Arlington	4	*Campylobacter jejuni*	Spray water	Spray Park
8/2/2015	Arlington	4	*Cryptosporidium*	Spray water	Spray Park
7/10/2015	Loudoun	4	*Giardia lamblia*	Stream water	Camp
7/17/2015	Lord Fairfax	96	*Cryptosporidium*	Swimming pool	Campground

Zoonotic Outbreaks

In 2015, five zoonotic outbreaks were reported, all involving residents in the northwest region. One outbreak was caused by *Cryptosporidium* and was associated with ill calves. Another outbreak was also associated with ill calves and *Cryptosporidium* was suspected of causing illness. In this outbreak, *Cryptosporidium* was confirmed in specimens from calves, but not in human specimens. The three remaining outbreaks were multi-state and involved residents in Virginia and residents in other states. The vehicle for these outbreaks was live poultry and each was confirmed to be caused by *Salmonella* Hadar, *Salmonella* Muenster, or *Salmonella* Enteritidis (Table 11).

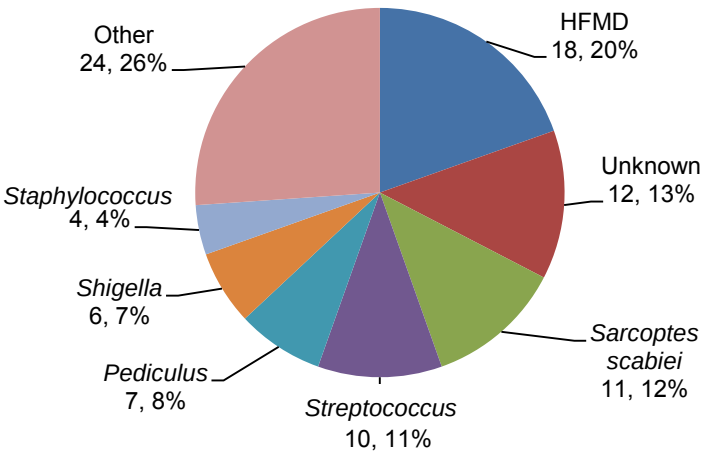
Table 11. Zoonotic Outbreaks Reported in Virginia, 2015

Onset Date	Health District	Number of Cases	Etiologic Agent	Vehicle	Place Where Outbreak Occurred
4/9/2015	Multi-state	9 VA 80 US	*Salmonella* Hadar	Live Poultry	Private Home
4/25/2015	Multi-state	1 VA 41 US	*Salmonella* Muenster	Live Poultry	Private Home
5/10/2015	Multi-state	7 VA 65 US	*Salmonella* Enteritidis	Live Poultry	Private Home
6/30/2015	Thomas Jefferson	13	*Cryptosporidium*	Calves	Private Home
11/6/2015	Central Shenandoah	5	*Cryptosporidium* suspected	Calves	Private Home

Other Outbreaks

In addition to the norovirus, influenza, foodborne, healthcare-associated, vaccine-preventable, waterborne, and zoonotic disease outbreaks discussed above, 92 outbreaks related to other types of illness were reported in Virginia in 2015. This was a 24% decrease compared to the 121 outbreaks reported in this category in 2014. The average number of ill persons per outbreak was 15, and ranged from two to 98 persons. As in previous years, the majority of these outbreaks (85, 92%) were attributed to person-to-person transmission. Chemical exposure contributed to two outbreaks (2%). The remaining five (5%) outbreaks were attributed to undetermined factors.

Figure 62. Other/Miscellaneous Outbreaks: Etiologic Agent Confirmed or Suspected, Virginia, 2015



The most frequent causes of illness reported from these other outbreaks were confirmed or suspected hand, foot, and mouth (HFM) disease (18 outbreaks, 20%), scabies (11, 12%), *Streptococcus*

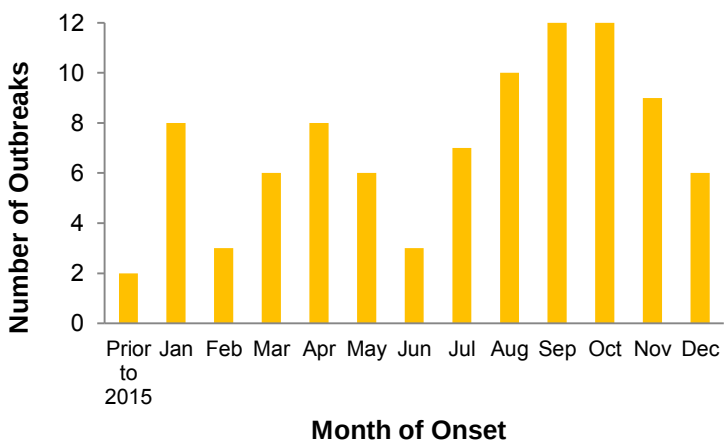
(10, 11%), *Pediculus* (7, 8%), *Shigella* (6, 7%), or *Staphylococcus* (4, 4%) (Figure 62). The number of HFMD outbreaks decreased dramatically compared to the prior year. In 2014, there were 71 HFMD outbreaks, representing 59% of all outbreaks in this category. The remaining 36 outbreaks in 2015 were suspected or confirmed to be caused by a variety of etiologic agents. Specifically, three outbreaks each were suspected or confirmed to be caused by respiratory syncytial virus, rhinovirus, and rotavirus. Two outbreaks each were suspected or confirmed to be caused by *Adenoviridae* and *Clostridium difficile*. In addition, single outbreaks were confirmed or suspected to be caused by *Campylobacter*, carbon monoxide, clenbuterol, *Escherichia coli*, *Mycoplasma pneumonia*, parainfluenza virus, parvovirus B19, *Salmonella*, sapovirus, *Stenotrophomonas maltophilia*, and tinea corporis (ringworm). The etiologic agent was unknown in nine respiratory illness outbreaks, two gastrointestinal illness outbreaks, and one conjunctivitis outbreak.

Overall, the most common settings for these 92 outbreaks were schools (K-12) (33, 36%), daycare/pre-K facilities (28, 30%), and assisted living facilities (20, 22%). In addition, four (4%) outbreaks were reported from correctional facilities, and two outbreaks each were reported from two colleges (2%) and two private homes (2%). Furthermore, three single outbreaks occurred at a restaurant, a workplace, and a community event.

Although these outbreaks occurred throughout the year, more outbreaks (56, 61%) occurred in the second half of the year than in the first half of the year (Figure 63).

Regionally, "other" outbreaks occurred throughout the state in 2015, with the largest proportions in the central (31, 34%), northern (21, 23%), and northwest (19, 21%) regions, followed by the eastern (14, 15%) and southwest (6, 7%) regions.

Figure 63. Other/Miscellaneous Outbreaks: Month of Onset, Virginia, 2015



Outbreak spotlight: Scabies

Twelve scabies outbreaks were reported statewide in 2015 without a particular seasonality. Of these, 11 were reported as other outbreaks, and one as healthcare-associated. The majority of scabies outbreaks occurred in assisted living facilities (8, 67%). Two outbreaks occurred in school (K-12) settings, one occurred in a nursing home, and one occurred in a daycare center. Human scabies is caused by the human itch mite (*Sarcoptes scabiei* var. *hominis*). The microscopic mite can burrow into the upper layer of the skin where it will live and lay its eggs. The most common symptoms of scabies are intense itching and a pimple-like skin rash. However, symptoms may not appear immediately, and an infested person can transmit scabies even in the absence of symptoms. The scabies mite usually is spread by direct, prolonged, skin-to-skin contact with a person who has scabies. Scabies can spread

rapidly under crowded settings such as nursing homes, assisted living facilities, and prisons. Preventive measures include handwashing, avoiding direct contact with an infested person or with soiled items used by an infested person, and thoroughly cleaning rooms used by a patient.

Outbreak spotlight: Streptococcal infection

Twelve outbreaks of streptococcal disease were reported during 2015. Of these, ten were reported as other outbreaks and two as healthcare-associated. Three outbreaks were due to invasive streptococcal infections, and nine were due to non-invasive infections. The outbreaks of invasive infections occurred in a nursing home, a medical facility (non-long term care), and an assisted living facility. The outbreaks of non-invasive infections caused respiratory or rash illnesses (primarily presenting as "strep throat") in five school (K-12) settings and four daycare/pre-K settings. Streptococcal infections are caused by the bacterium *Streptococcus pyogenes*. Most streptococcal infections are mild (non-invasive), but rarely, the organism can lead to a severe invasive infection if the bacteria enter a normally sterile site (blood, internal body fluids). Preventive measures include proper hand washing and prompt identification and treatment of non-invasive infections. Wounds should be kept clean and medical care should be sought at the first sign of infection.

Outbreak spotlight: Hand, foot, and mouth disease

Among the 92 other outbreaks in 2015, 18 (20%) were outbreaks suspected to be due to hand, foot, and mouth (HFM) disease, a viral illness that can cause fever, blister-like sores in the mouth, and a skin rash. This is a 75% decrease from the 71 HFM outbreaks reported in 2014. Two-thirds of the HFM disease outbreaks occurred in daycare facilities (12, 67%), and the remaining outbreaks occurred in school (K-12) settings (6, 33%), consistent with the pattern in 2014. HFM disease usually affects infants and children younger than five years of age, but can sometimes occur in adults. HFM disease is caused by the Enterovirus group of viruses, which includes polioviruses, coxsackieviruses, echoviruses, and enteroviruses. There is no vaccine to protect against hand, foot, and mouth disease. Effective preventive measures include handwashing, cleaning and disinfecting touched surfaces and soiled items, and avoiding close contact with people with hand, foot, and mouth disease.

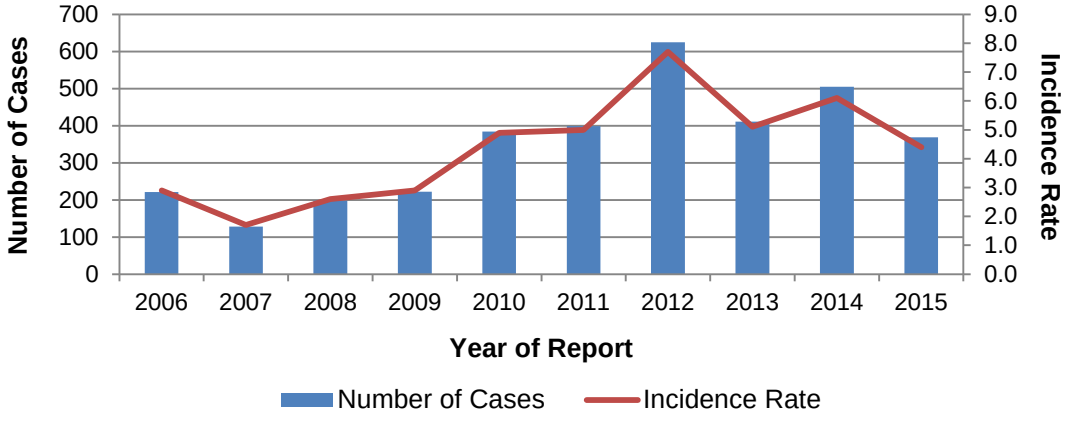
Pertussis

Agent: *Bordetella pertussis* (bacteria)
Mode of Transmission: Person-to-person transmission by contact with respiratory droplets from infected patients.
Signs/Symptoms: Insidious cough that progresses to paroxysmal coughing (i.e., severe, sequential coughs with difficulty inhaling) and may be accompanied by post-cough vomiting.
Prevention: Appropriate vaccine should be administered beginning at 2 months of age.
Other Important Information: Pertussis is also known as whooping cough. The occurrence of coughing fits can last up to 10 weeks or more. In vaccinated populations, the case-fatality rate is low. When deaths occur, they are generally in children less than six months old who are too young to have been vaccinated.

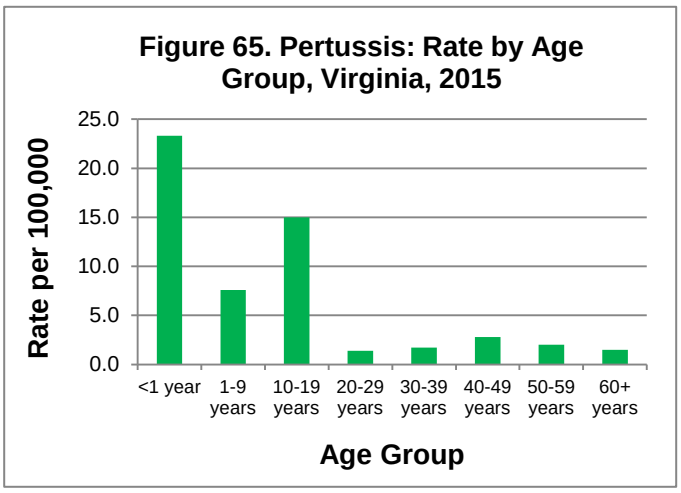
Pertussis: 2015 Data Summary	
Number of Cases:	369
5-Year Average Number of Cases:	466.2
% Change from 5-Year Average:	-21%
Incidence Rate per 100,000:	4.4

During 2015, 369 cases of pertussis were reported in Virginia. This represents a 27% decrease from 505 cases in 2014 and a 21% decrease from the five-year average of 466.2 cases per year (Figure 64). The overall decrease in cases since 2012 is consistent with the trend of pertussis cases occurring in waves with peaks every three to five years. The increase seen in 2014, and overall increase in cases over the past 20-30 years, may be attributed to increased awareness of pertussis, improved and more frequent diagnostic testing, increased circulation of the bacteria, and waning immunity in all age groups. While vaccination against pertussis is recommended for all ages, those receiving whole cell vaccine appear to have longer lasting protection compared to those that received only the acellular vaccine (i.e., those born after 1996) as demonstrated by incidence rates by age.

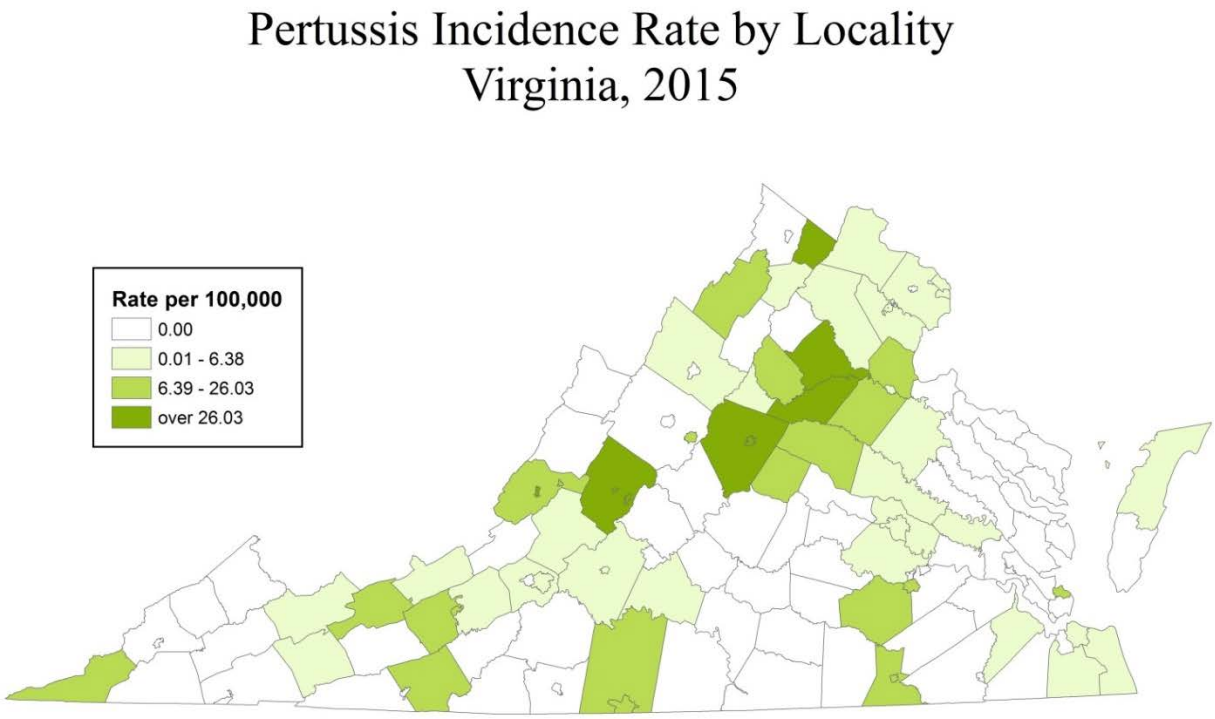
Figure 64. Pertussis: Ten-Year Trend for Number of Cases and Incidence Rate, Virginia, 2006-2015



While cases were reported among all age groups, incidence rates were highest among the youngest age groups (Figure 65). The incidence rate was highest for those under one year of age (23.3 cases per 100,000), followed by the 10-19 year age group (15.0 cases per 100,000) and 1-9 year age group (7.6 cases per 100,000). Race was provided for 70% of the reported cases, and among those with a known race, incidence was highest among the white population at 3.7 cases per 100,000, followed by the black population (1.8 cases per 100,000) and the "other" race population (1.1 cases per 100,000). Sex was reported for all cases and incidence rates were higher in females (5.1 cases per 100,000) when compared to males (3.8 cases per 100,000).



Pertussis cases were reported throughout the year with a majority of cases having onset during the second quarter (38%). The incidence rate was significantly higher in the northwest region (16.9 cases per 100,000) when compared to the state incidence rate (4.4 cases per 100,000). Other regions of the state had rates ranging from 0.8 to 3.6 cases per 100,000. This regional difference can be attributed to outbreaks that occurred in the northwest region. Ten outbreaks were reported in 2015, with eight of them occurring in the northwest region. One outbreak in the northwest region accounted for 21% of the cases statewide. This outbreak occurred in a school setting and also affected the incidence rate for the 10-19 year age group. Over 90% of the outbreaks were linked to school settings. Incidence by locality can be seen in the map below. No deaths from pertussis were reported in 2015.



Plague

Agent: *Yersinia pestis* (bacteria)
Mode of Transmission: Transmitted to humans through the bite of infected fleas or through handling tissue or body fluids of a plague-infected animal. If the disease attacks the lungs, it may be spread from person to person by respiratory droplets released when coughing.
Signs/Symptoms: Fever, chills, nausea, headache and body aches. Specific types of plague also lead to other symptoms, such as swollen lymph nodes ("buboes"), bloodstream infections, and pneumonia.
Prevention: In areas where plague occurs, travelers should avoid contact with rodents and fleas and avoid handling stray animals. Persons with plague that results in pneumonia should be isolated until 48 hours after antibiotics have been started.
Other Important Information: Modern antibiotics are effective in treating plague; however, without prompt treatment, the disease can result in serious illness or death. Fewer than 20 people in the United States are diagnosed with plague every year. The last urban plague in the U.S. occurred in Los Angeles from 1924 through 1925. Human plague infections continue to occur in the western United States in two particular regions, one being northern New Mexico, northern Arizona, and southern Colorado and the other being California, southern Oregon, and far western Nevada. In the past few decades, an average of seven cases of human plague has been reported each year. Ten cases of plague were reported in the U.S. in 2014. Many more cases occur internationally, mostly in Africa and Asia. *Y. pestis* is considered to be one of the agents that could be used for bioterrorism because the bacteria can be spread from person to person and would cause increased illness and death in the population if it were used as a weapon.

No cases of plague have been reported in Virginia since the nineteenth century.

Poliovirus Infection, Including Poliomyelitis

Agent: Poliovirus
Mode of Transmission: Person-to-person transmission through ingestion of contaminated food or direct contact with fecal material from infected people.
Signs/Symptoms: Up to 90% of all polio infections are asymptomatic. Ten percent will develop into a non-specific syndrome with fever, malaise, headache, nausea, and vomiting. Flaccid paralysis occurs in less than 1% of poliovirus infections.
Prevention: Vaccine should be administered beginning at 2 months of age. Four doses of trivalent, inactivated poliovirus vaccine (IPV) are recommended with the last dose administered prior to kindergarten entry and after the fourth birthday.
Other Important Information: Polio eradication programs, which primarily utilize oral poliovirus vaccine (OPV), have led to the elimination of the disease in four of the six World Health Organization (WHO) designated regions. Polio incidence has dropped more than 99% since the launch of global polio eradication efforts in 1988, and 80% of the world's population now live in polio-free areas. Additional progress toward polio eradication was made in 2015 when type 2 poliovirus, one of the three serotypes, was declared eradicated. No cases of type 3 poliovirus have been detected since 2012. Type 1 poliovirus is the most pervasive and continues to circulate in endemic countries. The WHO recommended in 2015 that all countries using oral poliovirus vaccine change from trivalent (types 1, 2, and 3) to bivalent (types 1 and 3) to reduce the risk of vaccine-derived poliovirus transmission (VDPV). Worldwide, Nigeria reported no cases in 2015 after reporting six cases in 2014. Poliovirus remains endemic in Afghanistan and Pakistan. The number of cases reported in Pakistan declined from 306 cases in 2014 to 54 cases in 2015. Afghanistan also had a decrease in cases from 28 in 2014 to 20 in 2015. Until poliovirus transmission is interrupted in these endemic countries, all countries remain at risk of importation of polio, especially in the "wild poliovirus importation belt" stretching from west Africa to central Africa and the Horn of Africa. In 2011, Virginia's reporting requirements were changed to require reporting of any poliovirus infection, not only poliomyelitis.

No poliovirus infections were reported in Virginia in 2015. The last reported case of poliomyelitis in Virginia occurred in 1978.

Psittacosis

Agent: *Chlamydia psittaci* (bacteria)
Mode of Transmission: Transmission usually occurs when a person inhales organisms that have been aerosolized from dried feces or respiratory tract secretions of infected birds. Other means of exposure include mouth-to-beak contact and handling of feathers or tissues from infected birds.
Signs/Symptoms: Most commonly fever, headache, weakness, muscle aches, chills, and nonproductive cough. The severity of the disease ranges from a mild, non-specific influenza-like illness to a systemic illness with severe pneumonia. With appropriate treatment, the infection is rarely fatal.
Prevention: Preventive measures include proper design and management of facilities that raise and sell birds and use of protective clothing (e.g., wearing of masks or respirators and gloves) by those working with birds confirmed with avian chlamydiosis or birds exposed to confirmed avian cases. Bird cages should be cleaned regularly with disinfectants and the contents of the cage should be disposed of properly. People who work with birds or have birds as companion animals who experience symptoms compatible with psittacosis should bring this potential exposure to their healthcare provider's attention.
Other Important Information: Birds may or may not show signs of illness when infected. The severity of clinical illness can range from subtle upper respiratory disease or mild conjunctivitis to death and depends on the virulence of the particular *Chlamydia* strain and the immune status of the host. Chlamydial organisms have been isolated from over 460 bird species, but are most commonly identified in psittacine (parrot-type) birds, especially cockatiels and budgerigars (also called parakeets or budgies). Among caged, nonpsittacine birds, infection with *C. psittaci* occurs most frequently in pigeons and doves. People who raise, sell or keep birds should consult with a licensed veterinarian about protocols and best practices for preventing and treating avian psittacosis.

No cases of psittacosis were reported in Virginia during 2015. The most recent psittacosis case was reported in 2003.

Q Fever

Agent: *Coxiella burnetii* (bacteria)
Mode of Transmission: Inhalation of air contaminated with *Coxiella burnetii*. Most commonly, people are exposed to this organism via inhalation of infectious aerosols directly from birth fluids of infected animals or via inhalation of dust contaminated with dried birth fluids or tissues. Less common routes of transmission include ingestion of raw milk and dairy products or contact with contaminated clothing. Person-to-person transmission is rare.
Signs/Symptoms: While up to 60% of cases identified during outbreak investigations have been asymptomatic, symptomatic Q fever may be acute or chronic. Acute Q fever is characterized by high fever, severe headache, fatigue, chills and muscles aches. Serious illness can progress to pneumonia or inflammation of the liver. Children with Q fever are less likely than adults to have symptoms and might have a milder illness. When symptomatic, children are more likely to manifest gastrointestinal symptoms of illness and develop a skin rash. Chronic Q fever is a severe disease developing in less than 5% of acutely-infected patients, and is rarely reported in children. Endocarditis is the major form of chronic disease, comprising 60-70% of all reported cases. It may present within a few months after an acute infection or may manifest years later. Chronic disease can occur after symptomatic or asymptomatic infections. The three groups at highest risk for developing chronic Q fever are pregnant women, immunocompromised persons and patients with a pre-existing heart valve defect.
Prevention: Preventive measures include appropriate disposal of potentially infectious tissues and proper hygiene when handling animal birth material.
Other Important Information: Although infection has been confirmed in many species, cattle, sheep and goats are the main natural reservoirs for *C. burnetii*. The infectious form of these bacteria is highly resistant to heat, desiccation, and disinfectant substances, and can persist in the environment for long periods of time. Windborne particles containing infectious organisms can travel a half-mile or more, which may contribute to cases with no known animal contact. From 2000-2010, information associated with Q fever cases reported to the CDC indicated that 60% of patients reported no animal contact. This bacterium is classified by the CDC as a potential bioterrorism agent because it could easily be disseminated and result in a moderate amount of illness.

No cases of Q fever were reported in Virginia in 2015. Four cases were reported in 2014, three acute and one chronic. Of these, one acute case had a confirmed history of raw milk consumption and another reported travel to South America where raw dairy products may have been consumed. No specific risk factors were identified for the third acute case. The chronic case was associated with valvular heart disease. The five-year average for Q fever is 2.4 cases per year.

Rabies

Agent: Rabies virus, a rhabdovirus of the genus Lyssavirus
Mode of Transmission: Most commonly transmitted through the bite of an infected animal, but may be transmitted through any method by which virus-infected saliva or central nervous system tissue enters the body.
Signs/Symptoms: Vary widely, but in people, symptoms often include an initial headache, fever and apprehension which progresses to paralysis, spasms of the muscles used for swallowing, delirium and convulsions. Once symptoms appear, rabies is almost invariably fatal.
Prevention: Important prevention methods include vaccinating cats, dogs, and ferrets; using animal control to remove stray animals; and avoiding handling wildlife. A series of vaccines is recommended for people whose occupations increase their likelihood of being exposed to rabies (e.g., veterinarians and laboratorians working with rabies virus) and a vaccine series is also available for people who have been exposed.
Other Important Information: The main reservoir of rabies in the United States is wildlife. In most other countries, the main reservoir is dogs. Not everyone who meets the health department's definition of possible exposure to rabies is required to undergo the rabies vaccination series, also known as post-exposure prophylaxis (PEP). A person may receive PEP if he is considered exposed to rabies and the animal associated with the exposure is either not available or tests positive for rabies.

Human

In 2015, no human rabies cases were reported in Virginia. The last human rabies case reported in Virginia occurred in 2009 in an adult male who was infected with the Indian canine variant of the rabies virus. This person was thought to have been exposed during an encounter with a dog while traveling in India. The patient died as a result of this infection.

In 2015, 1,568 individuals were reported as having received rabies post-exposure prophylaxis in Virginia. This represents a statewide rate of 18.8 per 100,000 individuals receiving PEP and represents a slight increase from 2014 when 1,545 individuals were reported as having received PEP. All health districts reported residents receiving rabies PEP with Fairfax Health District having the highest number of individuals (226) receiving PEP and both the Hampton and Portsmouth health districts reporting the lowest number of individuals receiving PEP with four each. The highest incidence rate of 46.5 per 100,000 was reported from the Eastern Shore health district while the lowest rate was reported from the Chesapeake health district with 2.6 per 100,000. By health planning region, the northwest region had the highest rate of people receiving PEP with 27.5 per 100,000 and the eastern region had the lowest at 12.1 per 100,000. See Table 12 and the map insert for rabies PEP by individual health district.

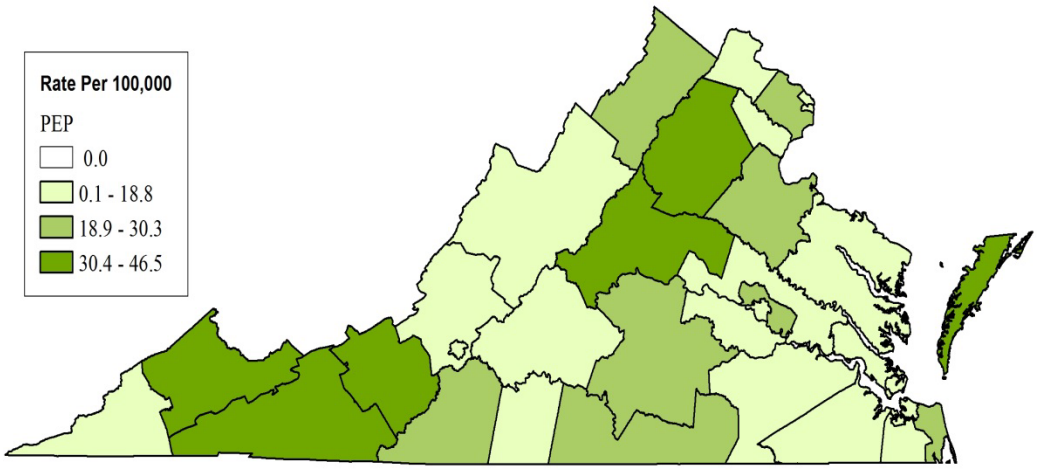
For health districts that recorded exposures by species among those receiving PEP, almost 38% of individuals received PEP due to exposure to a wildlife species, approximately 36% received PEP due to exposure to a dog, and approximately 24% received PEP due to exposure to a cat. Less than 3% of people received PEP due to livestock exposure. Thirty-one individuals received PEP due to an unknown or other animal exposure. Most potential human exposures to rabies that are reported to the health department each year are associated with dogs and cats.

Table 12: Number of People Receiving Rabies PEP by Health District, Virginia, 2015

Health District	Population	PEP	
		Number	Rate Per 100,00
Alexandria	150,575	15	10.0
Alleghany/Roanoke City*	278,652	35	12.6
Arlington	226,908	33	14.5
Central Shenandoah	293,467	40	13.6
Central Virginia	257,835	42	16.3
Chesapeake	233,371	6	2.6
Chesterfield	378,679	71	18.7
Chickahominy	150,898	12	8.0
Crater	155,789	28	18.0
Cumberland Plateau	109,889	40	36.4
Eastern Shore	45,142	21	46.5
Fairfax	1,175,622	226	19.2
Hampton	136,879	4	2.9
Henrico	321,924	77	23.9
Lenowisco	91,301	11	12.0
Lord Fairfax	230,199	67	29.1
Loudoun	363,050	68	18.7
Mount Rogers	190,942	60	31.4
New River	181,605	73	40.2
Norfolk	245,428	19	7.7
Peninsula	348,629	38	10.9
Piedmont	102,939	25	24.3
Pittsylvania/Danville	104,827	6	5.7
Portsmouth	96,004	4	4.2
Prince William	503,349	88	17.5
Rappahannock	352,679	81	23.0
Rappahannock/Rapidan	172,958	76	43.9
Richmond City	217,853	28	12.9
Southside	82,890	16	19.3
Thomas Jefferson	244,403	92	37.6
Three Rivers	140,811	13	9.2
Virginia Beach	450,980	99	22.0
West Piedmont	140,414	34	24.2
Western Tidewater	149,398	20	13.4
Total for 2015	**8,326,289**	**1568**	**18.8**

* For surveillance purposes, rabies PEP data and population figures are combined for these two health districts.

Table 12 Map Insert: Persons Receiving Rabies PEP Incidence Rate by Health District, Virginia, 2015

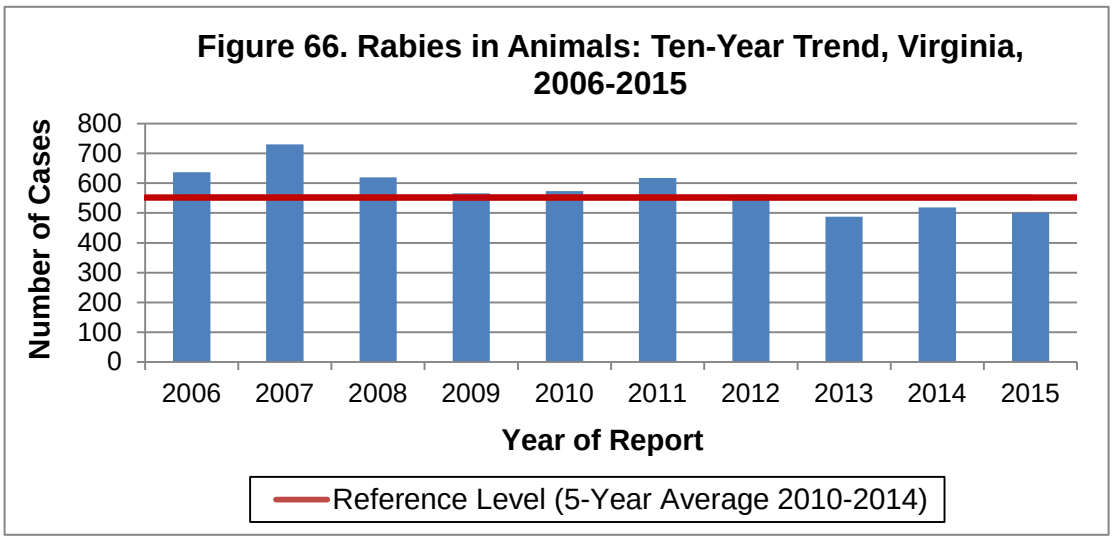


For reference, a link to health districts and their corresponding localities can be found at http://www.vdh.virginia.gov/content/uploads/sites/10/2016/03/vamap.jpg

Animal

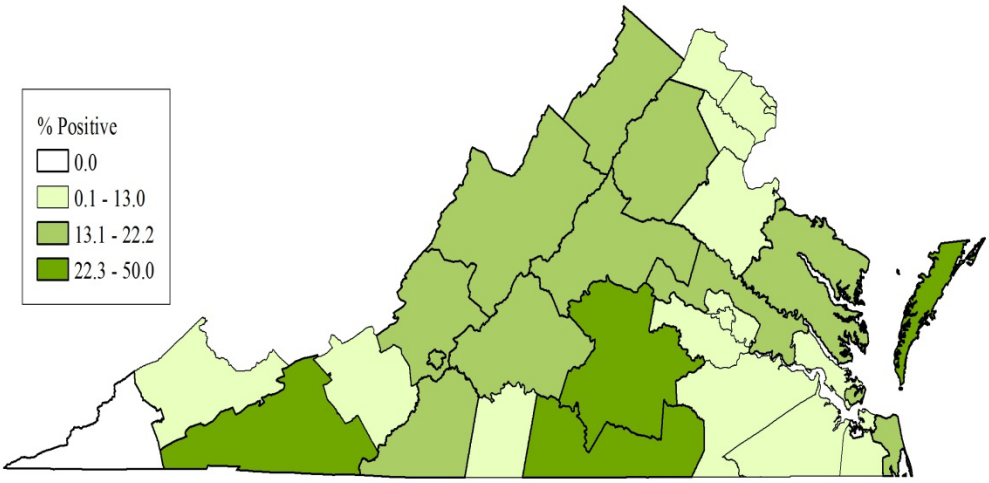
In 2015, health districts investigated over 19,000 incidents where either an animal potentially exposed a person to rabies or the animal itself was potentially exposed to rabies. Over 60% of these incidents involved dogs. Cats accounted for a little more than one-fourth of all incidents and wildlife accounted for almost 12% of incidents. Among all the incidents investigated, only 3,750 animals were submitted for rabies testing. Of these, 500 (13%) were laboratory confirmed positive for rabies. Nine additional out-of-state animals were tested for rabies, including a dog imported from Egypt and a fox from North Carolina, both of which tested positive for rabies. The percent of animals testing positive for rabies in 2015 is consistent with the range of 13-16% of animals testing positive that has been observed over the last 10 years. The 500 animals that tested positive for rabies in 2015 represents a 4% decrease from the 519 animals that tested positive for rabies in 2014 and is below the five-year average of 552 cases per year (Figure 66). All animals are tested for rabies by the Division of Consolidated Laboratory Services or the Fairfax County Health Department Laboratory.

Of note, the suspected rabies virus in the imported dog from Egypt was detected by DCLS. Further verification and strain typing performed by CDC identified Egyptian cosmopolitan dog rabies, a strain previously eradicated in the U.S. The full investigation involved VDH, CDC, four states, the transport airline, the Egyptian Ministry of Health, and the U.S. Department of Agriculture. The investigation exposed an intentional falsification of a rabies vaccination certificate and difficulty enforcing existing regulations.



Based on laboratory submission data, seven localities submitted no animals for rabies testing. Of the localities that did submit animals for testing, Fairfax County submitted the highest number at 285 and had the highest number of positives with 36. By district, the largest number of rabid animals were reported from the Mount Rogers Health District (46), followed by the Fairfax Health District (43), and Central Virginia Health District (35). No rabid animals were identified in either the Lenowisco Health District or the Portsmouth Health District in 2015. At the regional level, the largest number of laboratory-confirmed rabid animals was reported from the southwest region (130) followed by the northwest region (126). The number of lab-confirmed rabid animals in the remaining regions ranged from 70 to 97. More detailed information about the number of animals testing positive by locality, health district, and region can be found in the section of this report entitled Number of Reported Cases and Rate per 100,000 Population for Selected Diseases by Locality, District and Region. The map below depicts data reflecting the percent of animals testing positive for rabies by health district.

Percent of Animals Testing Positive for Rabies by Health District, Virginia, 2015



Among all animal species, cats were the most frequently tested for rabies (907), and had the highest number of positives (37) among domestic animals (Table 13). Bats were the most commonly tested wildlife species, with 858 specimens submitted and 15 testing positive. Aside from a single otter testing positive (100%), skunks had the highest percentage of positive test results (62%), followed by raccoons (40%) and foxes (34%). Of the 500 animals testing positive for rabies in Virginia in 2015, raccoons accounted for half (50%) of all positive results, followed by skunks (24%), and foxes (8%). Cattle accounted for the largest number (20) and proportion (17%) of livestock testing positive for rabies. All small rodents submitted for testing were negative. Cats remain the domestic animal most commonly diagnosed with rabies, and raccoons remain the most common wildlife species diagnosed with rabies; these trends have been consistent for over 10 years.

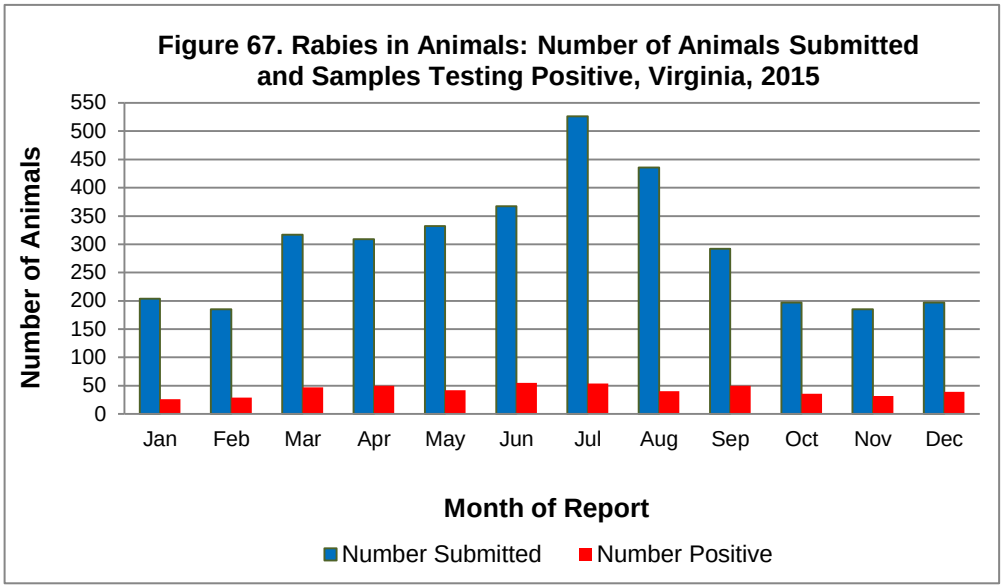
Table 13. Animals Testing Positive for Rabies by Species, Virginia, 2015

Animal Species	Number of Animals Tested	Positive	
		Number	Percent
Alpaca	6	0	0%
Bat	858	15	2%
Bear	3	0	0%
Bobcat	1	0	0%
Cat	907	37	4%
Chipmunk	4	0	0%
Cow	115	20	17%
Coyote	6	1	17%
Deer	2	0	0%
Dog	519	3	<1%
Donkey	3	0	0%
Ferret	2	0	0%
Fox	110	38	34%
Goat	36	3	8%
Gopher	1	0	0%
Groundhog	108	7	6%
Hamster	1	0	0%
Horse	29	2	7%
Llama	1	0	0%
Mink	1	0	0%
Mole	4	0	0%
Muskrat	3	0	0%
Opossum	117	0	0%
Otter	1	1	100%
Pig	6	1	17%
Pony	1	0	0%
Rabbit	10	0	0%

Table 13. Animals Testing Positive for Rabies by Species, Virginia, 2015 (cont.)

Animal Species	Number of Animals Tested	Positive	
		Number	Percent
Raccoon	628	251	40%
Rat	5	0	0%
Rodent	4	0	0%
Sheep	18	0	0%
Shrew	1	0	0%
Skunk	195	121	62%
Squirrel	43	0	0%
Vole	1	0	0%
Total for 2015	**3,750**	**500**	**13%**

The largest number of animals submitted for rabies testing occurred during the late spring and summer months, while the fewest number of animals were submitted for testing during the winter months (Figure 67). This seasonal pattern is likely a result of increased domestic animal and human interaction with wildlife during warmer months. No particularly strong seasonal pattern was observed in the number of animals testing positive for rabies, but June had the highest number of any month, with 55 animals testing positive, followed closely by July with 54 animals testing positive.



Rubella

Agent: Rubella virus
Mode of Transmission: Person-to-person transmission through contact with nose and throat secretions from infected people. The virus may also be transmitted from mother to child during pregnancy, causing congenital rubella syndrome (CRS) in the infant.
Signs/Symptoms: Fever and rash, with frequent occurrences of joint pain, arthritis, and swelling of the lymph nodes.
Prevention: Vaccination, administered as MMR vaccine, should begin at 12 months of age.
Other Important Information: In 2004, rubella was declared to no longer be endemic in the United States, although a small number of cases continue to be imported.

No cases of rubella were reported in Virginia during 2015. The most recent Virginia cases occurred in 2010 in two unvaccinated individuals. Prior to these cases, the last reported case occurred in 2001. Nationally, five cases of rubella and one case of congenital rubella syndrome were reported in 2015, while six cases were reported in 2014.

Surveillance for rubella elimination in the Americas is ongoing. While rubella elimination has been maintained in the United States since 2011, it is important to maintain high vaccination rates as rubella is endemic in other parts of the world as evidenced by the estimated 100,000 babies born worldwide with CRS every year.

Salmonellosis

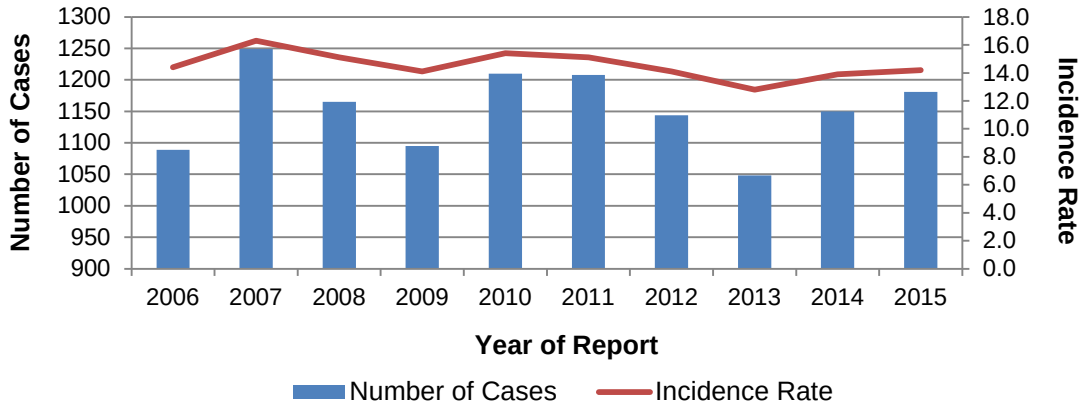
Agent: *Salmonella* (bacteria)
Mode of Transmission: Ingestion of food or water contaminated with animal or human feces. Infected persons can spread the bacteria to other persons by not washing their hands properly after using the bathroom and then handling food that others eat. Infection can also occur after eating, smoking, or touching one's mouth if hands are contaminated with the bacteria and not washed well. People can also be infected with *Salmonella* by the feces of some pets, including reptiles and young birds, if hands are not washed well after contact with sick or seemingly healthy infected animals.
Signs/Symptoms: Sudden onset of headache, fever, abdominal pain, diarrhea and sometimes vomiting. Dehydration, especially in older adults and young children, can be a severe complication.
Prevention: Preventive measures should include following proper sanitation methods for food preparation and water supplies, including preventing cross-contamination of food preparation surfaces; maintaining sanitary sewage disposal; excluding infected people from handling food or providing healthcare; prohibiting the sale of small turtles; and avoiding chicks, ducklings, turtles, and other reptiles as pets for small children. Proper hand hygiene should be practiced, including washing hands after toileting or diapering, before and after handling food, and after handling animals or their feces. Eggs and other animal food products should be cooked thoroughly.
Other Important Information: With approximately 42,000 salmonellosis cases reported each year in the United States, *Salmonella* is one of the leading pathogens that cause foodborne illnesses, many of which result in hospital admissions. Incidence rates are highest among infants and young children. Mortality rates are higher in infants, older adults and people with impaired immune systems.
Special Note about Salmonellosis: While more than 2,500 serotypes of *Salmonella* can cause human illness, two specific *Salmonella* serotypes (*S*. ser Typhi and *S*. ser Paratyphi*) can lead to typhoidal illness (i.e., typhoid fever and paratyphoid fever, respectively). Typhoidal illness is found only in humans and often results in more serious infections than those seen in other *Salmonella* serotypes; up to 10% of people who are untreated for typhoidal illness may die. Cases of typhoid fever and paratyphoid fever are usually associated with foreign travel and are alike in regard to clinical features and measures necessary to control the spread of infection. However, despite their similarities, paratyphoid fever tends to be milder than typhoid fever, with a lower fatality rate. Due to its severity, typhoid fever is reported as a separate condition in Virginia (see the Typhoid Fever section of this report for more information), while cases of paratyphoid fever are included in the general salmonellosis report.

* Paratyphoid fever can be caused by any of three separate strains of *S.* ser Paratyphi: *S*. ser Paratyphi A, *S*. ser schottmuelleri (also called *S*. ser Paratyphi B), or *S*. ser hirschfeldii (also called *S*. ser Paratyphi C). A separate strain of *S.* ser Paratyphi B (i.e., *S.* ser Paratyphi B var. L[+] tartrate [+]) causes illness that resembles non-typhoidal salmonellosis; these cases are treated as general salmonellosis and are not considered to be paratyphoid fever.

Salmonellosis: 2015 Data Summary	
Number of Cases:	1,181
5-Year Average Number of Cases:	1,152.0
% Change from 5-Year Average:	+3%
Incidence Rate per 100,000:	14.2

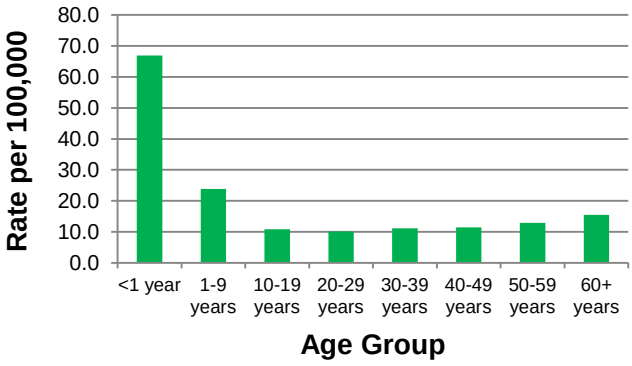
During 2015, 1,181 cases of salmonellosis were reported in Virginia. This is slightly higher than the 1,150 cases reported in 2014 and the five-year average of 1,152 cases per year (Figure 68).

Figure 68. Salmonellosis: Ten-Year Trend for Number of Cases and Incidence Rate, Virginia, 2006-2015

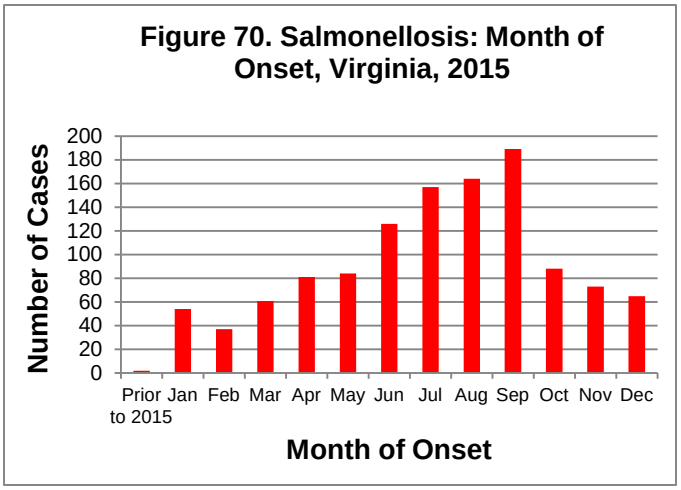


According to the CDC, children under 5 years of age are the most likely to be infected with *Salmonella*. This was seen in Virginia in 2015, with an incidence rate among infants less than 1 year of age of 66.9 per 100,000, which was much higher than any other age group (Figure 69). The incidence rate among children 1-9 years of age was 23.8 per 100,000 while rates in all other age groups ranged from 10.1 to 15.5 per 100,000. Race information was not reported for 33% of cases. Among those where race was known, incidence was higher in the white population (9.9 per 100,000) than the black and "other" race populations (8.7 and 7.5 per 100,000, respectively). By sex, incidence rates were higher among females than males (14.7 and 13.8 per 100,000, respectively).

Figure 69. Salmonellosis: Rate by Age Group, Virginia, 2015



By region, the northwest region had the highest incidence rate in the state (16.3 per 100,000), followed by the central, eastern, and northern regions (15.7, 15.1, and 13.3 per 100,000, respectively). The southwest region had the lowest incidence rate at 10.8 per 100,000. For incidence rates by locality, please see the map below. While *Salmonella* infections were reported in every quarter of the year, the majority of cases occurred during the summer months, peaking in September (Figure 70). Six deaths were attributed to salmonellosis during 2015. The deaths occurred among four males and two females ranging in age from 43 to 103 years.



In 2015, nine confirmed salmonellosis outbreaks occurred, seven of which were multistate outbreaks. Of the nine outbreaks, five were foodborne, three were zoonotic, and for one the transmission type could not be identified. The number of Virginia residents affected during each outbreak ranged from 1 to 30. Of the foodborne outbreaks, one was linked to cucumbers imported from Mexico, one was associated with frozen tuna imported from Indonesia, and the other three were related to exposures at various restaurants. All three of the zoonotic outbreaks were attributed to contact with live poultry.

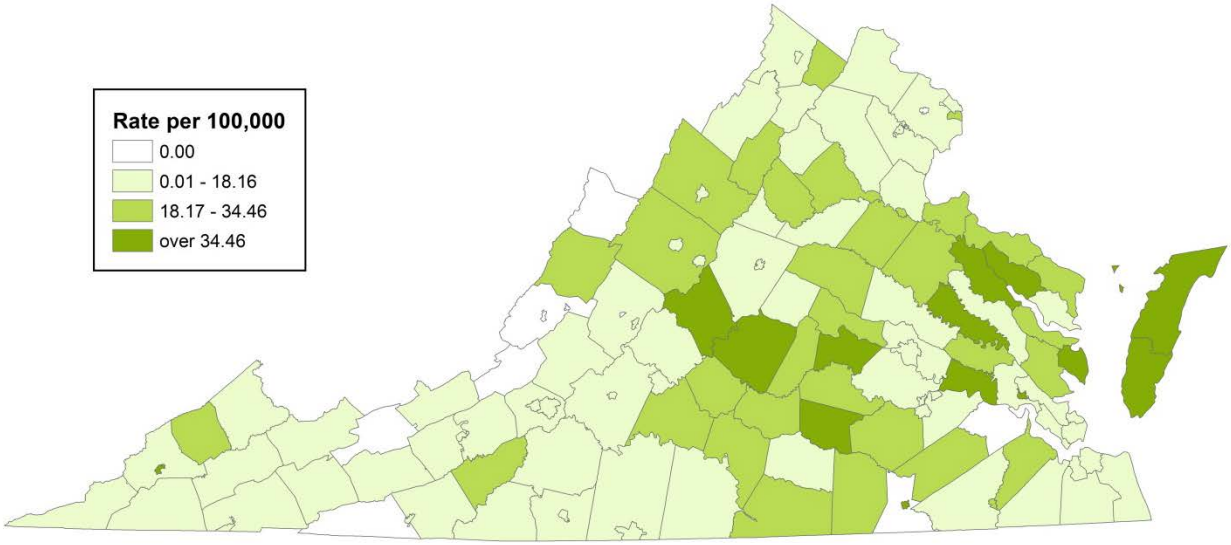
Salmonellosis cases identified in outbreaks and sporadic illness during 2015 were attributed to several *Salmonella* serotypes. The serotypes involved in the outbreaks included Enteritidis, Hadar, Muenster, Poona, and Paratyphi B var. L(+) tartrate + (Java). For all salmonellosis infections in 2015, including sporadic cases among Virginia residents, the most commonly detected serotypes were *Salmonella* ser. Enteritidis and *Salmonella* ser. Typhimurium (Table 14).

Table 14. Top Ten *Salmonella* Serotypes Reported to the CDC PulseNet System by the Division of Consolidated Laboratory Services, Virginia, 2015

Rank	Serotype Causing Infection	Number		Rank	Serotype Causing Infection	Number
1	*S.* ser Enteritidis	228		6	*S.* ser Bareilly	33
2	*S.* ser Typhimurium	194		7	*S.* ser Infantis	30
3	*S.* ser Newport	128		8	*S.* ser Saintpaul	29
4	*S.* ser Javiana	80		9	*S.* ser Braenderup	25
5	*S.* ser I 4,12:i:-	57		10	*S.* ser Thompson	23

Six cases of paratyphoid fever (five *S.* ser Paratyphi A and one *S.* ser Paratyphi B) were reported in Virginia during 2015. All of the affected individuals reported traveling internationally in the month prior to illness onset; countries visited by infected persons included India, Pakistan, Peru, and Myanmar.

Salmonellosis Incidence Rate by Locality
Virginia, 2015



Severe Acute Respiratory Syndrome (SARS)

Agent: Severe acute respiratory syndrome-associated coronavirus (SARS-CoV)
Mode of Transmission: Most likely transmitted from person to person through respiratory droplets released during coughing and sneezing; transmission can also occur by touching a contaminated surface or object and then touching the mouth, nose, or eyes. It is possible that SARS-CoV might be spread more broadly through the air or by other routes that are not yet known.
Signs/Symptoms: Fever, chills, headache, body aches, followed by respiratory symptoms, such as cough, shortness of breath, or difficulty breathing. Diarrhea may occur.
Prevention: Factors that may reduce transmission include frequent hand washing, avoidance of touching the eyes, nose, and mouth with contaminated hands, and covering the nose and mouth with a tissue when coughing or sneezing.
Other Important Information: Major outbreaks of SARS occurred between November 2002 and July 2003 in Canada, China, Singapore and Vietnam. In the United States, eight people had laboratory evidence of SARS-CoV infection. SARS is thought to have originated in China. In 2012, the National Select Agent Registry program published a final rule declaring SARS coronavirus a select agent because of its potential to pose a severe threat to public health and safety.

No cases of SARS have been reported in Virginia since 2003. The one confirmed case of SARS in Virginia occurred in 2003 during the international outbreaks. The case was reported in an adult female who had traveled to several Asian countries in the four weeks before she developed symptoms. Her exposure most likely occurred in a Singapore hospital where she had direct contact with patients being treated for SARS.

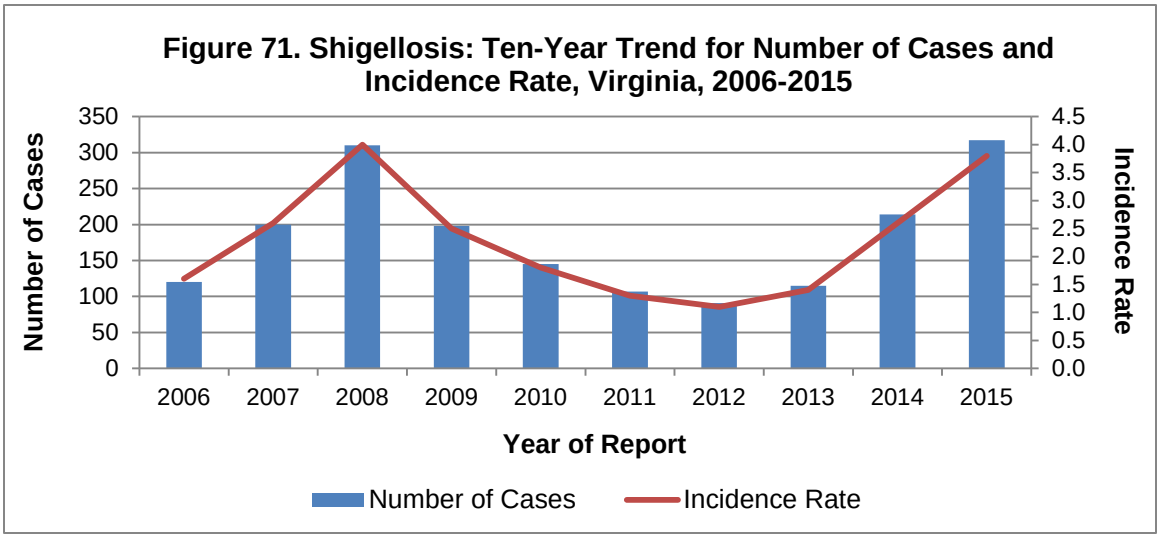
The last reported case detected through active global surveillance occurred in China in April 2004. Since then, there has been no evidence of SARS circulating in the human population.

Shigellosis

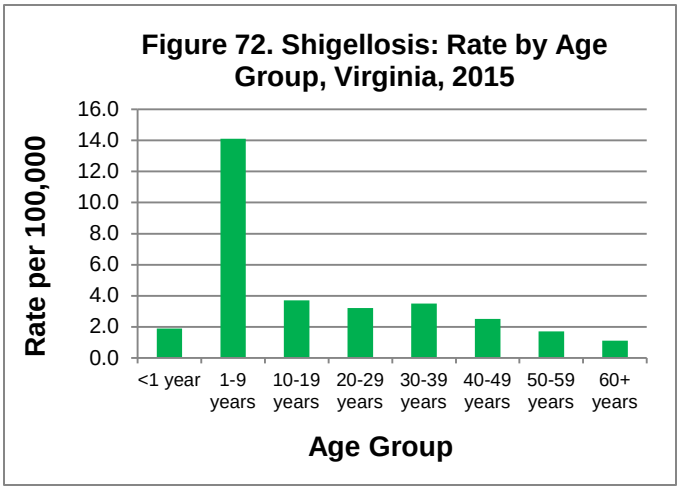
Agent: *Shigella* (bacteria)
Mode of Transmission: Primarily person-to-person transmission when the bacteria are passed from the stool of an infected person to another person through direct contact. Additionally, contact with contaminated surfaces or objects (such as changing tables, diaper pails, toys), ingestion of contaminated food or water, and exposure to feces through sexual contact may spread the disease.
Signs/Symptoms: Diarrhea ranging from watery and loose to mucoid with or without blood; fever; and sometimes nausea, vomiting, abdominal cramps and painful straining while defecating. Mild and asymptomatic infections can also occur.
Prevention: Proper hand hygiene is essential to limit transmission. Additional control measures include improved sanitation, chlorination of drinking water, proper cooking and storage of food, and measures to decrease contamination of food by houseflies. Cases of shigellosis in food handlers, childcare center attendees or workers, or in healthcare personnel providing direct patient/resident care require public health evaluation and intervention to prevent the spread of disease.
Other Important Information: *Shigella sonnei*, (also known as "group D" *Shigella)*, accounts for over two-thirds of shigellosis in the United States, while *Shigella flexneri* (also known as "group B" *Shigella)* accounts for almost all the rest. Resistance to some antibiotics used to treat shigellosis is increasing worldwide.

Shigellosis: 2015 Data Summary	
Number of Cases:	317
5-Year Average Number of Cases:	134.4
% Change from 5-Year Average:	+136%
Incidence Rate per 100,000:	3.8

During 2015, 317 cases of shigellosis were reported in Virginia. This represents a 48% increase from the 214 cases reported in 2014, and is more than double the five-year average of 134.4 cases per year (Figure 71). *Shigella* spp. are estimated to cause almost



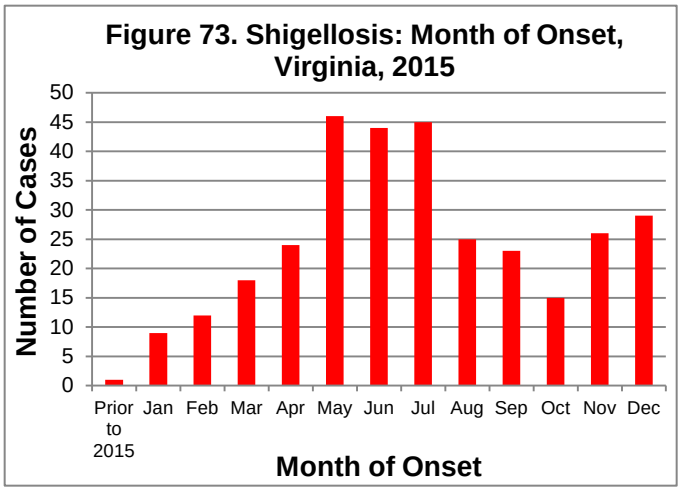
500,000 illnesses each year in the United States, although the number of laboratory-confirmed cases is much lower (CDC).



Historically in Virginia, the 1-9 year age group has had the highest number of cases and the highest incidence rate. From 2014 to 2015, the incidence rate in the 1-9 year age group nearly doubled, rising from 7.7 per 100,000 in 2014 to 14.1 per 100,000 in 2015 (Figure 72). High incidence in this age group is expected because toddlers, age 2 to 4 years, are more likely to be exposed to shigellosis in child care and home settings where other young children may not routinely wash their hands after using the toilet. Incidence among the other age groups ranged from 1.1 to 3.7 per 100,000.

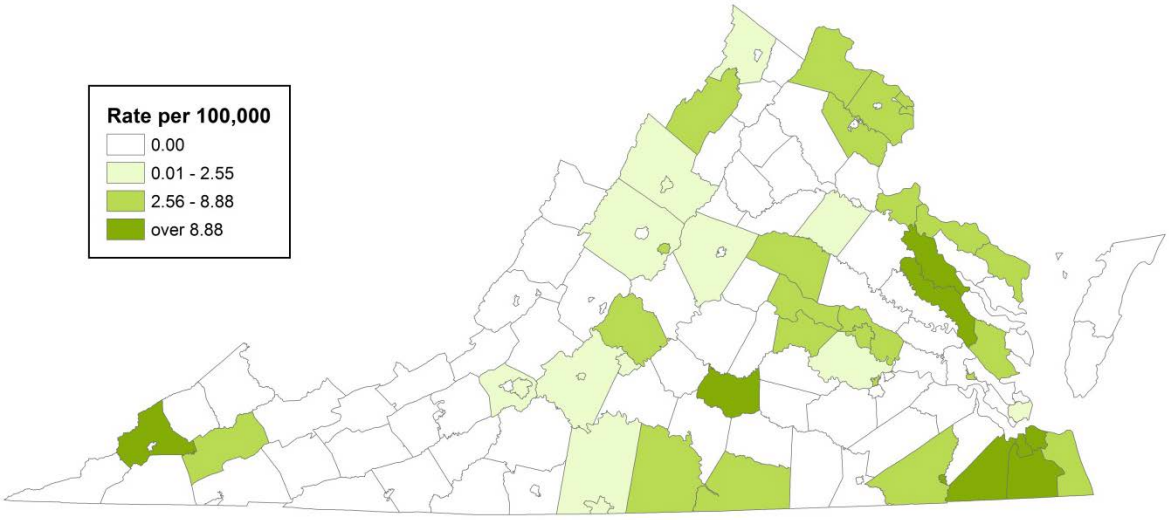
Race was not reported for 37% of cases. Among those for whom race was known, incidence rates were highest in the black population (6.6 per 100,000), followed by the white and "other" populations (1.3 and 1.1 per 100,000, respectively). Incidence was slightly higher among females compared to males (4.0 and 3.7 per 100,000, respectively).

Geographically, the eastern region accounted for nearly 50% of all cases in Virginia during 2015; as a result, the eastern region had the highest incidence rate overall (8.5 per 100,000), followed by the northern and central regions (each with a rate of 3.5 per 100,000). The southwest and northwest regions had incidence rates of 0.9 and 1.1 per 100,000, respectively (see map below for incidence by locality). Transmission occurred throughout the year, with the majority of cases occurring in the late spring to mid-summer (Figure 73).



Five confirmed shigellosis outbreaks were reported in 2015. These outbreaks ranged in size from 2 to 33 persons and occurred in a variety of settings, including individual households, daycare centers and schools. The largest shigellosis outbreak occurred in an eastern region elementary school, spanning from April to September, which impacted the high incidence rate for that region. In total, 33 cases were linked to this outbreak via laboratory data.

Shigellosis Incidence Rate by Locality
Virginia, 2015



Smallpox

Agent: Variola virus
Mode of Transmission: Person-to-person transmission through contact with respiratory droplets, airborne particles (rare), and skin lesions of an infected person. Smallpox can also be transmitted through contact with contaminated clothing or bedding.
Signs/Symptoms: Sudden onset of fever, headache, weakness and exhaustion followed by development of a rash that first appears on the face and extremities.
Prevention: Preventive measures include vaccination with the genetically distinct vaccinia virus. Routine vaccination of the American public stopped in 1972. At this time, vaccine is available only to members of emergency response teams and some military personnel.
Other Important Information: The last case of smallpox in the United States was in 1949; the last naturally occurring case in the world was in Somalia in 1977. Although the disease was declared eradicated in 1980 after worldwide vaccination programs, smallpox is considered to be one of the agents that could be used for bioterrorism because the disease can be spread from person to person and would cause increased illness and death in the population if used as a weapon.

The last case of smallpox in Virginia occurred in 1944.

Spotted Fever Rickettsiosis, including Rocky Mountain Spotted Fever

Agent: Tick-borne species of *Rickettsia* (bacteria). Spotted fever rickettsiosis (SFR) may be caused by several different tick-borne disease agents, including *Rickettsia rickettsii*, the cause of Rocky Mountain spotted fever (RMSF), and *Rickettsia parkeri*, the cause of Tidewater spotted fever. Cases may also be caused by exposure to other tick-borne species of *Rickettsia* that commonly occur in Virginia.

Mode of Transmission: Transmitted to humans by the bite of an infected tick. Ticks generally must be attached for 10 to 20 hours to transmit the bacterium.

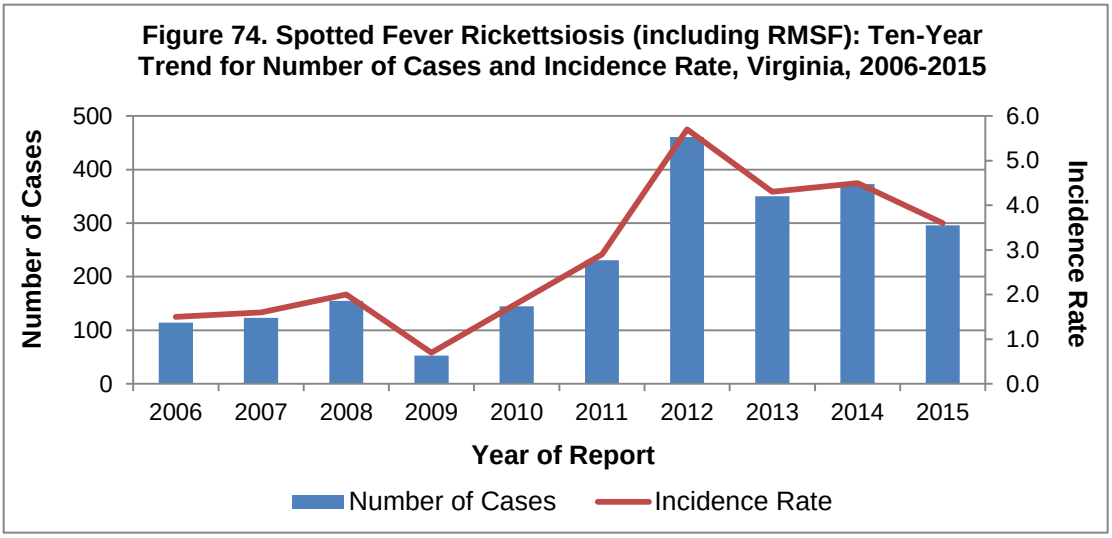
Signs/Symptoms: Persons with spotted fever rickettsiosis may have a sudden onset of fever, severe headache, muscle pain, nausea and vomiting and a rash. In the case of RMSF, a rash may develop three to five days after onset of illness. This rash starts on the wrists and ankles, and spreads to the rest of the body, and is seen in about 90% of RMSF cases.

Prevention: RMSF, the most serious SFR, may be transmitted by either the brown dog tick (*Rhipicephalus sanguinius*) or the American dog tick (*Dermacentor variabilis*). Bites by the brown dog tick can be avoided by vigilance for ticks when exposed to the bedding, floors or walls of kennels, dog houses or buildings where dogs have been kept. Bites by the American dog tick, and ticks in general, can be prevented by avoiding tick-prone habitats such as leaf litter or low vegetation in forests, old fields with early succession forest growth, and open fields with tall brush and weeds. Repellents containing DEET, Picaridin, BioUD, IR3535, or oil of lemon eucalyptus as active ingredients are effective against ticks and should be applied to exposed areas of skin before entering tick habitats. When in tick-prone habitats, light-colored clothing should be worn to make ticks more visible. Additionally, pants legs should be tucked into socks and shirts tucked into pants. Permethrin-based repellants should be applied to clothing, socks and shoes. After visiting tick habitats, a person should thoroughly check all body surfaces for ticks and, if found, attached ticks should be removed as soon as possible.

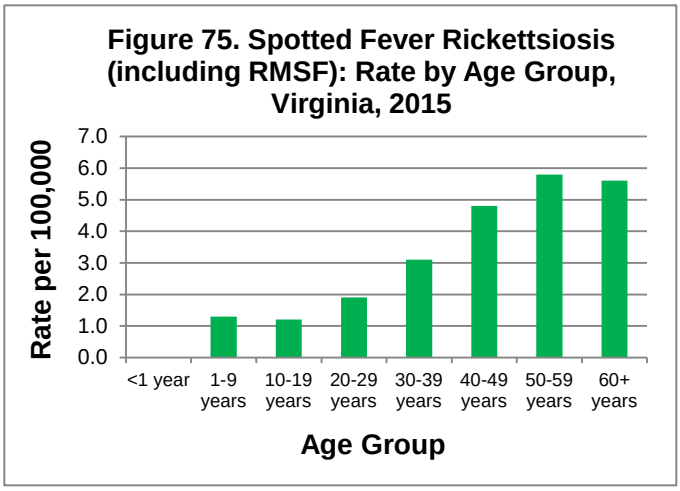
Other Important Information: Although the severity of infections attributable to spotted fever rickettsiosis varies greatly depending on the causative agent, all suspect patients should be treated as if they have RMSF. RMSF can be a serious illness, particularly in untreated patients and patients treated late in the course of illness. About 25% of all untreated RMSF cases are fatal and up to 3% of hospitalized patients die because treatment was provided too late in the course of illness. If tick exposure is noted or RMSF is suspected, treatment should be started based on suspicion of infection and not delayed pending the outcome of diagnostic tests. While SFR case numbers have increased in recent years, case-fatality rates have declined to less than 1% of reported cases. One possible explanation is prompt disease recognition and increased availability and appropriate use of effective antibiotics. Another explanation is the increasing prevalence of other spotted fever group *Rickettsia* (SFGR) species in Virginia's ticks. These other SFGR species may not cause illness in people, or may cause only a mild illness, but exposure to any SFGR causes cross-reactive positive results on blood tests for RMSF. Therefore, it is possible that most reported RMSF cases in recent years are actually due to exposure to non-pathogenic or mildly pathogenic SFGR, and/or to other Rickettsial illnesses such as ehrlichiosis, which cause acute symptoms similar to those of RMSF. Lone star ticks are the most common cause of tick bites in Virginia, and tick surveys have shown that the majority of lone star ticks in Virginia carry a non-pathogenic SFGR, as well as several agents of ehrlichiosis, but do not carry RMSF.

Spotted Fever Rickettsiosis: 2015 Data Summary	
Number of Cases:	296
5-Year Average Number of Cases:	312.0
% Change from 5-Year Average:	-5%
Incidence Rate per 100,000:	3.6

In 2015, 296 cases of spotted fever rickettsiosis were reported in Virginia. This represents a 5% decrease from the five-year average of 312.0 cases per year, and 21% decrease from the 373 cases reported in 2014 (Figure 74).



In 2015, spotted fever rickettsiosis incidence rates increased with age from a rate of 0.0 per 100,000 in the less than one year age group to a rate of 5.8 per 100,000 in the 50-59 year age group and 5.6 per 100,000 in the 60 year and older age group (Figure 75). Although previous U.S. studies had shown higher incidence for RMSF in children under age ten years, more recent U.S. data indicate a shift in the age distribution, with the highest incidence among adults 40 years and older. This is the general pattern observed in Virginia since 2004, and is consistent with the age distribution of Rickettsial diseases other than RMSF, such as ehrlichiosis or anaplasmosis.



Race was not provided for 60% of reported cases. Among cases with a known race, the incidence rate for the white population (1.7 cases per 100,000) was higher than incidence in the "other" and black race populations (0.3 and 0.9 per 100,000, respectively). Incidence among males was almost double the rate among females (4.7 and 2.5 per 100,000, respectively).

Spotted fever rickettsiosis displays a distinctly seasonal pattern. For 80% of cases, symptom onset occurred from May through August, with a peak in June and July (Figure 76). This is consistent with the peak activity periods for the most common human-biting tick species in Virginia.

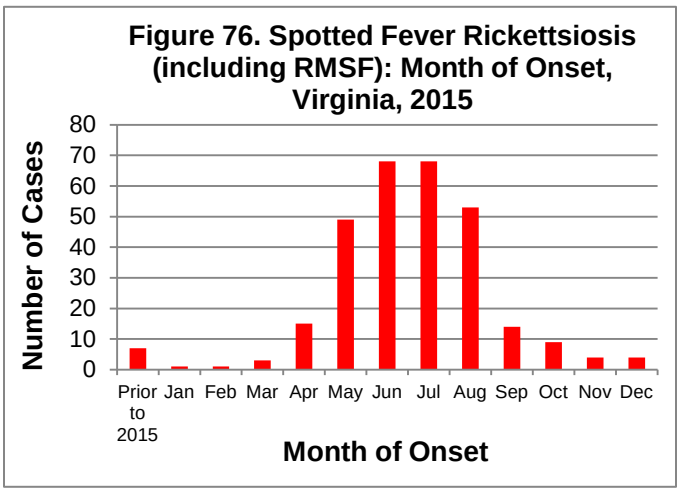
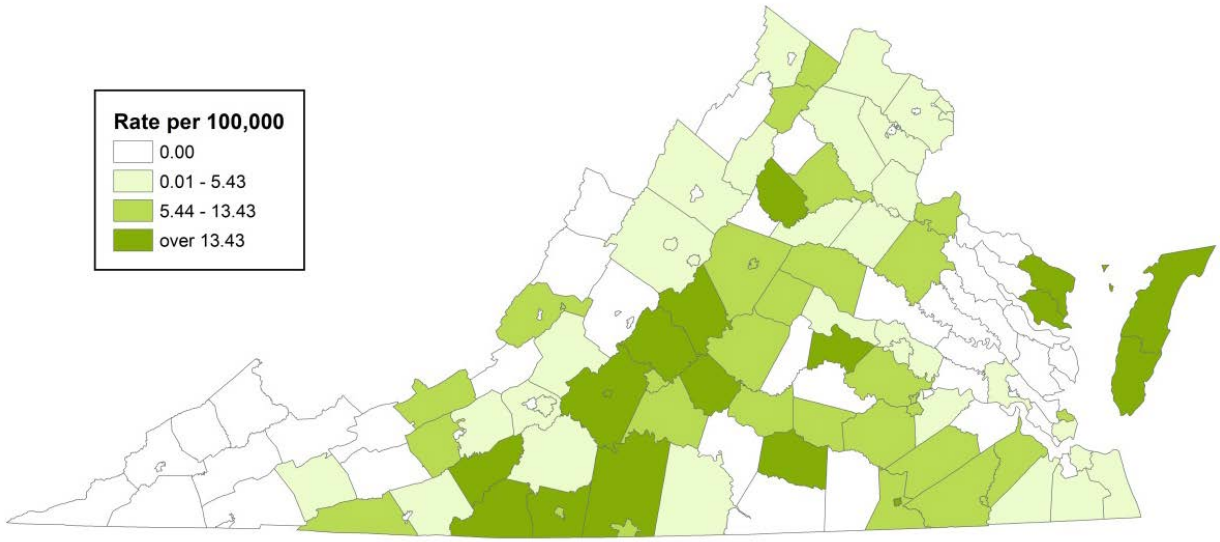


Figure 76. Spotted Fever Rickettsiosis (including RMSF): Month of Onset, Virginia, 2015

The southwest region had the highest incidence rate at 7.1 per 100,000, followed by the northwest and central regions with 4.9 and 4.3 cases per 100,000, respectively. Incidence rates in the eastern and northern regions were lower (2.0 and 1.7 per 100,000, respectively). The northwest and central regions have had high incidence rates since 2009, but the incidence rate in the southwest region increased substantially during 2012 and remained high in 2015. Incidence rates by locality can be viewed in the map below.

Two cases of *Rickettsia parkeri* were identified by laboratory results (PCR) in 2015, one in the eastern region and one in the northern region. *Rickettsia parkeri* is a species of *Rickettsia* transmitted to humans by the Gulf Coast tick (*Amblyomma maculatum)* and occasionally by the lone star tick (*Amblyomma americanum*).

Spotted Fever Rickettsiosis, including RMSF,
Incidence Rate by Locality, Virginia, 2015



Staphylococcus aureus Infection, Invasive, Methicillin-Resistant (MRSA)

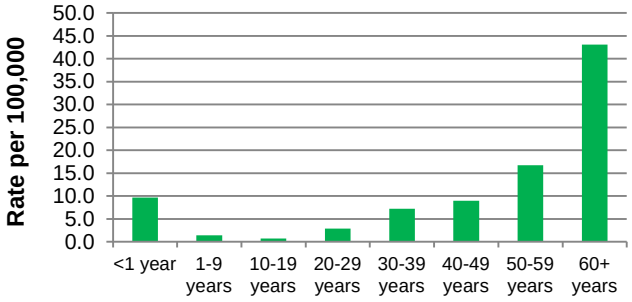
Agent: *Staphylococcus aureus* (bacteria) that have developed resistance to the class of beta-lactam antibiotics, including penicillin, cloxacillin, oxacillin, nafcillin, and methicillin, as well as cephalosporins and carbapenems.
Mode of Transmission: Person-to-person transmission via direct contact with colonized skin or skin lesions of an infected person, or by indirect contact with contaminated personal items or surfaces. Invasive infections occur when the bacteria penetrate normally sterile sites.
Signs/Symptoms: Invasive infections may affect the blood, bone, lung, and lining of the brain and spinal cord and may cause fever, difficulty breathing, chills, pain and other syndrome-specific signs and symptoms. Non-invasive skin and soft tissue infections commonly cause swelling, tenderness, and redness and can manifest as abscesses, boils, or pustules.
Prevention: In the community, preventive measures include practicing proper hygiene and wound care and cleaning hands regularly and thoroughly with soap and water or alcohol-based hand sanitizer. In healthcare settings, control measures include adhering to appropriate infection prevention practices, including management of catheters or other medical equipment, and practicing prudent use of antibiotics.
Other Important Information: Only invasive MRSA infections are required to be reported in Virginia and only laboratories are required to report these infections. Asymptomatic colonization and infections from non-sterile sites (e.g., skin and soft tissue) do not have to be reported to the health department. Reporting of this condition became effective in Virginia on October 26, 2007. As of September 25, 2015, hospitals are also required to provide information to VDH on MRSA bacteremia laboratory-identified events via the CDC's National Healthcare Safety Network. State aggregate data on MRSA bacteremia laboratory-identified events are available in the Healthcare-Associated Infections chapter of this report.

***Staphylococcus aureus* Infection, Invasive, Methicillin-Resistant (MRSA): 2015 Data Summary**	
Number of Cases:	1,142
5-Year Average Number of Cases:	1,236.0
% Change from 5-Year Average:	-8%
Incidence Rate per 100,000:	13.7

In Virginia, 1,142 cases of invasive MRSA infection were reported during 2015. This represents a slight increase from the 1,134 cases reported in 2014, and an 8% decrease from the 5-year average of 1,236 cases per year. The first full reporting year for invasive MRSA infection in Virginia was 2008, with 1,524 cases reported in that year.

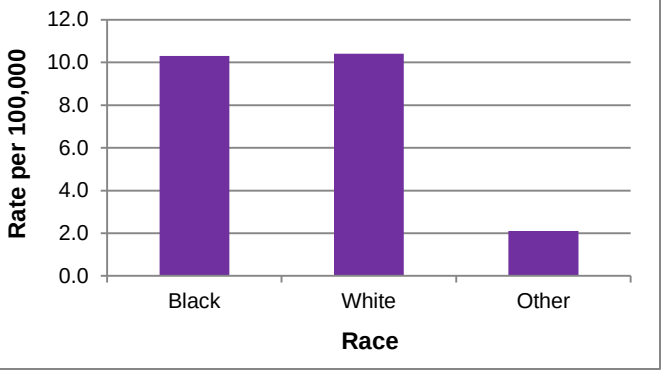
In 2015, with the exception of infants, incidence rates generally increased as age increased (Figure 77). Consistent with previous years, persons 60 years and older experienced the highest number of cases and incidence rate (699 cases, 43.1 per 100,000), followed by the 50-59 year age group (196 cases, 16.7 per 100,000). With 10 cases, infants had an incidence rate of 9.7 per 100,000. Children 10-19 years of age had the lowest number of cases and lowest incidence of all age groups in 2015 (7 cases, 0.7 per 100,000).

Figure 77. *Staphylococcus aureus* Infection, Invasive, Methicillin-Resistant (MRSA): Rate by Age Group, Virginia, 2015



Race was not provided for 29% of cases. Among cases with a known race, the incidence rate in the white population (10.4 per 100,000) was similar to the incidence in the black population (10.3 per 100,000) (Figure 78). This represents the third consecutive year that incidence among the black population was not substantially higher than incidence among the white population. Racial disparities in invasive MRSA have been noted nationally, with the black population having two-fold the incidence rate of the white population. It is unclear why Virginia has seen little difference in incidence between these two populations since 2013. In Virginia, incidence was higher in males compared to females (16.8 and 10.8 per 100,000, respectively).

Figure 78. *Staphylococcus aureus* Infection, Invasive, Methicillin-Resistant (MRSA): Rate by Race, Virginia, 2015

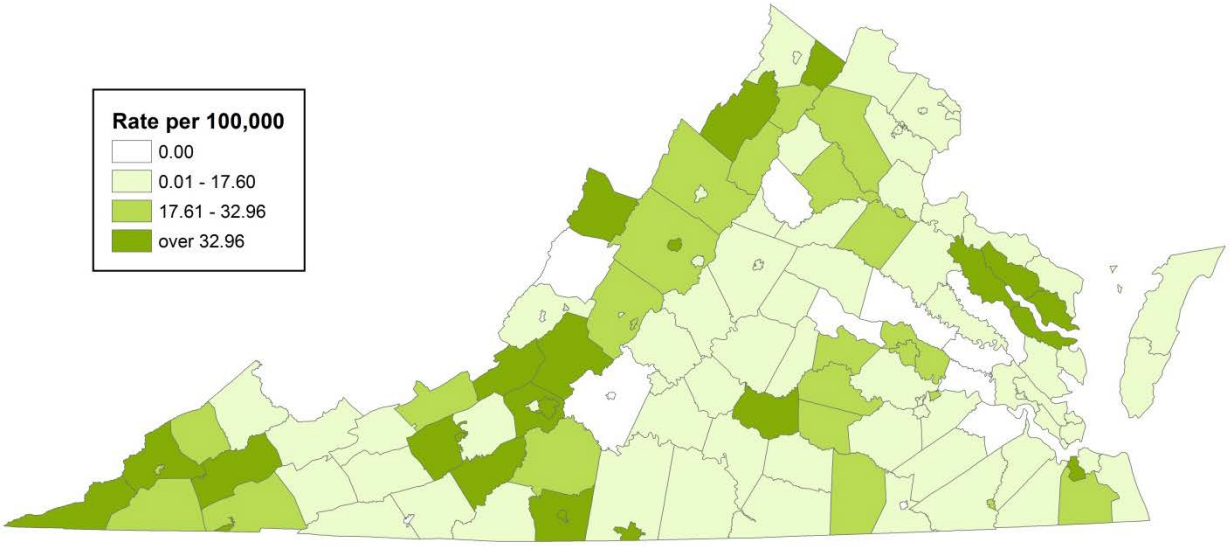


The southwest region had the highest incidence rate (24.9 per 100,000) and the northern region had the lowest (7.4 per 100,000). Incidence is typically higher in the western half of the state. Incidence rates by locality can be viewed in the map below. In general, invasive MRSA infections occurred throughout the year with little seasonal variation.

Three MRSA outbreaks were reported in 2015, but none caused invasive illness. These outbreaks occurred in a hospital in the northwest region, a correctional facility in the central region, and a school in the southwest region. In all situations, the facilities instituted numerous control measures that prevented additional cases.

In 2015, 25 (2%) persons with invasive MRSA infections died. The case-fatality rate was slightly higher in females than males (1% and 0.7%, respectively).

Staphylococcus aureus Infection, Invasive, Methicillin-Resistant (MRSA), Incidence Rate by Locality, Virginia, 2015



Staphylococcus aureus **Infection, Vancomycin-Intermediate (VISA) or Vancomycin-Resistant (VRSA)**

Agent: *Staphylococcus aureus* (bacteria) that have developed intermediate or complete resistance to the antibiotic vancomycin, based on susceptibility testing.
Mode of Transmission: Person-to-person spread through direct contact or through contact with contaminated materials or surfaces.
Signs/Symptoms: Dependent on site of infection (e.g., skin, bone, urinary or respiratory tract) VISA or VRSA infections can cause a range of symptoms including skin infections, abscesses, pneumonia, and infection of the heart valves, bones, or blood. Infection may develop into toxic shock syndrome. Asymptomatic colonization can occur.
Prevention: Preventive measures include appropriate use of antibiotics to treat infections, good hand hygiene, and proper cleaning and disinfecting of contaminated surfaces.
Other Important Information: While VRSA infection became a reportable condition in 1999, VISA infection was not added to the reportable list of conditions until 2007.

In 2015, one case of VISA infection was reported in Virginia. The infection occurred in a female in the 40-49 year age group from the northern region. The individual had a history of MRSA infections. Thirteen VISA cases have been reported in Virginia since surveillance was initiated in 1999. Of note, nine of the 13 VISA cases have occurred in the black population.

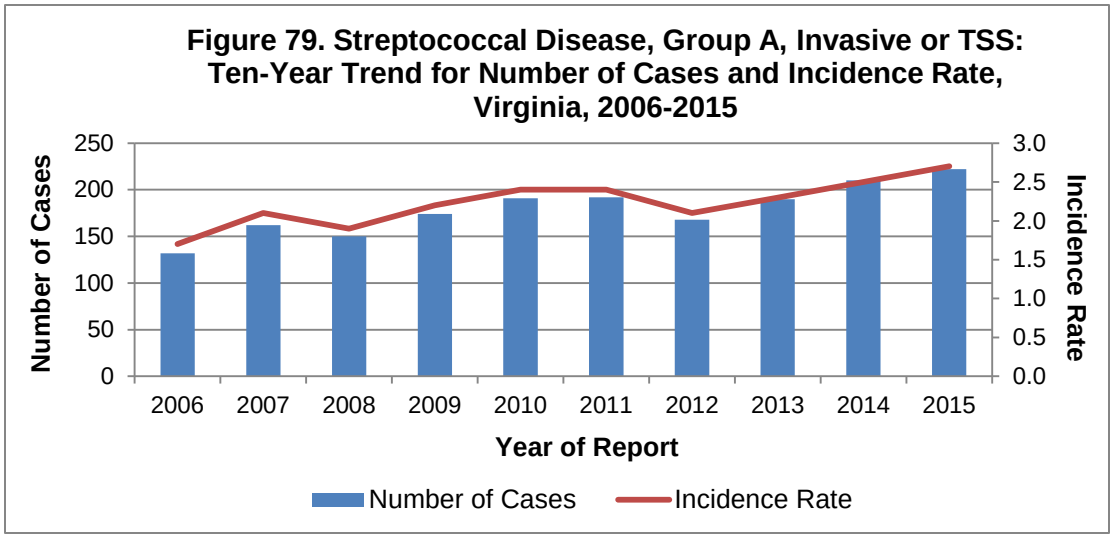
No cases of VRSA have ever been reported in a Virginia resident.

Streptococcal Disease, Group A, Invasive or Toxic Shock Syndrome

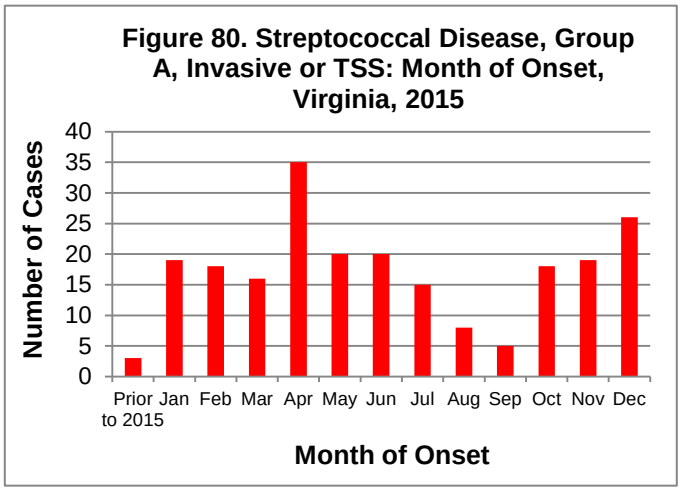
Agent: *Streptococcus pyogenes* (bacteria)
Mode of Transmission: Person-to-person transmission through respiratory droplets, contact with infected wounds or sores, or (rarely) through indirect contact with objects contaminated with the body fluids of infected persons.
Signs/Symptoms: People may carry group A streptococci in the throat or on the skin and have no symptoms of illness. Most Group A Strep infections are relatively mild, such as "strep throat" or impetigo (a skin infection). Rarely, the bacteria can lead to severe invasive infections of the blood or other internal body fluids if they enter a normally sterile site. Invasive infections often require hospitalization and may cause death.
Prevention: The spread of all types of Group A Strep infection can be reduced by careful attention to hand washing, especially after coughing or sneezing. Other preventive measures include prompt identification and treatment of non-invasive cases (such as strep throat) and temporary exclusion of infected persons from work, school or daycare until 24 hours after taking an appropriate antibiotic. Wounds should be kept clean, and medical care should be sought at the first signs of infection.
Other Important Information: Most people who come into contact with Group A Strep will not develop invasive disease. Persons at higher risk for developing invasive Group A Strep infections include older persons, immunocompromised persons, and those with chronic, underlying conditions (such as diabetes). The two most severe, but least common, forms of invasive Group A Strep infections are necrotizing fasciitis (NF) and streptococcal toxic shock syndrome (TSS). NF infections present with severe pain and rapid destruction of muscles, fat, and skin tissue. Streptococcal TSS infections are characterized by shock and rapid organ failure.

Streptococcal Disease, Group A, Invasive or TSS: 2015 Data Summary	
Number of Cases:	222
5-Year Average Number of Cases:	190.2
% Change from 5-Year Average:	+17%
Incidence Rate per 100,000:	2.7

During 2015, 222 cases of invasive Group A Strep infection were reported in Virginia. This represents an almost 6% increase from the 210 cases reported in 2014, and a 17% increase from the five-year average of 190.2 cases per year. This is the third consecutive year that the number of cases of invasive Group A Strep reported in Virginia has increased (Figure 79). Among the 222 cases, 203 persons were reported with invasive Group A Strep infections (age range: less than one to 95 years), and 19 persons were reported with streptococcal toxic shock syndrome (age range: 36 to 73 years).



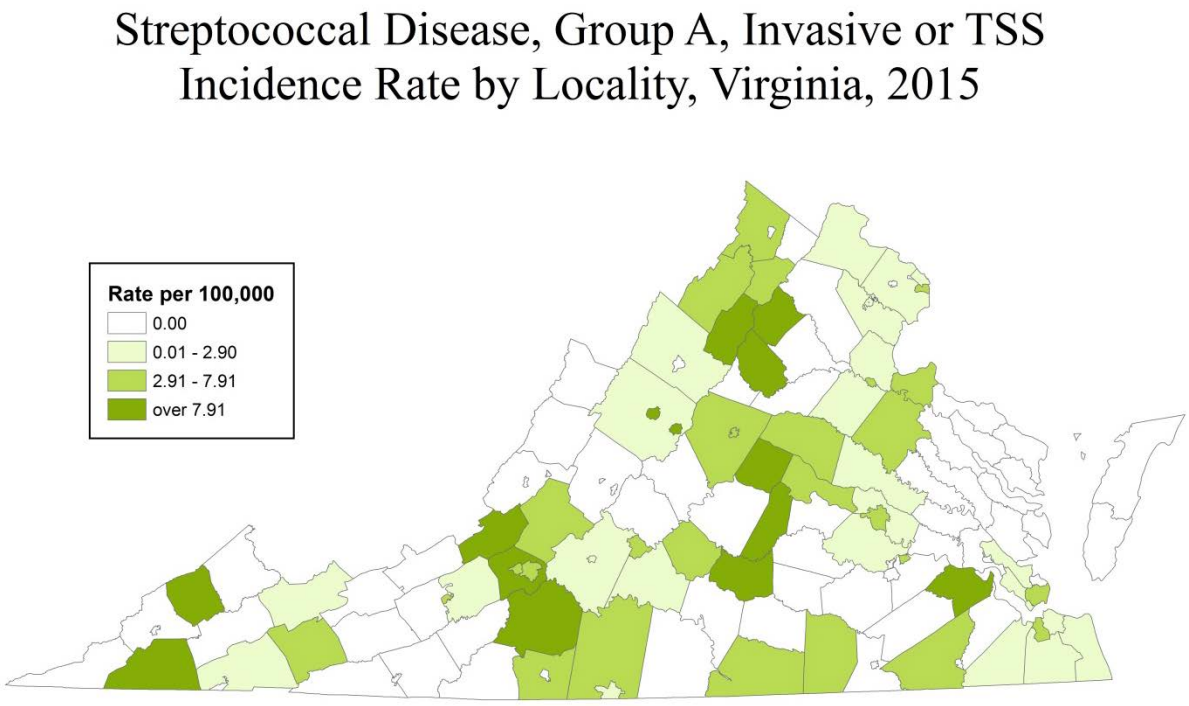
The highest number and incidence rate of invasive Group A Strep infections occurred in the 60 year and older age group (99 cases, 6.1 per 100,000). This was followed by the 50-59 and 40-49 year age groups, with incidence rates of 2.8 and 2.3 per 100,000, respectively. The other age groups had rates between 0.5 and 2.1 per 100,000. Information on race was provided for 85% of reported cases. Incidence rates did not vary widely between races, with the highest rate reported in the black population (2.4 per 100,000), followed by the white and "other" race populations (2.2 and 2.1 per 100,000, respectively). Incidence was similar among males and females (2.6 and 2.7 per 100,000, respectively). Geographically, incidence was highest in the southwest region (3.9 per 100,000), followed by the northwest region (3.3 per 100,000). Rates in the other regions ranged from 2.0 to 2.7 per 100,000. Information on incidence rates for individual localities is presented in the map below.



While cases occurred throughout the year, the majority of cases (34%) were reported during the second quarter with a peak in April (Figure 80). Among the 222 cases reported in 2015, nine persons died as a result of invasive Group A Strep infection (age range: 48 to 93 years), and six died from streptococcal toxic shock syndrome (age range: 41 to 73 years). Of these fifteen total deaths, 67% occurred in individuals aged 60 years and older.

Three invasive Group A Strep outbreaks were reported in 2015; one occurred in a nursing home, one occurred in a medical facility (non-long-term care), and one occurred in an assisted living facility. Two invasive Group A Strep outbreaks occurred in the southwest region and one occurred in the central region. Additionally, nine non-invasive Group A Strep outbreaks were reported in 2015. Non-invasive Group A Strep outbreaks typically cause respiratory or rash illnesses, primarily

presenting as “strep throat”. Of the nine non-invasive Group A Strep outbreaks, five occurred in a school (K-12) setting, and four occurred in a daycare/pre-K facility. Three of these outbreaks due to non-invasive strep infections were reported from the central region, three from the northwest region, and three from the northern region.

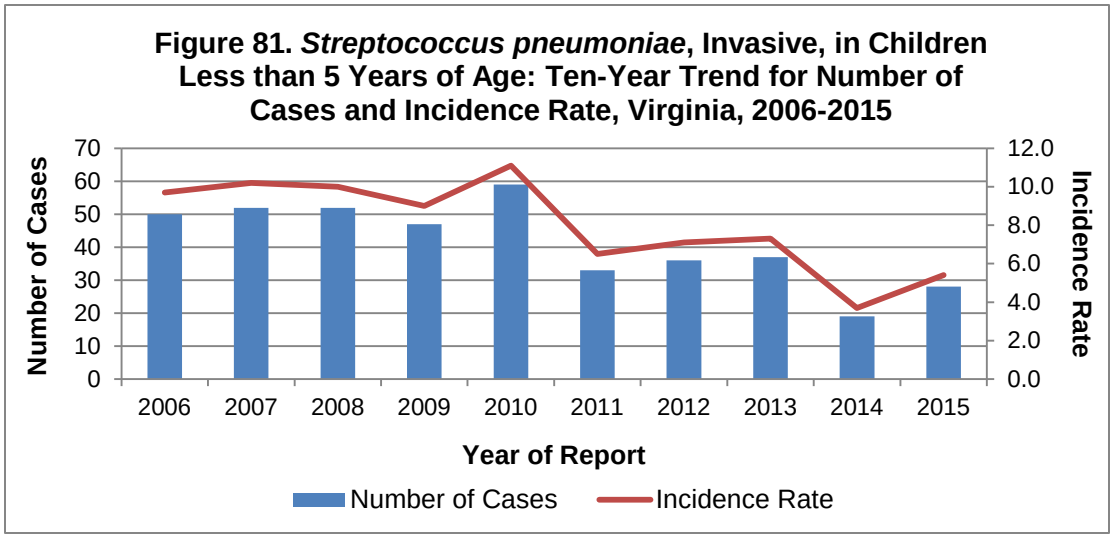


Streptococcus pneumoniae, Invasive, in Children Less than 5 Years of Age

Agent: *Streptococcus pneumoniae* (bacteria)
Mode of Transmission: Person-to-person transmission via respiratory droplets or direct contact with respiratory secretions from persons carrying the bacteria in their upper respiratory tract.
Signs/Symptoms: Invasive pneumococcal disease (IPD) may affect the blood, lung, and lining of the brain and spinal cord and may cause fever, chills, and irritability. Headache, stiff neck, confusion, sleepiness, vomiting, and poor feeding can occur with meningitis.
Prevention: Routine immunization with pneumococcal conjugate vaccine as a 4-dose series is recommended for infants at 2, 4, 6, and 12 to 15 months of age. IPD can be hard to treat because of antibiotic resistance, thus making prevention through vaccination even more important. The 7-valent conjugate vaccine was first licensed in the U.S. in 2000 and was replaced with a 13-valent vaccine that was licensed in 2012. Following the introduction of the 13-valent vaccine, clients that completed the immunization series were recommended to receive a booster dose for protection against the additional strains. Clients two years of age and over with certain high-risk conditions are also recommended to receive one dose of a 23-valent polysaccharide vaccine following series completion with pneumococcal conjugate vaccine. Vaccination with 13-valent followed by 23-valent polysaccharide vaccine is also recommended for adults aged 65 years or older, and other persons at increased risk for infection.
Other Important Information: There are more than 90 known serotypes of *S. pneumoniae*. Although all serotypes may cause serious disease, a relatively limited number of serotypes cause the majority of invasive infections. From 1998 (two years before implementation of routine immunization of infants with 7-valent pneumococcal conjugate vaccine) through 2007, incidence of vaccine-type invasive pneumococcal infections decreased by 99% in children less than 5 years of age, and the incidence for all pneumococcal infections decreased by 76%. Today *S. pneumoniae* continues to be the leading cause of bacterial meningitis among children less than 5 years of age in the United States.

***Streptococcus pneumoniae*, Invasive, in Children Less than 5 Years of Age: 2015 Data Summary**	
Number of Cases:	28
5-Year Average Number of Cases:	36.8
% Change from 5-Year Average:	-24%
Incidence Rate per 100,000:	5.4

In 2015, 28 cases of invasive *S. pneumoniae* infection in children less than five years of age were reported in Virginia representing a 24% decrease when compared to the five-year average, but an increase of eleven cases when compared to 2014. A similar increase was seen in 2010 and could be indicative of a cyclical trend with the disease (Figure 81).



The incidence rate in children less than one year of age (10.7 per 100,000) was more than double compared to children one to four years of age (4.1 per 100,000). Race was reported for 79% of cases. Among those with a known race, incidence in the black population (7.4 per 100,000) was twice the rate in the white population (3.7 cases per 100,000). Incidence in males (6.5 per 100,000) was higher than females (4.4 per 100,000). Incidence rates have been adjusted to reflect populations less than five years of age.

Three regions were at or above the state incidence rate of 5.4 cases per 100,000. The central region had the highest incidence rate (7.4 cases per 100,000), followed by the southwest region (5.7 cases per 100,000) and the northwest region (5.4 cases per 100,000). Rates in the eastern and northern regions were 5.1 and 4.6 cases per 100,000, respectively. Cases occurred throughout the year with the highest percentage of onset reported in the fourth quarter (36%) and the lowest percentage reported in the first quarter (18%). Twenty-one (75%) of the 28 cases were hospitalized. One death related to invasive pneumococcal disease was reported in a child in 2015.

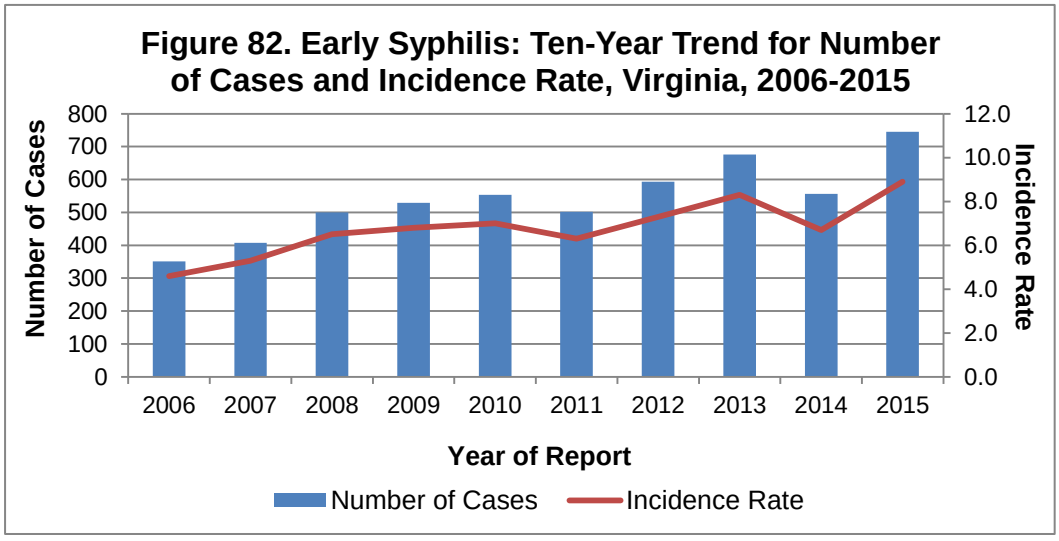
Syphilis

Agent: *Treponema pallidum* (bacteria)
Mode of Transmission: Through sexual intercourse, from mother to child through the placenta (or during birth) and via blood transfusion from an infected donor in the early stage of disease.
Signs/Symptoms: The primary stage is characterized by a painless sore (chancre). The secondary stage includes a skin rash and lesions of the mucous membranes. A latent period follows with no clinical symptoms. If left untreated, late latent syphilis occurs. The central nervous system, skin, bones and heart may become sufficiently damaged, causing disability or death.
Prevention: Preventive measures include safe sexual practices, screening of all women during early pregnancy to prevent infection of infants, and treatment of infected partners.
Other Important Information: In 2015, there was a 29% increase in reported early syphilis in Virginia compared to the five-year average. Nationwide, early syphilis is on the rise, particularly among men who have sex with men (MSM).

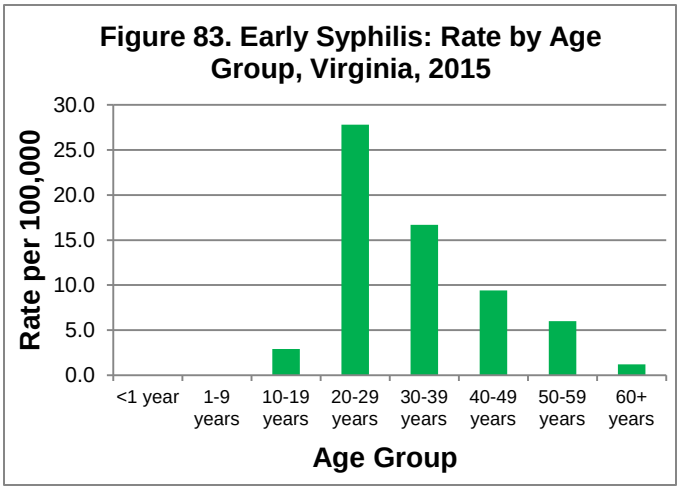
Early Syphilis: 2015 Data Summary	
Number of Cases:	745
5-Year Average Number of Cases:	576
% Change from 5-Year Average:	+29%
Incidence Rate per 100,000:	8.9

Early Syphilis

"Early syphilis" refers to the symptomatic primary and secondary stages of syphilis, as well as asymptomatic early latent syphilis. In 2015, 745 early syphilis cases were reported in Virginia. This is a 29% increase from the five-year average of 576 cases (Figure 82). In Virginia and nationwide, early syphilis is most frequently diagnosed in MSM.



As in previous years, the highest incidence rate occurred in the 20-29 year age group (27.8 per 100,000), followed by the 30-39 year age group (16.7 per 100,000) (Figure 83). No early syphilis cases were reported in children less than ten years of age. Information on race was provided for 98% of reported cases. The incidence rate in black individuals (24.8 per 100,000) was more than five times the incidence rate observed in white individuals (4.5 per 100,000) and more than four times the incidence rate observed in the "other" race population (5.6 per 100,000). The incidence rate among males is twelve times that of females (16.8 and 1.4 per 100,000, respectively). The highest incidence of early syphilis occurred in the eastern region (15.8 cases per 100,000), followed by the central region (13.2 cases per 100,000), northern region (6.3 cases per 100,000), southwest region (5.0 cases per 100,000) and northwest region (3.6 cases per 100,000). For incidence rates by locality, please see the map below.



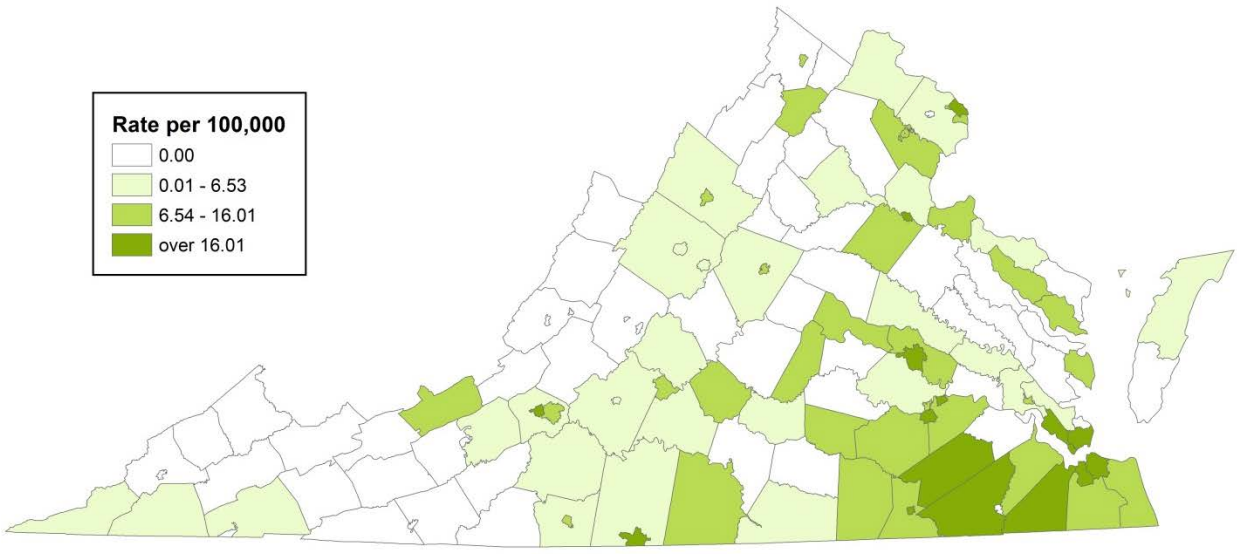
Congenital Syphilis

Congenital syphilis is a condition affecting an infant whose mother had untreated or inadequately treated syphilis at delivery. Diagnosis is based on maternal serologic testing and treatment; an infant who shows no clinical symptoms of congenital syphilis whose mother was not sufficiently treated in the CDC-designated timeline is counted as a case. Three cases of congenital syphilis were reported in Virginia in 2015. There were three cases of congenital syphilis reported in 2014 and two in 2013, before which there had not been more than one case reported per year since 2009. In the U.S., 458 cases of congenital syphilis were reported during 2014 compared to 348 cases reported in 2013. The Centers for Disease Control and Prevention considers each case of congenital syphilis in the U.S. to be a sentinel event representing a public health failure.

Late Latent Syphilis

Late latent syphilis is diagnosed when the patient has no symptoms of primary or secondary syphilis and no evidence that infection was acquired within the preceding 12 months. In 2015, 275 cases of late latent syphilis were reported in Virginia, an 11% decrease from 2014. Of all men diagnosed with syphilis in 2015, 21% were diagnosed in the late latent stage, compared to 60% of women with syphilis.

Syphilis, Early Stage, Incidence Rate by Locality
Virginia, 2015



Tetanus

Agent: Toxin secreted by the bacteria *Clostridium tetani*
Mode of Transmission: The bacteria enter the body through a break in the skin, usually when a wound, either major or minor, is infected by contaminated soil, dust, or animal or human feces. Person-to-person transmission does not occur.
Signs/Symptoms: A descending pattern of painful muscle contractions, particularly of the neck muscles, difficulty swallowing and abdominal rigidity.
Prevention: Tetanus vaccine is available as part of the diphtheria/tetanus/pertussis (DTaP) vaccine for children and the combination tetanus/diphtheria/pertussis (Tdap) vaccine for adolescents and adults. One dose of Tdap should be given at 11 to 12 years of age with booster doses of tetanus/diphtheria (Td) every ten years thereafter.
Other Important Information: Tetanus was made nationally reportable in 1947. Since then, incidence of tetanus has declined over 95% and tetanus-related deaths have declined over 99%. Production of tetanus toxoid (TT) began in 1924 and was initially used for armed services personnel during World War II. It was included in the routine childhood immunization schedule in the late 1940s. Universal vaccination, including boosters for adolescents and adults, along with use of tetanus antitoxin for wound management, is primarily responsible for the decline of cases and death from tetanus. The case-fatality rate of tetanus ranges from 10% to over 80% and depends on patient age, length of incubation period, and quality of and access to care, especially access to intensive care unit resources and tetanus immune globulin. Sporadic cases of tetanus continue to occur in adults, especially in people who were never vaccinated or did not receive ten-year booster shots. Proper wound management is necessary for all wounds, even wounds that appear to be minor, as a higher proportion of patients with tetanus in recent years had minor wounds.

No cases of tetanus were reported in Virginia in 2015. Two cases of tetanus were reported in Virginia in 2013 and one case was reported in 2012. The five-year average for tetanus is less than one case per year.

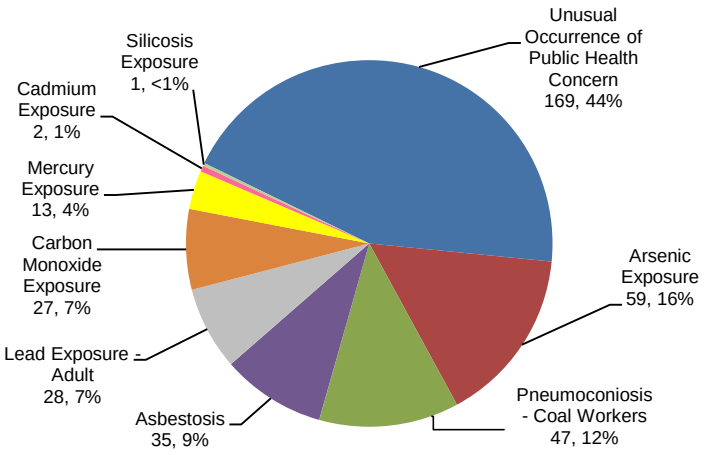
Toxic Substance-Related Illness

Agent: Multiple agents, including heavy metals (e.g., lead, cadmium, mercury, arsenic), occupational dusts or fibers (e.g., coal, silica, asbestos), gases (e.g., carbon monoxide, methane), pesticides, or radioactive materials.
Mode of Transmission: Varies depending on agent; can include absorption through skin, ingestion, or inhalation.
Signs/Symptoms: Varies depending on agent, route, dose and duration of exposure. Chronic occupational dust or fiber exposure may increase the risk of lung cancer, mesothelioma and nonmalignant lung disorders. Heavy metals, gases and pesticides may damage nervous, hepatic (liver), digestive, or reproductive systems.
Prevention: Eating, drinking, or smoking should not occur in contaminated work areas. Hands and face should be washed with soap and water after contact with toxic materials. After working with potential toxic substances, showering and changing clothes should occur at the worksite, if possible. Preventive measures include strict adherence to safety guidelines and requirements.
Other Important Information: Improving public and healthcare professional awareness and recognition of various toxic substance exposures can help reduce subsequent illness.

Toxic Substance-related Illness: 2015 Data Summary	
Number of Cases:	381
5-Year Average Number of Cases:	309.8
% Change from 5-Year Average:	23%
Incidence Rate per 100,000:	4.6

In 2015, 381 cases of toxic substance-related illness were reported in Virginia. This is a 7% increase from the 357 cases reported in 2014, and a 23% increase from the five-year average of 309.8 cases per year. A determination of illness is based upon a physician's diagnosis, a laboratory finding outside an occupational standard, or when no standard exists, outside expected normal values. Toxic substance exposures are identified by public health professionals from electronic laboratory reports, death certificates, and through claims by exposed persons to the Virginia Workers' Compensation Commission (WCC). The two most frequently reported toxic substance-related conditions in 2015 were arsenic exposure and coal workers' pneumoconiosis. These were followed by asbestosis, lead and carbon monoxide exposure (Figure 84). Other toxic substance-related exposures reported during 2015

Figure 84: Reported Toxic Substance-Related Illness, by Illness or Exposure Type, Virginia, 2015



included mercury, silicosis and cadmium exposures. Illness from exposure to rarely reported substances were also captured. While the occurrence of most types of toxic substance exposure or illness has remained very similar in recent years, more "unusual occurrences of public health concern" were captured in 2014 and 2015 compared to the previous years. These included unintentional workplace exposures to aerosol cleaners, solvents, exhaust fumes, and methane, or other illness sustained during a toxic substance or chemical release. Inhalation was the most common route of exposure, followed by dermal contact then ingestion.

Arsenic exposure has continued to be one of the most frequently reported toxic substance exposures in Virginia, due in part to the presence of arsenic in various foods, particularly fish and shellfish. Since the 2012 spike of 92 cases, arsenic trends have been declining and are showing proof of stabilization including the 66 exposures reported in 2013, 57 exposures in 2014, and the 59 exposures in 2015. The 2012 spike was due to a more thorough and comprehensive reporting approach through utilization of electronic laboratory reporting. Of the 59 arsenic exposures in 2015, 49 cases did not present with any clinical symptoms. This is common in many elevated total arsenic cases due to exposure through ingestion of seafood versus detrimental inhalation or ingestion of inorganic, carcinogenic types of arsenic. Exposure to the inorganic, carcinogenic form commonly happens through cigarette smoke or in contaminated drinking water.

Coal workers' pneumoconiosis, also referred to as black lung disease, is an industrial disease that is the result of breathing in dust from coal, graphite, or man-made carbon over a period of years. The dust particles reside in the lungs following inhalation and build up over time. This creates chronic exposure due to the lungs not being able to excrete the dust. This continued exposure causes inflammation, fibrosis, and necrosis. Although rates of pneumoconiosis have declined since the Federal Coal Mine Health and Safety Act of 1969, new cases appear each year in Virginia. In 2015, 47 cases of coal workers' pneumoconiosis were reported. Nearly all were associated with working in the coal mining industry, and were mostly identified through surveillance of death certificates. This nearly 500% increase in cases from the eight cases reported in 2014 is likely due to the delayed reporting of death certificate data. Some death certificates of persons who died in 2014 as a result of coal workers' pneumoconiosis were not received until 2015. As a result, these deaths were counted as 2015 cases. This may have artificially reduced the case count for 2014, while increasing the number for 2015.

The number of reported asbestos exposures has remained relatively stable over the past decade, with only a slight increase for the current year. In 2015, 35 persons were reported with asbestos exposure in Virginia. The age of reported individuals ranged from 29-94 years, with a mean of 77 years. The majority of cases were 70 years or older which reflects current illness from exposures that occurred before regulatory standards and guidelines went into effect. Of those reporting exposure, all were male and 29 cases (83%) were white. Asbestos exposures were reported mainly by death certificates (86%), followed by reporting through the Worker's Compensation Commission (14%).

Reports of adult lead exposures (≥25 μg/dL of lead in blood for persons aged 16 years or older) continue to decrease. In 2015, 28 cases of elevated blood lead levels in adults were reported compared to the 181 cases in 2006. Of the 28 reported cases, 96% were male. The majority of reported cases with elevated lead exposure did not include information on occupation or industry. Among those who did, historic preservation, lead and asbestos abatement, and radiator repairs were the most common industries listed. Greater awareness of the dangers of lead exposure, as well as enforcement of workplace lead safety standards, has contributed to the decrease in reported exposures. Lead exposures among children aged 15 years and younger are discussed in the childhood lead section of this report.

In 2015, 27 carbon monoxide exposures were reported in Virginia compared to the 93 reported exposures in 2014. This dramatic decrease was due, in part, to a large number of workers being exposed at a produce facility in 2014. The workers of the produce facility were thought to have been exposed to carbon monoxide from forklift exhaust located inside the facility. The majority of cases reported in 2015 worked in various industries including automobile, construction, and law enforcement. Twelve exposures were reported through death certificate surveillance and were the result of exposure to vehicle exhaust or carbon monoxide within the home. Ten cases were reported through the WCC. The majority of exposures were occupational, while most deaths were a result of accidental poisonings due to vehicle exhaust or carbon monoxide inside the home.

A declining trend phenomenon has been seen in the reporting of cadmium and mercury exposures over the last decade. The number of reported cases of cadmium has dropped noticeably in the last two years, and now only accounts for 1% of all reported toxic substance-related exposures. Mercury exposures have been declining as well. Only 13 reported exposures to mercury were reported in 2015. Mercury accounted for 3% of all reported toxic substance exposures in 2015.

Among all reported toxic substance exposures, the largest proportion of cases (30%) and the highest incidence rate (7.6 per 100,000) occurred in the 60 year and older age group. Incidence rates ranged from 1.0 to 6.2 per 100,000 among the remaining age groups, averaging 4.4 per 100,000. This age distribution reflects the large proportion of cases identified by public health through WCC reports and death certificates, which are likely to represent long-term exposures. Race information was not reported for 66% of toxic substance-related cases. As such, no statement can be made about the distribution of toxic substance exposures by race. Males accounted for 67% of all cases. The incidence rate among males was twice the rate of females (6.2 and 2.9 per 100,000, respectively). The southwest region had the highest incidence rate at 7.5 per 100,000. Rates in other regions ranged from 2.6 to 5.0 per 100,000.

Trichinosis

Agent: Roundworms of genus *Trichinella; T. spiralis* is the most common cause of human infections.
Mode of Transmission: Eating raw or undercooked contaminated meat, including bear, pork, wild feline (such as cougar), fox, dog, wolf, horse, seal, or walrus. Trichinosis is not transmitted from person to person.
Signs/Symptoms: Usually occur in 1-2 days after consuming contaminated meat and may include nausea, diarrhea, vomiting, fatigue, fever, and abdominal discomfort. Headaches, fever, chills, cough, eye swelling, aching joints and muscle pains, itchy skin, diarrhea, or constipation may follow. Individuals may be asymptomatic, but severe or even fatal infections can occur.
Prevention: All meat should be cooked to safe temperatures and a meat thermometer should be used to measure the internal temperature of cooked meat. Whole cuts of meat (excluding poultry and wild game) should be cooked to at least 145 degrees Fahrenheit. Ground meat (excluding poultry) and wild game (both whole cuts and ground) should be cooked to at least 160 degrees Fahrenheit. All poultry products should be cooked to at least 165 degrees Fahrenheit. Meat grinders should be cleaned thoroughly after each use.
Other Important Information: Trichinosis used to be more common in the United States, but has decreased dramatically in the past forty years. Consumption of raw or undercooked pork products was the most common risk factor. Now, more cases in the United States are associated with consuming raw or undercooked wild game meats than with pork products. Curing, drying, smoking or microwaving meat alone does not always kill infective worms. Homemade jerky and sausage have reportedly been the cause of many cases in recent years.

No cases of trichinosis were reported in Virginia in 2015. One case was reported in 2014. The five-year average for trichinosis in Virginia is 1.4 cases per year.

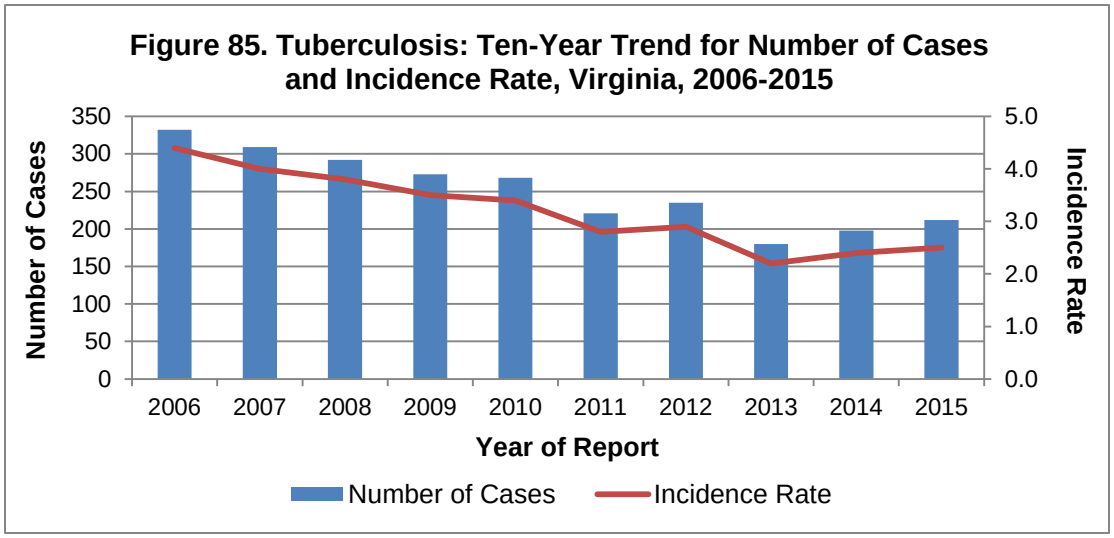
Tuberculosis

Agent: *Mycobacterium tuberculosis* (bacteria)
Mode of Transmission: Inhalation of tubercle bacilli via airborne droplets produced when patients with pulmonary or respiratory tract tuberculosis (TB) exhale the bacilli through coughing, singing, or sneezing.
Signs/Symptoms: Dependent on the organ(s) affected. General systemic signs and symptoms include fever, chills, night sweats, weight loss and fatigue. Symptoms of pulmonary tuberculosis may also include a prolonged (i.e., greater than 3 weeks) productive cough and coughing up blood.
Prevention: Control measures include the prompt identification, diagnosis and treatment of persons with infectious tuberculosis, followed by timely contact investigations to identify and treat additional persons with active tuberculosis disease and persons with latent tuberculosis infection. Special infection control measures should be practiced in high-risk settings.
Other Important Information: Persons with latent tuberculosis infection do not have any signs or symptoms of disease. These persons do not spread tuberculosis bacteria. Approximately 10% of those infected with tuberculosis will develop active disease during their lifetime, with the greatest risk for disease progression during the two years following infection. Co-infection with HIV and other immune suppressing conditions represent the greatest risks for progression to active disease.

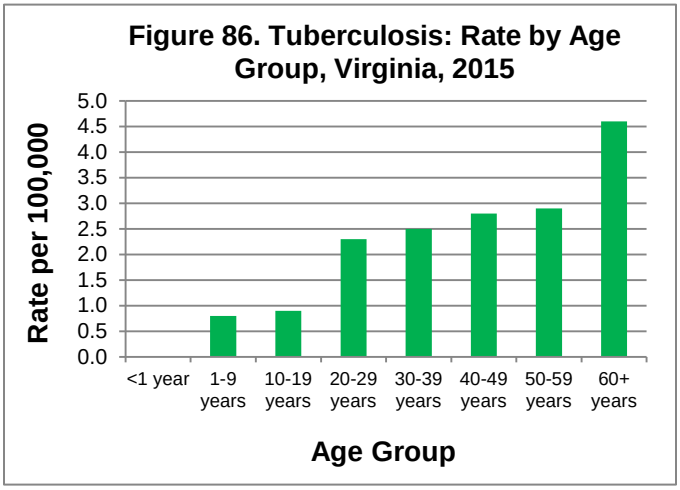
Tuberculosis: 2015 Data Summary	
Number of Cases:	212
5-Year Average Number of Cases:	220.4
% Change from 5-Year Average:	-4%
Incidence Rate per 100,000:	2.5

The 212 cases of tuberculosis reported in Virginia during 2015 were less than the 5-year average of 220.4 cases per year, but represent a 7% increase in reported cases compared to 2014. This is the second consecutive year of increase and may indicate a slowing in the decline of TB in Virginia (Figure 85). After two decades of decline in the United States, CDC reports a leveling of TB incidence for 2013-2015 to 3.0 per 100,000 persons. Virginia ranked seventh in the nation for reported TB cases with an incidence rate of 2.5 per 100,000 population.

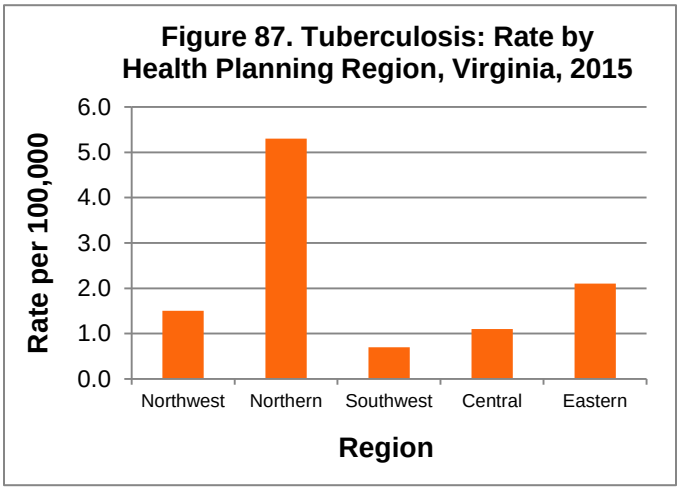
The increase in reported cases of tuberculosis in Virginia in 2015 can largely be attributed to a 14% increase in cases among foreign-born persons, from 147 in 2014 to 167 in 2015. For 2015, the five most frequent countries of origin for persons with TB born outside the U.S. were the Philippines, India, Viet Nam, Ethiopia, and Korea. Among U.S. born cases, the number decreased 12% from 51 persons in 2014 to 45 in 2015.



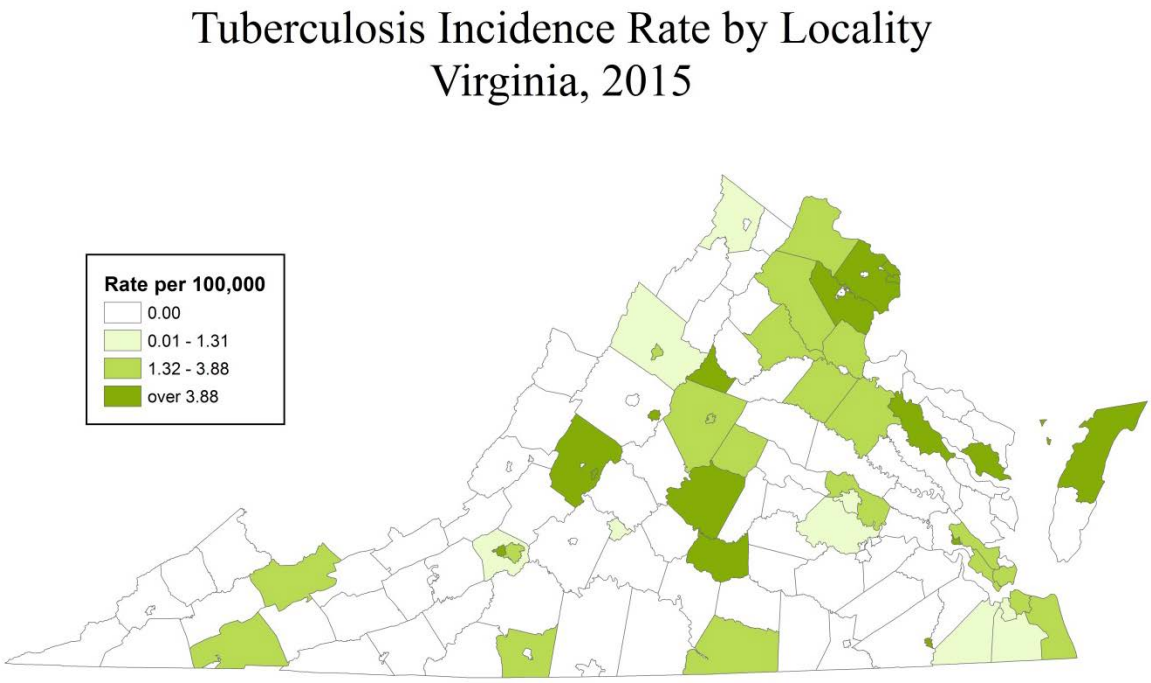
Incidence rates were higher in adults compared to children and adolescents. The highest incidence occurred among those in the 60 year and older age group (4.6 cases per 100,000), followed by those aged 50-59 (2.9 per 100,000) (Figure 86). Incidence among other adult age groups ranged from 2.3 to 2.8 cases per 100,000. Incidence among children ranged from 0.8 per 100,000 in the 1-9 year age group to 0.9 per 100,000 in the 10-19 year age group. No cases occurred among infants in 2015. Information on race was provided for all reported cases. The highest incidence was observed in the "other" race population (14.9 per 100,000), while incidence was substantially lower in the black and white populations (3.1 and 1.1 per 100,000, respectively). Males had slightly higher incidence (2.7 per 100,000) than females (2.5 per 100,000).



The highest number of cases and highest incidence rate (129 cases, 5.3 per 100,000) occurred in the northern region, where 72% of the foreign-born TB cases live (Figure 87). Incidence in the other regions ranged from 0.7 per 100,000 in the southwest region to 2.1 per 100,000 in the eastern region. Incidence by locality can be seen in the map below.



During 2015, drug susceptibility testing was performed for 171 culture positive cases. Of these, 12 cases (7%) were found to be drug resistant to one or more first-line drugs, most frequently being the drug isoniazid. In addition, one case (1%) was found to be multidrug-resistant (resistant to isoniazid and rifampin). Drug resistance to one or more first-line drugs has shown a general decline over the previous four years, while the number of multidrug-resistant cases has remained relatively stable. For treatment outcomes, 2014 is the most recent year for complete data with 96% of the drug-susceptible cases completing therapy within 12 months. No outbreaks were attributed to TB during 2015.



Tularemia

Agent: *Francisella tularensis* (bacteria)
Mode of Transmission: Transmission in the United States is primarily by the bite of an infected tick such as the American dog tick, the lone star tick, or occasionally by the bite of an infected deer fly. Hunters can contract the disease while cleaning infected game or when eating infected meat that is raw or undercooked. Humans can also become infected by drinking water contaminated by infected animals, by contaminating their eyes with infected material, or by breathing *F. tularensis* spores from the dried carcasses or pelts of animals that died from tularemia. Cases have also been associated with cat and hamster bites. Because *F. tularensis* is highly infectious when grown in culture, laboratorians who work with the bacteria can became infected with the bacteria through wound contamination, or inhalation of aerosolized material. The bacteria are not transmitted directly from person to person.
Signs/Symptoms: Symptoms vary depending on the mode of transmission, but usually include sudden onset of high fever, chills, fatigue, general body aches, headache and nausea. An ulcer can occur at the site of infectious bites or wounds, and proximate lymph nodes can become swollen and painful. Ingestion can result in painful pharyngitis, abdominal pain, diarrhea and vomiting. Pulmonary infection can result in pneumonia and requires prompt identification and treatment to prevent development of life-threatening illness.
Prevention: Preventive measures include minimizing the risk of tick bites by the use of both appropriate dress and insect repellants when recreating or working in tick habitats, and avoiding the consumption of untreated water. Impervious protective gloves should be used when skinning rabbits and other wild game. Utensils used for preparing meat from game should not be used to prepare other food items. Undercooked meat should not be consumed. Mowing over dead animals should be avoided to lower the risk of aerosolizing infectious particles.
Other Important Information: Wild animals are the reservoir for *F. tularensis* with rabbits, hares, and rodents being especially susceptible to infection. Tularemia is classified as a potential bioweapon because its spores are relatively easy to disseminate as a breathable aerosol or as a food and water contaminant. Most tularemia infections can be successfully treated with antibiotics.

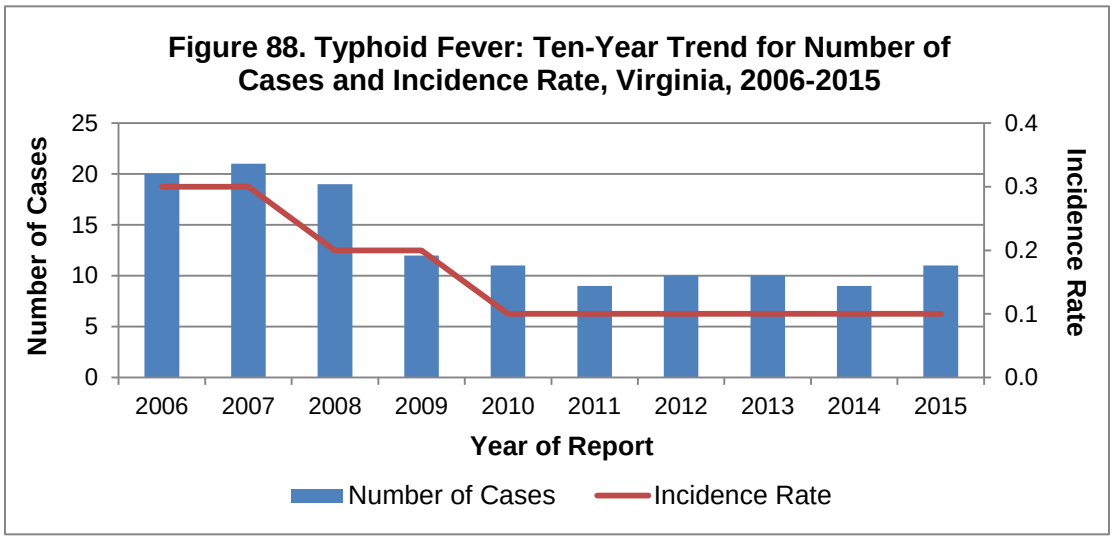
In 2015, four cases (two confirmed and two probable) of tularemia were reported in Virginia. This is higher than the 5-year average of 2.2 cases per year. Both confirmed cases were reported in adults and both probable cases were reported in school-aged children. Cases were reported from three different regions including the northern (1), northwest (1), and eastern (2) regions. Two of the cases reported tick bites, one case reported a cat bite, and one case had reported contact with a dead rabbit.

Typhoid Fever

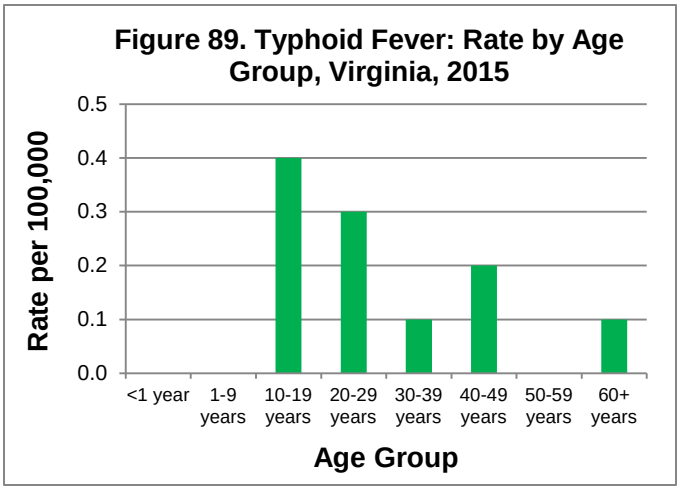
Agent: *Salmonella* ser. Typhi (bacteria)
Mode of Transmission: Ingestion of food or water contaminated by feces or urine of infected persons. The bacteria live only in humans.
Signs/Symptoms: Include sustained fever, headache, malaise, altered mental status, lethargy, anorexia, fast heart rate, enlarged spleen, a non-productive cough and constipation.
Prevention: Access to safe water and proper sanitation, and following safe food handling and hand hygiene practices are essential. Travelers to countries where the disease is common should get vaccinated and avoid consuming risky foods and drinks.
Other Important Information: According to the CDC, most cases of typhoid fever in the U.S. (up to 75%) are acquired while traveling internationally. The condition is very common in the developing world, where it affects more than 20 million persons annually. Approximately 200,000 deaths are attributed to typhoid fever worldwide each year.

Typhoid Fever: 2015 Data Summary	
Number of Cases:	11
5-Year Average Number of Cases:	9.8
% Change from 5-Year Average:	+12%
Incidence Rate per 100,000:	0.1

During 2015, 11 cases of typhoid fever were reported in Virginia. This is more than the 9 cases reported in 2014, and represents a slight increase from the five-year average of 9.8 cases per year (Figure 88). Ten cases reported travel outside the U.S. in the 30 days prior to illness onset. Countries traveled to include India (4 persons), Pakistan (2 persons), Bangladesh, Chad, Colombia and Singapore (1 person each). One case was not associated with travel outside the U.S. and had no known exposures.



Among all age groups, the 10-19 year age group had the highest number of cases and incidence rate (4 cases, 0.4 per 100,000) (Figure 89). No children less than 10 years of age were reported with typhoid fever. Race was reported for all cases. The most cases and highest incidence rate were reported from the "other" race population (9 cases, 1.4 cases per 100,000), while one case was reported as white and one as black. Females had a slightly higher rate than males (0.2 and 0.1 per 100,000, respectively). Ten cases were reported from the northern region, resulting in an incidence rate of 0.4 per 100,000. One case was reported from the southwest region.



Onset occurred in the first three quarters of the year with the highest number of cases reported during the third quarter (6 cases, 55%). However, because most cases are acquired outside the U.S., any seasonal pattern would most likely be related to travel patterns. During 2015, no deaths were attributed to typhoid fever in Virginia.

Vaccinia, Disease or Adverse Event

Agent: Vaccinia virus, which is used in the smallpox vaccine. The virus also occurs in some bovine (cattle) populations, primarily in Brazil.
Mode of Transmission: Through injection with the smallpox vaccine, or through direct contact with contaminated materials, or by inadvertent inoculation by contact with the vaccination site before it has healed. Outbreaks among dairy cattle in Brazil have led to transmission of the virus to their human handlers, primarily farmers and ranchers.
Signs/Symptoms: Include rash, fever and head and body aches. Some individuals, especially those with certain skin conditions or weakened immune systems, may experience more serious effects, such as a toxic or allergic reaction at the vaccination site or spread of the virus to other parts of the body.
Prevention: When smallpox is not circulating, and to prevent serious reaction to the vaccine, administration of the smallpox vaccine should be generally limited to laboratory workers who handle smallpox and similar viruses and certain healthcare workers. The vaccine is currently available only to members of emergency response teams and some military personnel.
Other Important Information: Routine vaccination against smallpox ceased in 1972 when smallpox was eradicated in the U.S. The U.S. government has enough smallpox vaccine to vaccinate every person in the country in the event of a smallpox emergency. Vaccinia became a reportable condition in Virginia in 2003. It is not a nationally notifiable condition and U.S. totals are not available.

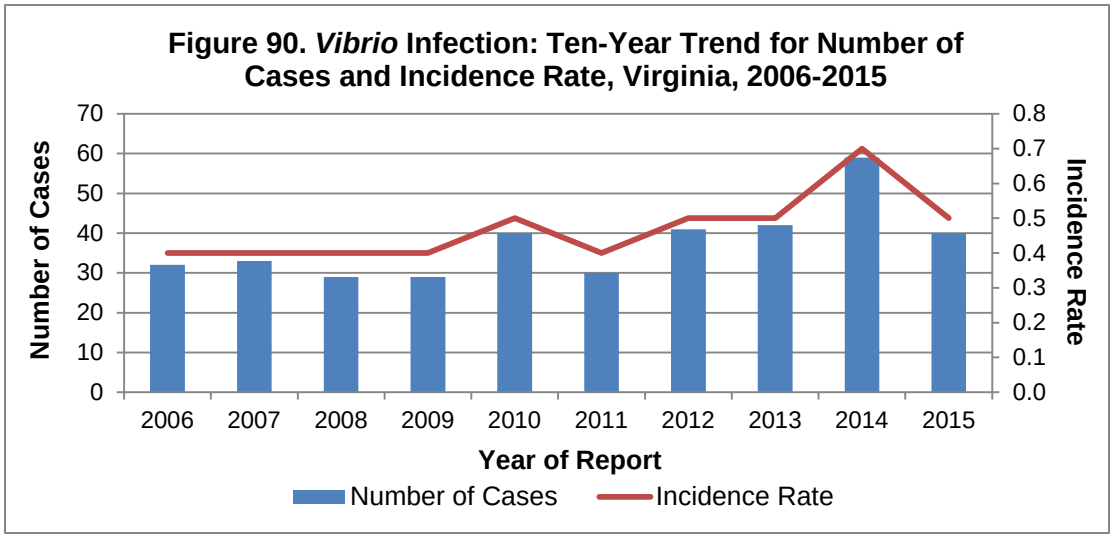
Smallpox vaccination is generally limited to a small population, primarily those who work with smallpox and similar viruses. Therefore, occurrences of vaccinia due to inadvertent transmission of the vaccine virus or occurrences of adverse events in vaccine recipients are very rare. No cases of vaccinia were reported in Virginia in 2015. The five-year average of 0.2 cases per year is based on a single case of a vaccinia adverse event reported in 2013 in a vaccinated member of the military. The first and only other report of vaccinia infection in Virginia was reported in 2008 and occurred in a laboratory worker who handled vaccinia-infected mice.

Vibrio Infection

Agent: *Vibrio* (bacteria)
Mode of Transmission: Gastroenteritis caused by *Vibrio* is usually related to the consumption of raw or undercooked seafood, particularly shellfish. Several large foodborne outbreaks of *Vibrio parahaemolyticus* have occurred in the United States in which undercooked seafood was the food vehicle. Wound infections occur when seawater carrying the *Vibrio* bacteria enters the body through a break in the skin, usually from brackish (i.e., somewhat salty) waters or from occupational injuries (e.g., among fishermen).
Signs/Symptoms: Symptoms associated with *Vibrio* infection include diarrhea (gastrointestinal infection), wound infection, and septicemia (bloodstream infection). Diarrheal illness is most common and includes watery stools and abdominal cramping. Low-grade fever, headache, and chills are seen in half of those ill with diarrheal illness, while 30% of those with diarrheal illness will experience vomiting. Wound infection is usually severe in those who have liver disease or weakened immune systems. Among those infected with *V. vulnificus*, approximately 50% of patients with primary septicemia die.
Prevention: Seafood should be cooked adequately and should be refrigerated. Avoid exposing open wounds to sea or brackish water. Abrasions suffered by those swimming in sea or brackish water should be washed with soap and clean water. Most people are considered susceptible, especially those with liver disease, decreased gastric acidity, diabetes, peptic ulcers, or weakened immune systems. People in high risk groups should refrain from eating raw or undercooked seafood.
Other Important Information: Marine coastal areas are the natural habitat of *Vibrio*. During the cold season, organisms are found in marine silt; during the warm season, they are found free in coastal waters and in fish and shellfish. Most *Vibrio* infections occur during summer and fall months, when levels of bacteria in brackish waters and estuaries are highest.

***Vibrio* Infection: 2015 Data Summary**	
Number of Cases:	40
5-Year Average Number of Cases:	42.4
% Change from 5-Year Average:	-6%
Incidence Rate per 100,000:	0.5

During 2015, 40 cases of *Vibrio* infection were reported in Virginia. This is less than the 59 cases reported in 2014 and represents a slight decrease from the 5-year average of 42.4 cases per year (Figure 90). The statewide incidence rate of *Vibrio* infection in 2015 was 0.5 per 100,000.



Species were identified for all but one *Vibrio* infection in 2015. As in previous years, *V. parahaemolyticus* was the most commonly identified strain (43%). Illnesses for all species included 8 wound infections, 19 gastrointestinal infections, 5 ear infections, 6 bloodstream infections, 1 urinary tract infection, and 1 wound and bloodstream co-infection (Table 15).

Table 15. *Vibrio* Infections by Species and Specimen Source, 2015

***Vibrio* species (number of cases)**	***Vibrio* Specimen Source***				
	Wound	**Stool**	**Ear**	**Blood**	**Urine**
V. parahaemolyticus (17)	3	12	0	2	0
V. vulnificus (8)	4	0	0	5	0
V. alginolyticus (6)	1	0	5	0	0
V. fluvialis (2)	0	2	0	0	0
V. mimicus (2)	0	2	0	0	0
Vibrio cholerae, non-O1, non-O139 (2)	1	1	0	0	0
Vibrio, unspeciated (1)	0	0	0	0	1
V. parahaemolyticus/V. fluvialis coinfection (1)	0	1	0	0	0
Grimontia hollisae (1)	0	1	0	0	0

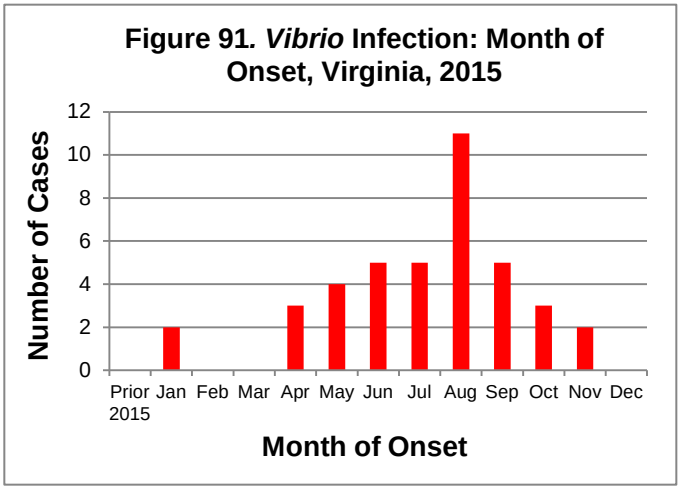
*The total number of positive specimens is larger than the total number of *Vibrio* cases because multiple specimen types may have been collected from a single patient.

The largest number of *Vibrio* infections (13 cases) occurred among persons aged 60 years and older, with an incidence rate of 0.8 per 100,000 population. The 50-59 year age group had a slightly lower number of cases (10), but a higher rate of 0.9 per 100,000. Relatively few cases were reported in the 20-29 year (1 case), 30-39 year (3 cases), and 40-49 year (4 cases) age groups. Among children, the highest number of cases was seen

in the 10-19 year age group, with 6 cases, followed by the 1-9 year age group (3 cases). No cases were reported among children less than one year of age.

Race information was available for 85% of 2015 cases. Among those with a known race, incidence was highest among the white population (0.5 per 100,000) compared to the black (0.3 per 100,000) and "other" race populations (0.2 per 100,000). In Virginia, *Vibrio* infections typically affect males more often than females. This was unchanged in 2015, with 70% of cases reported among males.

As in previous years, the eastern region had both the highest number of cases and the highest incidence rate (22 cases, 1.2 per 100,000). The central region had the second highest incidence rate (7 cases, 0.5 per 100,000), while the northern region had the second highest number of cases (8 cases, 0.3 per 100,000). The northwest region had two cases and the southwest region had one case in 2015. As is typical, cases peaked in late summer. Onset of illness for 11 cases occurred in August, which was more than double the number of cases reported in any other single month. Five cases were reported with illness onset in each of the months of June, July, and September (Figure 91).



During 2015, sixteen (40%) vibriosis cases required hospitalization and two died as a result of the infection. Both deaths occurred in adult males infected with *Vibrio vulnificus*. No outbreaks attributed to *Vibrio* infection were reported in Virginia in 2015.

Viral Hemorrhagic Fever

Agent(s): Viruses of four distinct families including *Arenaviridae* (Argentine, Bolivian, Venezuelan, Brazilian, Chapare and Lujo hemorrhagic fevers, and Lassa fever), *Filoviridae* (Ebola and Marburg hemorrhagic fevers), *Bunyaviridae* (Crimean-Congo hemorrhagic fever, Rift Valley fever, and hemorrhagic fever with renal syndrome [HFRS]), and *Flaviviridae* (dengue hemorrhagic fever, yellow fever, Omsk hemorrhagic fever, and Kyasansur Forest disease). Historically, among the viral hemorrhagic fevers, only dengue hemorrhagic fever has been found to occur naturally in North America.
Mode of Transmission: Varies by agent. Arenaviruses are carried by rodents and are contracted by breathing dust contaminated with saliva, feces or urine of infected rodents, but may also be transmitted person-to-person by infected patients. Filovirus hemorrhagic fevers are contracted through direct contact with blood or body fluids from infected animals or persons. Bunyaviruses are typically transmitted by the bites of arthropods but may also be contracted through contact with the blood and body fluids of infected livestock or people, or in the case of HFRS may be contracted through exposure to dust contaminated with saliva, feces or urine of infected rodents. Hemorrhagic fevers caused by Flaviviruses are typically transmitted by the bites of arthropods (mosquitoes or ticks).
Signs/Symptoms: Vary by type, including but not limited to, malaise, headache, fever, bleeding from the nose and gums, rash, appearance of blood in the eyes, or vomiting. Case-fatality rates can range from 1% (dengue) to 90% (Ebola).
Prevention: Depending on the agent, exposure to hemorrhagic diseases can be reduced by rodent control in and around the home in endemic areas, by isolation of infected persons during their febrile period, by preventing contact with blood or body fluids of sick or dead humans or animals, and by avoiding the bites of mosquito or tick vectors.
Other Important Information: Viral hemorrhagic fevers are classified as potential bioweapons because they could cause high mortality, public panic, or social disruption. For surveillance purposes, cases of dengue fever are counted in the Arboviral Infection section of this report, while cases of yellow fever are counted in the Yellow Fever section. Therefore, any cases of dengue fever or yellow fever, including those with hemorrhagic signs, will be discussed in their respective sections of this surveillance report.

No cases of viral hemorrhagic fever were reported in Virginia in 2015. The last reported case of dengue hemorrhagic fever was reported in 2011. Information on this case is available in the Arboviral Infection section of the Reportable Disease Surveillance, 2011 report.

Yellow Fever

Agent: Yellow fever virus
Mode of Transmission: Transmitted through the bite of several species of infected *Aedes* mosquitoes, most notably the yellow fever mosquito (*Aedes aegypti*), which breeds in containers of water occurring around human habitats. Yellow fever mosquitoes occur in Virginia but have become rare after being displaced from their container breeding habitats by the arrival of the closely related Asian tiger mosquito (*Aedes albopictus*) in 1992. The Asian tiger mosquito is more cold tolerant than the yellow fever mosquito and is able to overwinter and maintain populations from year to year in most parts of Virginia. As a result, Asian tiger mosquitoes have become very common throughout most of Virginia and could be potential vectors of the yellow fever virus. Tiger mosquitoes are similar in behavior and somewhat similar in appearance to yellow fever mosquitoes. Although the Asian tiger mosquito's competence as a yellow fever vector has been proven in laboratory studies, there are currently no records of this mosquito having transmitted yellow fever in nature.
Signs/Symptoms: Varying levels of severity, but could include a sudden onset of fever, chills, headache, backache, generalized muscle pain, prostration, nausea, vomiting and jaundice. Jaundice is usually mild in early disease but intensifies later. Among cases with jaundice, the fatality rate is 20-50%.
Prevention: Vaccination against the yellow fever virus before traveling to yellow fever endemic regions of the world and avoidance of mosquito bites while traveling in these regions.

No cases of yellow fever have been reported in Virginia since the nineteenth century.

Yersiniosis

Agent: *Yersinia* species (bacteria)
Mode of Transmission: Ingestion of contaminated foods, particularly raw or incompletely cooked pork products and unpasteurized milk, contaminated surface or well water, or by direct or indirect contact with infected people or animals.
Signs/Symptoms: Vary depending on age, but may include fever, abdominal pain, and bloody diarrhea.
Prevention: Preventive measures include safe food preparation and pasteurization of dairy products. People handling pork intestines should wash their hands and environmental surfaces thoroughly after contact with raw meat, and should not handle infants or young children or their toys, bottles, or pacifiers until hands are washed thoroughly.
Other Important Information: Infection most often occurs from eating contaminated food, especially raw or undercooked pork products, including pork intestines (chitterlings). Children are infected more often than adults. While most infections occur during the winter months, this is believed to be related to the preparation of chitterlings for the holidays, and not to outdoor temperatures.

Yersiniosis: 2015 Data Summary	
Number of Cases:	17
5-Year Average Number of Cases:	12.6
% Change from 5-Year Average:	+35%
Incidence Rate per 100,000:	0.2

In 2015, 17 cases of yersiniosis were reported in Virginia. This is fewer than the 21 cases reported in 2014, but more than the five-year average of 12.6 cases per year.

No yersiniosis cases were reported in infants in 2015. At least one case occurred in each of the other age groups, with the most cases occurring in the 20-29 year (5 cases) and 50-59 year (4 cases) age groups. The remaining age groups had 1-2 cases each. Ten of 17 cases had race reported. Among those with a known race, seven were in the white population, two in the black population, and one in the "other" race population. Ten cases were reported among males and seven among females.

Seven cases were reported from the southwest region, five from the central region, three from the northern region, and one each from the eastern and northwest regions. Cases were distributed throughout the year, with seven occurring in the first quarter, three in the second quarter, four in the third quarter, and three in the fourth quarter. Among the 17 cases reported, three individuals consumed pork prior to becoming ill, one individual ate raw oysters, one was injured while working in a chicken coop, and one visited a farm with animals.

NUMBER OF REPORTED CASES
AND
RATE PER 100,000 POPULATION
FOR SELECTED DISEASES BY
LOCALITY, DISTRICT AND REGION

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Amebiasis REPORTED CASES	Amebiasis RATE PER 100,000	Campylobacteriosis REPORTED CASES	Campylobacteriosis RATE PER 100,000	Chickenpox REPORTED CASES	Chickenpox RATE PER 100,000
VIRGINIA TOTAL	8,326,289	25	0.3	1,564	18.8	354	4.3
LOCALITY							
Accomack County	33,021	0	0.0	13	39.4	2	6.1
Albemarle County	104,489	0	0.0	24	23.0	12	11.5
Alleghany County	15,820	0	0.0	1	6.3	0	0.0
Amelia County	12,855	0	0.0	2	15.6	0	0.0
Amherst County	32,041	0	0.0	4	12.5	0	0.0
Appomattox County	15,279	0	0.0	1	6.5	0	0.0
Arlington County	226,908	2	0.9	55	24.2	13	5.7
Augusta County	73,862	0	0.0	22	29.8	3	4.1
Bath County	4,563	0	0.0	1	21.9	3	65.7
Bedford County	76,583	0	0.0	4	5.2	1	1.3
Bland County	6,625	0	0.0	2	30.2	0	0.0
Botetourt County	33,100	0	0.0	3	9.1	0	0.0
Brunswick County	16,498	0	0.0	1	6.1	1	6.1
Buchanan County	23,106	0	0.0	3	13.0	3	13.0
Buckingham County	16,913	0	0.0	5	29.6	0	0.0
Campbell County	54,885	0	0.0	4	7.3	1	1.8
Caroline County	29,778	0	0.0	9	30.2	0	0.0
Carroll County	29,621	0	0.0	1	3.4	1	3.4
Charles City County	7,023	0	0.0	0	0.0	2	28.5
Charlotte County	12,225	0	0.0	2	16.4	0	0.0
Chesterfield County	332,499	0	0.0	22	6.6	10	3.0
Clarke County	14,423	0	0.0	11	76.3	0	0.0
Craig County	5,234	0	0.0	0	0.0	1	19.1
Culpeper County	49,166	0	0.0	11	22.4	7	14.2
Cumberland County	9,827	0	0.0	4	40.7	0	0.0
Dickenson County	15,308	0	0.0	6	39.2	0	0.0
Dinwiddie County	27,859	0	0.0	4	14.4	0	0.0
Essex County	11,103	0	0.0	3	27.0	0	0.0
Fairfax County	1,137,538	10	0.9	277	24.4	49	4.3
Fauquier County	68,248	0	0.0	17	24.9	0	0.0
Floyd County	15,578	0	0.0	2	12.8	0	0.0
Fluvanna County	26,092	0	0.0	5	19.2	1	3.8
Franklin County	56,358	0	0.0	7	12.4	9	16.0
Frederick County	82,377	0	0.0	23	27.9	2	2.4
Giles County	16,815	0	0.0	2	11.9	0	0.0
Gloucester County	37,141	0	0.0	5	13.5	0	0.0
Goochland County	21,936	0	0.0	5	22.8	1	4.6
Grayson County	15,093	0	0.0	2	13.3	2	13.3
Greene County	19,031	0	0.0	12	63.1	1	5.3
Greensville County	11,681	0	0.0	0	0.0	4	34.2
Halifax County	35,200	0	0.0	3	8.5	0	0.0
Hanover County	101,918	0	0.0	22	21.6	1	1.0
Henrico County	321,924	1	0.3	52	16.2	16	5.0
Henry County	52,081	0	0.0	3	5.8	0	0.0
Highland County	2,248	0	0.0	1	44.5	0	0.0
Isle of Wight County	36,007	0	0.0	2	5.6	0	0.0
James City County	72,583	0	0.0	5	6.9	0	0.0

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Amebiasis REPORTED CASES	Amebiasis RATE PER 100,000	Campylobacteriosis REPORTED CASES	Campylobacteriosis RATE PER 100,000	Chickenpox REPORTED CASES	Chickenpox RATE PER 100,000
VIRGINIA TOTAL	8,326,289	25	0.3	1,564	18.8	354	4.3
LOCALITY							
King and Queen County	7,175	0	0.0	0	0.0	0	0.0
King George County	25,371	0	0.0	5	19.7	2	7.9
King William County	16,186	0	0.0	2	12.4	0	0.0
Lancaster County	11,044	0	0.0	1	9.1	1	9.1
Lee County	24,951	0	0.0	5	20.0	0	0.0
Loudoun County	363,050	1	0.3	116	32.0	37	10.2
Louisa County	34,348	0	0.0	13	37.8	2	5.8
Lunenburg County	12,466	0	0.0	0	0.0	0	0.0
Madison County	13,157	0	0.0	0	0.0	0	0.0
Mathews County	8,836	0	0.0	2	22.6	0	0.0
Mecklenburg County	31,192	0	0.0	7	22.4	0	0.0
Middlesex County	10,696	0	0.0	0	0.0	0	0.0
Montgomery County	97,244	1	1.0	7	7.2	7	7.2
Nelson County	14,850	0	0.0	3	20.2	2	13.5
New Kent County	20,021	0	0.0	1	5.0	0	0.0
Northampton County	12,121	0	0.0	6	49.5	0	0.0
Northumberland County	12,251	0	0.0	0	0.0	0	0.0
Nottoway County	15,579	0	0.0	1	6.4	0	0.0
Orange County	35,026	0	0.0	6	17.1	0	0.0
Page County	23,848	0	0.0	14	58.7	8	33.5
Patrick County	18,264	0	0.0	1	5.5	0	0.0
Pittsylvania County	62,383	0	0.0	11	17.6	4	6.4
Powhatan County	28,449	0	0.0	7	24.6	0	0.0
Prince Edward County	23,074	0	0.0	3	13.0	0	0.0
Prince George County	37,333	0	0.0	3	8.0	0	0.0
Prince William County	446,094	0	0.0	44	9.9	23	5.2
Pulaski County	34,322	0	0.0	9	26.2	1	2.9
Rappahannock County	7,361	0	0.0	2	27.2	0	0.0
Richmond County	8,902	0	0.0	1	11.2	1	11.2
Roanoke County	93,785	0	0.0	9	9.6	8	8.5
Rockbridge County	22,327	0	0.0	5	22.4	1	4.5
Rockingham County	78,171	0	0.0	92	117.7	8	10.2
Russell County	28,023	0	0.0	13	46.4	4	14.3
Scott County	22,384	0	0.0	7	31.3	0	0.0
Shenandoah County	43,021	0	0.0	19	44.2	4	9.3
Smyth County	31,555	0	0.0	19	60.2	0	0.0
Southampton County	18,059	0	0.0	2	11.1	0	0.0
Spotsylvania County	129,188	0	0.0	46	35.6	4	3.1
Stafford County	139,992	0	0.0	31	22.1	3	2.1
Surry County	6,790	0	0.0	1	14.7	0	0.0
Sussex County	11,767	1	8.5	0	0.0	1	8.5
Tazewell County	43,452	0	0.0	14	32.2	2	4.6
Warren County	38,987	0	0.0	5	12.8	3	7.7
Washington County	54,729	0	0.0	27	49.3	0	0.0
Westmoreland County	17,477	0	0.0	4	22.9	0	0.0
Wise County	39,935	0	0.0	9	22.5	1	2.5
Wythe County	29,121	0	0.0	4	13.7	0	0.0
York County	66,342	0	0.0	2	3.0	1	1.5

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Amebiasis REPORTED CASES	Amebiasis RATE PER 100,000	Campylobacteriosis REPORTED CASES	Campylobacteriosis RATE PER 100,000	Chickenpox REPORTED CASES	Chickenpox RATE PER 100,000
VIRGINIA TOTAL	8,326,289	25	0.3	1,564	18.8	354	4.3
LOCALITY							
Alexandria	150,575	2	1.3	50	33.2	6	4.0
Bristol	17,184	0	0.0	4	23.3	0	0.0
Buena Vista	6,603	0	0.0	2	30.3	0	0.0
Charlottesville	45,593	0	0.0	13	28.5	6	13.2
Chesapeake	233,371	0	0.0	20	8.6	10	4.3
Colonial Heights	17,731	0	0.0	2	11.3	0	0.0
Covington	5,802	0	0.0	1	17.2	0	0.0
Danville	42,444	0	0.0	5	11.8	1	2.4
Emporia	5,462	0	0.0	1	18.3	0	0.0
Fairfax City	24,483	0	0.0	2	8.2	0	0.0
Falls Church	13,601	0	0.0	3	22.1	0	0.0
Franklin City	8,526	0	0.0	1	11.7	0	0.0
Fredericksburg	28,350	0	0.0	4	14.1	0	0.0
Galax	7,014	0	0.0	1	14.3	0	0.0
Hampton	136,879	0	0.0	10	7.3	1	0.7
Harrisonburg	52,478	0	0.0	18	34.3	5	9.5
Hopewell	22,196	0	0.0	1	4.5	0	0.0
Lexington	7,311	0	0.0	0	0.0	1	13.7
Lynchburg	79,047	0	0.0	2	2.5	1	1.3
Manassas	42,081	0	0.0	7	16.6	3	7.1
Manassas Park	15,174	0	0.0	2	13.2	0	0.0
Martinsville	13,711	0	0.0	2	14.6	0	0.0
Newport News	182,965	0	0.0	12	6.6	11	6.0
Norfolk	245,428	2	0.8	24	9.8	3	1.2
Norton	4,031	0	0.0	1	24.8	0	0.0
Petersburg	32,701	0	0.0	1	3.1	1	3.1
Poquoson	12,048	0	0.0	0	0.0	0	0.0
Portsmouth	96,004	0	0.0	7	7.3	4	4.2
Radford	17,646	0	0.0	1	5.7	0	0.0
Richmond City	217,853	2	0.9	33	15.1	3	1.4
Roanoke City	99,428	0	0.0	3	3.0	4	4.0
Salem	25,483	0	0.0	0	0.0	0	0.0
Staunton	24,538	0	0.0	6	24.5	5	20.4
Suffolk	86,806	0	0.0	8	9.2	1	1.2
Virginia Beach	450,980	3	0.7	48	10.6	8	1.8
Waynesboro	21,366	0	0.0	3	14.0	1	4.7
Williamsburg	14,691	0	0.0	16	108.9	2	13.6
Winchester	27,543	0	0.0	8	29.0	3	10.9

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Amebiasis REPORTED CASES	Amebiasis RATE PER 100,000	Campylobacteriosis REPORTED CASES	Campylobacteriosis RATE PER 100,000	Chickenpox REPORTED CASES	Chickenpox RATE PER 100,000
VIRGINIA TOTAL	8,326,289	25	0.3	1,564	18.8	354	4.3
DISTRICT/REGION							

Central Shenandoah	293,467	0	0.0	150	51.1	27	9.2
Lord Fairfax	230,199	0	0.0	80	34.8	20	8.7
Rappahannock	352,679	0	0.0	95	26.9	9	2.6
Rappahannock/Rapidan	172,958	0	0.0	36	20.8	7	4.0
Thomas Jefferson	244,403	0	0.0	70	28.6	24	9.8
Northwest Region	1,293,706	0	0.0	431	33.3	87	6.7

Alexandria	150,575	2	1.3	50	33.2	6	4.0
Arlington	226,908	2	0.9	55	24.2	13	5.7
Fairfax	1,175,622	10	0.9	282	24.0	49	4.2
Loudoun	363,050	1	0.3	116	32.0	37	10.2
Prince William	503,349	0	0.0	53	10.5	26	5.2
Northern Region	2,419,504	15	0.6	556	23.0	131	5.4

Alleghany	179,224	0	0.0	14	7.8	9	5.0
Central Virginia	257,835	0	0.0	15	5.8	3	1.2
Cumberland Plateau	109,889	0	0.0	36	32.8	9	8.2
Lenowisco	91,301	0	0.0	22	24.1	1	1.1
Mount Rogers	190,942	0	0.0	60	31.4	3	1.6
New River	181,605	1	0.6	21	11.6	8	4.4
Pittsylvania/Danville	104,827	0	0.0	16	15.3	5	4.8
Roanoke City	99,428	0	0.0	3	3.0	4	4.0
West Piedmont	140,414	0	0.0	13	9.3	9	6.4
Southwest Region	1,355,465	1	0.1	200	14.8	51	3.8

Chesterfield	378,679	0	0.0	31	8.2	10	2.6
Chickahominy	150,898	0	0.0	28	18.6	4	2.7
Crater	155,789	1	0.6	11	7.1	6	3.9
Henrico	321,924	1	0.3	52	16.2	16	5.0
Piedmont	102,939	0	0.0	17	16.5	0	0.0
Richmond City	217,853	2	0.9	33	15.1	3	1.4
Southside	82,890	0	0.0	11	13.3	1	1.2
Central Region	1,410,972	4	0.3	183	13.0	40	2.8

Chesapeake	233,371	0	0.0	20	8.6	10	4.3
Eastern Shore	45,142	0	0.0	19	42.1	2	4.4
Hampton	136,879	0	0.0	10	7.3	1	0.7
Norfolk	245,428	2	0.8	24	9.8	3	1.2
Peninsula	348,629	0	0.0	35	10.0	14	4.0
Portsmouth	96,004	0	0.0	7	7.3	4	4.2
Three Rivers	140,811	0	0.0	18	12.8	2	1.4
Virginia Beach	450,980	3	0.7	48	10.6	8	1.8
Western Tidewater	149,398	0	0.0	13	8.7	1	0.7
Eastern Region	1,846,642	5	0.3	194	10.5	45	2.4

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:		***Chlamydia trachomatis* Infection**		**Cryptosporidiosis**		**Ehrlichiosis/ Anaplasmosis**	
LOCALITY/DISTRICT/REGION	2014 POPULATION	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000
VIRGINIA TOTAL	8,326,289	35,341	424.5	234	2.8	116	1.4
LOCALITY							
Accomack County	33,021	220	666.2	0	0.0	4	12.1
Albemarle County	104,489	244	233.5	2	1.9	4	3.8
Alleghany County	15,820	35	221.2	1	6.3	0	0.0
Amelia County	12,855	36	280.0	0	0.0	0	0.0
Amherst County	32,041	112	349.6	2	6.2	5	15.6
Appomattox County	15,279	64	418.9	0	0.0	1	6.5
Arlington County	226,908	806	355.2	11	4.8	3	1.3
Augusta County	73,862	152	205.8	2	2.7	0	0.0
Bath County	4,563	5	109.6	0	0.0	0	0.0
Bedford County	76,583	112	146.2	2	2.6	5	6.5
Bland County	6,625	7	105.7	0	0.0	0	0.0
Botetourt County	33,100	45	136.0	1	3.0	0	0.0
Brunswick County	16,498	104	630.4	0	0.0	0	0.0
Buchanan County	23,106	27	116.9	0	0.0	0	0.0
Buckingham County	16,913	57	337.0	0	0.0	0	0.0
Campbell County	54,885	158	287.9	1	1.8	6	10.9
Caroline County	29,778	115	386.2	1	3.4	0	0.0
Carroll County	29,621	53	178.9	0	0.0	0	0.0
Charles City County	7,023	24	341.7	0	0.0	0	0.0
Charlotte County	12,225	47	384.5	1	8.2	1	8.2
Chesterfield County	332,499	1,300	391.0	0	0.0	5	1.5
Clarke County	14,423	26	180.3	0	0.0	1	6.9
Craig County	5,234	6	114.6	0	0.0	0	0.0
Culpeper County	49,166	131	266.4	3	6.1	0	0.0
Cumberland County	9,827	42	427.4	0	0.0	0	0.0
Dickenson County	15,308	11	71.9	0	0.0	0	0.0
Dinwiddie County	27,859	117	420.0	1	3.6	1	3.6
Essex County	11,103	49	441.3	0	0.0	0	0.0
Fairfax County	1,137,538	2,446	215.0	47	4.1	8	0.7
Fauquier County	68,248	146	213.9	1	1.5	5	7.3
Floyd County	15,578	22	141.2	0	0.0	0	0.0
Fluvanna County	26,092	35	134.1	0	0.0	2	7.7
Franklin County	56,358	125	221.8	1	1.8	2	3.5
Frederick County	82,377	184	223.4	2	2.4	1	1.2
Giles County	16,815	49	291.4	0	0.0	0	0.0
Gloucester County	37,141	100	269.2	1	2.7	0	0.0
Goochland County	21,936	69	314.6	0	0.0	0	0.0
Grayson County	15,093	38	251.8	0	0.0	0	0.0
Greene County	19,031	25	131.4	0	0.0	1	5.3
Greensville County	11,681	60	513.7	0	0.0	0	0.0
Halifax County	35,200	150	426.1	0	0.0	0	0.0
Hanover County	101,918	259	254.1	0	0.0	0	0.0
Henrico County	321,924	1,697	527.1	1	0.3	2	0.6
Henry County	52,081	183	351.4	3	5.8	0	0.0
Highland County	2,248	1	44.5	0	0.0	0	0.0
Isle of Wight County	36,007	145	402.7	1	2.8	1	2.8
James City County	72,583	198	272.8	1	1.4	2	2.8

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:		***Chlamydia trachomatis* Infection**		**Cryptosporidiosis**		**Ehrlichiosis/ Anaplasmosis**	
LOCALITY/DISTRICT/REGION	2014 POPULATION	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000
VIRGINIA TOTAL	8,326,289	35,341	424.5	234	2.8	116	1.4
LOCALITY							
King and Queen County	7,175	28	390.2	0	0.0	0	0.0
King George County	25,371	57	224.7	0	0.0	4	15.8
King William County	16,186	68	420.1	0	0.0	0	0.0
Lancaster County	11,044	30	271.6	1	9.1	0	0.0
Lee County	24,951	29	116.2	1	4.0	0	0.0
Loudoun County	363,050	712	196.1	22	6.1	1	0.3
Louisa County	34,348	73	212.5	4	11.6	0	0.0
Lunenburg County	12,466	55	441.2	0	0.0	0	0.0
Madison County	13,157	40	304.0	0	0.0	0	0.0
Mathews County	8,836	22	249.0	0	0.0	0	0.0
Mecklenburg County	31,192	131	420.0	0	0.0	0	0.0
Middlesex County	10,696	17	158.9	0	0.0	0	0.0
Montgomery County	97,244	300	308.5	2	2.1	1	1.0
Nelson County	14,850	26	175.1	1	6.7	1	6.7
New Kent County	20,021	46	229.8	0	0.0	0	0.0
Northampton County	12,121	83	684.8	1	8.3	1	8.3
Northumberland County	12,251	48	391.8	0	0.0	0	0.0
Nottoway County	15,579	115	738.2	1	6.4	1	6.4
Orange County	35,026	133	379.7	5	14.3	0	0.0
Page County	23,848	29	121.6	1	4.2	1	4.2
Patrick County	18,264	16	87.6	0	0.0	0	0.0
Pittsylvania County	62,383	185	296.6	0	0.0	4	6.4
Powhatan County	28,449	77	270.7	0	0.0	1	3.5
Prince Edward County	23,074	128	554.7	1	4.3	0	0.0
Prince George County	37,333	320	857.2	0	0.0	0	0.0
Prince William County	446,094	1,595	357.5	12	2.7	2	0.4
Pulaski County	34,322	77	224.3	1	2.9	1	2.9
Rappahannock County	7,361	6	81.5	2	27.2	3	40.8
Richmond County	8,902	20	224.7	2	22.5	0	0.0
Roanoke County	93,785	186	198.3	2	2.1	1	1.1
Rockbridge County	22,327	40	179.2	2	9.0	0	0.0
Rockingham County	78,171	177	226.4	1	1.3	1	1.3
Russell County	28,023	36	128.5	0	0.0	0	0.0
Scott County	22,384	53	236.8	0	0.0	0	0.0
Shenandoah County	43,021	100	232.4	0	0.0	0	0.0
Smyth County	31,555	69	218.7	0	0.0	0	0.0
Southampton County	18,059	89	492.8	0	0.0	1	5.5
Spotsylvania County	129,188	355	274.8	5	3.9	3	2.3
Stafford County	139,992	423	302.2	3	2.1	2	1.4
Surry County	6,790	35	515.5	0	0.0	0	0.0
Sussex County	11,767	83	705.4	0	0.0	0	0.0
Tazewell County	43,452	59	135.8	1	2.3	0	0.0
Warren County	38,987	124	318.1	0	0.0	1	2.6
Washington County	54,729	100	182.7	2	3.7	0	0.0
Westmoreland County	17,477	56	320.4	2	11.4	0	0.0
Wise County	39,935	86	215.3	2	5.0	0	0.0
Wythe County	29,121	60	206.0	1	3.4	0	0.0
York County	66,342	170	256.2	1	1.5	0	0.0

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:		***Chlamydia trachomatis* Infection**		**Cryptosporidiosis**		**Ehrlichiosis/ Anaplasmosis**	
LOCALITY/DISTRICT/REGION	2014 POPULATION	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000
VIRGINIA TOTAL	8,326,289	35,341	424.5	234	2.8	116	1.4
LOCALITY							
Alexandria	150,575	641	425.7	10	6.6	2	1.3
Bristol	17,184	67	389.9	0	0.0	0	0.0
Buena Vista	6,603	16	242.3	0	0.0	0	0.0
Charlottesville	45,593	260	570.3	2	4.4	2	4.4
Chesapeake	233,371	1,158	496.2	10	4.3	1	0.4
Colonial Heights	17,731	101	569.6	0	0.0	0	0.0
Covington	5,802	17	293.0	0	0.0	0	0.0
Danville	42,444	379	892.9	0	0.0	1	2.4
Emporia	5,462	58	1,061.9	0	0.0	0	0.0
Fairfax City	24,483	129	526.9	1	4.1	0	0.0
Falls Church	13,601	67	492.6	0	0.0	0	0.0
Franklin City	8,526	91	1,067.3	0	0.0	0	0.0
Fredericksburg	28,350	184	649.0	0	0.0	0	0.0
Galax	7,014	30	427.7	1	14.3	0	0.0
Hampton	136,879	1,217	889.1	10	7.3	0	0.0
Harrisonburg	52,478	311	592.6	0	0.0	0	0.0
Hopewell	22,196	244	1099.3	2	9.0	0	0.0
Lexington	7,311	14	191.5	0	0.0	1	13.7
Lynchburg	79,047	495	626.2	0	0.0	12	15.2
Manassas	42,081	182	432.5	1	2.4	0	0.0
Manassas Park	15,174	46	303.2	0	0.0	0	0.0
Martinsville	13,711	95	692.9	0	0.0	1	7.3
Newport News	182,965	1,686	921.5	17	9.3	0	0.0
Norfolk	245,428	2,586	1,053.7	1	0.4	0	0.0
Norton	4,031	12	297.7	0	0.0	0	0.0
Petersburg	32,701	534	1,633.0	1	3.1	0	0.0
Poquoson	12,048	16	132.8	1	8.3	0	0.0
Portsmouth	96,004	991	1,032.2	0	0.0	0	0.0
Radford	17,646	156	884.1	0	0.0	0	0.0
Richmond City	217,853	2,787	1,279.3	4	1.8	1	0.5
Roanoke City	99,428	690	694.0	0	0.0	1	1.0
Salem	25,483	59	231.5	0	0.0	0	0.0
Staunton	24,538	99	403.5	0	0.0	1	4.1
Suffolk	86,806	546	629.0	1	1.2	0	0.0
Virginia Beach	450,980	2,230	494.5	4	0.9	2	0.4
Waynesboro	21,366	106	496.1	0	0.0	1	4.7
Williamsburg	14,691	70	476.5	2	13.6	0	0.0
Winchester	27,543	167	606.3	1	3.6	0	0.0

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:		***Chlamydia trachomatis* Infection**		**Cryptosporidiosis**		**Ehrlichiosis/ Anaplasmosis**	
LOCALITY/DISTRICT/REGION	2014 POPULATION	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000
VIRGINIA TOTAL	8,326,289	35,341	424.5	234	2.8	116	1.4
DISTRICT/REGION							

Central Shenandoah	293,467	921	313.8	5	1.7	4	1.4
Lord Fairfax	230,199	630	273.7	4	1.7	4	1.7
Rappahannock	352,679	1,134	321.5	9	2.6	9	2.6
Rappahannock/Rapidan	172,958	456	263.6	11	6.4	8	4.6
Thomas Jefferson	244,403	663	271.3	9	3.7	10	4.1
Northwest Region	1,293,706	3,804	294.0	38	2.9	35	2.7

Alexandria	150,575	641	425.7	10	6.6	2	1.3
Arlington	226,908	806	355.2	11	4.8	3	1.3
Fairfax	1,175,622	2,642	224.7	48	4.1	8	0.7
Loudoun	363,050	712	196.1	22	6.1	1	0.3
Prince William	503,349	1,823	362.2	13	2.6	2	0.4
Northern Region	2,419,504	6,624	273.8	104	4.3	16	0.7

Alleghany	179,224	348	194.2	4	2.2	1	0.6
Central Virginia	257,835	941	365.0	5	1.9	29	11.2
Cumberland Plateau	109,889	133	121.0	1	0.9	0	0.0
Lenowisco	91,301	180	197.2	3	3.3	0	0.0
Mount Rogers	190,942	424	222.1	4	2.1	0	0.0
New River	181,605	604	332.6	3	1.7	2	1.1
Pittsylvania/Danville	104,827	564	538.0	0	0.0	5	4.8
Roanoke City	99,428	690	694.0	0	0.0	1	1.0
West Piedmont	140,414	419	298.4	4	2.8	3	2.1
Southwest Region	1,355,465	4,303	317.5	24	1.8	41	3.0

Chesterfield	378,679	1,478	390.3	0	0.0	6	1.6
Chickahominy	150,898	398	263.8	0	0.0	0	0.0
Crater	155,789	1,451	931.4	4	2.6	1	0.6
Henrico	321,924	1,697	527.1	1	0.3	2	0.6
Piedmont	102,939	480	466.3	3	2.9	2	1.9
Richmond City	217,853	2,787	1,279.3	4	1.8	1	0.5
Southside	82,890	385	464.5	0	0.0	0	0.0
Central Region	1,410,972	8,676	614.9	12	0.9	12	0.9

Chesapeake	233,371	1,158	496.2	10	4.3	1	0.4
Eastern Shore	45,142	303	671.2	1	2.2	5	11.1
Hampton	136,879	1,217	889.1	10	7.3	0	0.0
Norfolk	245,428	2,586	1,053.7	1	0.4	0	0.0
Peninsula	348,629	2,140	613.8	22	6.3	2	0.6
Portsmouth	96,004	991	1,032.2	0	0.0	0	0.0
Three Rivers	140,811	438	311.1	6	4.3	0	0.0
Virginia Beach	450,980	2,230	494.5	4	0.9	2	0.4
Western Tidewater	149,398	871	583.0	2	1.3	2	1.3
Eastern Region	1,846,642	11,934	646.3	56	3.0	12	0.6

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	***Escherichia coli* Infection, Shiga Toxin-Producing** REPORTED CASES	RATE PER 100,000	**Giardiasis** REPORTED CASES	RATE PER 100,000	**Gonorrhea** REPORTED CASES	RATE PER 100,000
VIRGINIA TOTAL	8,326,289	107	1.3	269	3.2	8,095	97.2
LOCALITY							
Accomack County	33,021	0	0.0	1	3.0	39	118.1
Albemarle County	104,489	3	2.9	6	5.7	20	19.1
Alleghany County	15,820	0	0.0	0	0.0	1	6.3
Amelia County	12,855	0	0.0	0	0.0	5	38.9
Amherst County	32,041	1	3.1	0	0.0	21	65.5
Appomattox County	15,279	0	0.0	0	0.0	10	65.4
Arlington County	226,908	6	2.6	15	6.6	139	61.3
Augusta County	73,862	7	9.5	2	2.7	22	29.8
Bath County	4,563	0	0.0	1	21.9	3	65.7
Bedford County	76,583	0	0.0	1	1.3	16	20.9
Bland County	6,625	0	0.0	0	0.0	0	0.0
Botetourt County	33,100	2	6.0	1	3.0	7	21.1
Brunswick County	16,498	0	0.0	0	0.0	29	175.8
Buchanan County	23,106	0	0.0	1	4.3	3	13.0
Buckingham County	16,913	0	0.0	0	0.0	23	136.0
Campbell County	54,885	1	1.8	0	0.0	23	41.9
Caroline County	29,778	0	0.0	0	0.0	30	100.7
Carroll County	29,621	0	0.0	1	3.4	3	10.1
Charles City County	7,023	0	0.0	0	0.0	10	142.4
Charlotte County	12,225	0	0.0	1	8.2	9	73.6
Chesterfield County	332,499	1	0.3	4	1.2	235	70.7
Clarke County	14,423	0	0.0	0	0.0	1	6.9
Craig County	5,234	0	0.0	0	0.0	0	0.0
Culpeper County	49,166	0	0.0	2	4.1	8	16.3
Cumberland County	9,827	0	0.0	0	0.0	7	71.2
Dickenson County	15,308	1	6.5	0	0.0	1	6.5
Dinwiddie County	27,859	0	0.0	0	0.0	16	57.4
Essex County	11,103	0	0.0	0	0.0	4	36.0
Fairfax County	1,137,538	8	0.7	53	4.7	301	26.5
Fauquier County	68,248	1	1.5	2	2.9	8	11.7
Floyd County	15,578	1	6.4	0	0.0	4	25.7
Fluvanna County	26,092	0	0.0	1	3.8	6	23.0
Franklin County	56,358	1	1.8	1	1.8	21	37.3
Frederick County	82,377	1	1.2	2	2.4	21	25.5
Giles County	16,815	0	0.0	0	0.0	2	11.9
Gloucester County	37,141	0	0.0	1	2.7	9	24.2
Goochland County	21,936	0	0.0	0	0.0	3	13.7
Grayson County	15,093	1	6.6	2	13.3	1	6.6
Greene County	19,031	1	5.3	0	0.0	5	26.3
Greensville County	11,681	0	0.0	0	0.0	7	59.9
Halifax County	35,200	0	0.0	2	5.7	31	88.1
Hanover County	101,918	2	2.0	1	1.0	35	34.3
Henrico County	321,924	5	1.6	7	2.2	475	147.6
Henry County	52,081	1	1.9	0	0.0	53	101.8
Highland County	2,248	0	0.0	1	44.5	0	0.0
Isle of Wight County	36,007	0	0.0	3	8.3	20	55.5
James City County	72,583	1	1.4	2	2.8	53	73.0

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:		***Escherichia coli* Infection, Shiga Toxin-Producing**		**Giardiasis**		**Gonorrhea**	
LOCALITY/DISTRICT/REGION	2014 POPULATION	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000
VIRGINIA TOTAL	8,326,289	107	1.3	269	3.2	8,095	97.2
LOCALITY							
King and Queen County	7,175	0	0.0	0	0.0	5	69.7
King George County	25,371	0	0.0	0	0.0	8	31.5
King William County	16,186	0	0.0	0	0.0	4	24.7
Lancaster County	11,044	0	0.0	0	0.0	6	54.3
Lee County	24,951	1	4.0	0	0.0	1	4.0
Loudoun County	363,050	6	1.7	28	7.7	86	23.7
Louisa County	34,348	1	2.9	0	0.0	15	43.7
Lunenburg County	12,466	1	8.0	1	8.0	6	48.1
Madison County	13,157	0	0.0	1	7.6	3	22.8
Mathews County	8,836	0	0.0	1	11.3	0	0.0
Mecklenburg County	31,192	4	12.8	0	0.0	35	112.2
Middlesex County	10,696	0	0.0	0	0.0	5	46.7
Montgomery County	97,244	3	3.1	6	6.2	38	39.1
Nelson County	14,850	0	0.0	2	13.5	9	60.6
New Kent County	20,021	0	0.0	0	0.0	5	25.0
Northampton County	12,121	0	0.0	0	0.0	13	107.3
Northumberland County	12,251	0	0.0	0	0.0	5	40.8
Nottoway County	15,579	0	0.0	0	0.0	3	19.3
Orange County	35,026	1	2.9	1	2.9	19	54.2
Page County	23,848	1	4.2	3	12.6	1	4.2
Patrick County	18,264	1	5.5	1	5.5	2	11.0
Pittsylvania County	62,383	0	0.0	0	0.0	69	110.6
Powhatan County	28,449	0	0.0	0	0.0	11	38.7
Prince Edward County	23,074	0	0.0	0	0.0	26	112.7
Prince George County	37,333	0	0.0	0	0.0	44	117.9
Prince William County	446,094	5	1.1	14	3.1	193	43.3
Pulaski County	34,322	0	0.0	0	0.0	14	40.8
Rappahannock County	7,361	0	0.0	0	0.0	0	0.0
Richmond County	8,902	1	11.2	0	0.0	4	44.9
Roanoke County	93,785	0	0.0	3	3.2	45	48.0
Rockbridge County	22,327	0	0.0	0	0.0	5	22.4
Rockingham County	78,171	4	5.1	3	3.8	14	17.9
Russell County	28,023	1	3.6	1	3.6	2	7.1
Scott County	22,384	0	0.0	1	4.5	7	31.3
Shenandoah County	43,021	2	4.6	0	0.0	9	20.9
Smyth County	31,555	1	3.2	1	3.2	2	6.3
Southampton County	18,059	0	0.0	0	0.0	28	155.0
Spotsylvania County	129,188	2	1.5	5	3.9	68	52.6
Stafford County	139,992	3	2.1	6	4.3	49	35.0
Surry County	6,790	0	0.0	0	0.0	11	162.0
Sussex County	11,767	0	0.0	0	0.0	24	204.0
Tazewell County	43,452	2	4.6	2	4.6	2	4.6
Warren County	38,987	0	0.0	0	0.0	8	20.5
Washington County	54,729	0	0.0	3	5.5	14	25.6
Westmoreland County	17,477	0	0.0	0	0.0	6	34.3
Wise County	39,935	0	0.0	1	2.5	2	5.0
Wythe County	29,121	4	13.7	1	3.4	5	17.2
York County	66,342	0	0.0	0	0.0	29	43.7

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	***Escherichia coli* Infection, Shiga Toxin-Producing** REPORTED CASES	RATE PER 100,000	**Giardiasis** REPORTED CASES	RATE PER 100,000	**Gonorrhea** REPORTED CASES	RATE PER 100,000
VIRGINIA TOTAL	8,326,289	107	1.3	269	3.2	8,095	97.2
LOCALITY							
Alexandria	150,575	2	1.3	4	2.7	144	95.6
Bristol	17,184	0	0.0	0	0.0	13	75.7
Buena Vista	6,603	0	0.0	0	0.0	1	15.1
Charlottesville	45,593	1	2.2	5	11.0	34	74.6
Chesapeake	233,371	0	0.0	3	1.3	298	127.7
Colonial Heights	17,731	0	0.0	1	5.6	18	101.5
Covington	5,802	0	0.0	0	0.0	1	17.2
Danville	42,444	0	0.0	0	0.0	129	303.9
Emporia	5,462	0	0.0	0	0.0	17	311.2
Fairfax City	24,483	0	0.0	1	4.1	6	24.5
Falls Church	13,601	0	0.0	0	0.0	8	58.8
Franklin City	8,526	0	0.0	0	0.0	27	316.7
Fredericksburg	28,350	0	0.0	2	7.1	33	116.4
Galax	7,014	0	0.0	1	14.3	2	28.5
Hampton	136,879	1	0.7	1	0.7	431	314.9
Harrisonburg	52,478	2	3.8	3	5.7	23	43.8
Hopewell	22,196	0	0.0	1	4.5	80	360.4
Lexington	7,311	0	0.0	0	0.0	0	0.0
Lynchburg	79,047	0	0.0	2	2.5	140	177.1
Manassas	42,081	0	0.0	1	2.4	25	59.4
Manassas Park	15,174	0	0.0	0	0.0	3	19.8
Martinsville	13,711	0	0.0	0	0.0	49	357.4
Newport News	182,965	0	0.0	6	3.3	561	306.6
Norfolk	245,428	1	0.4	7	2.9	793	323.1
Norton	4,031	0	0.0	0	0.0	0	0.0
Petersburg	32,701	0	0.0	1	3.1	235	718.6
Poquoson	12,048	0	0.0	0	0.0	1	8.3
Portsmouth	96,004	1	1.0	2	2.1	311	323.9
Radford	17,646	0	0.0	0	0.0	13	73.7
Richmond City	217,853	1	0.5	4	1.8	971	445.7
Roanoke City	99,428	1	1.0	1	1.0	185	186.1
Salem	25,483	1	3.9	0	0.0	12	47.1
Staunton	24,538	0	0.0	0	0.0	18	73.4
Suffolk	86,806	0	0.0	1	1.2	160	184.3
Virginia Beach	450,980	3	0.7	18	4.0	594	131.7
Waynesboro	21,366	0	0.0	0	0.0	8	37.4
Williamsburg	14,691	2	13.6	4	27.2	12	81.7
Winchester	27,543	2	7.3	1	3.6	39	141.6

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:		***Escherichia coli* Infection, Shiga Toxin-Producing**		**Giardiasis**		**Gonorrhea**	
LOCALITY/DISTRICT/REGION	2014 POPULATION	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000
VIRGINIA TOTAL	8,326,289	107	1.3	269	3.2	8,095	97.2
DISTRICT/REGION							

Central Shenandoah	293,467	13	4.4	10	3.4	94	32.0
Lord Fairfax	230,199	6	2.6	6	2.6	79	34.3
Rappahannock	352,679	5	1.4	13	3.7	188	53.3
Rappahannock/Rapidan	172,958	2	1.2	6	3.5	38	22.0
Thomas Jefferson	244,403	6	2.5	14	5.7	89	36.4
Northwest Region	1,293,706	32	2.5	49	3.8	488	37.7

Alexandria	150,575	2	1.3	4	2.7	144	95.6
Arlington	226,908	6	2.6	15	6.6	139	61.3
Fairfax	1,175,622	8	0.7	54	4.6	315	26.8
Loudoun	363,050	6	1.7	28	7.7	86	23.7
Prince William	503,349	5	1.0	15	3.0	221	43.9
Northern Region	2,419,504	27	1.1	116	4.8	905	37.4

Alleghany	179,224	3	1.7	4	2.2	66	36.8
Central Virginia	257,835	2	0.8	3	1.2	210	81.4
Cumberland Plateau	109,889	4	3.6	4	3.6	8	7.3
Lenowisco	91,301	1	1.1	2	2.2	10	11.0
Mount Rogers	190,942	6	3.1	9	4.7	40	20.9
New River	181,605	4	2.2	6	3.3	71	39.1
Pittsylvania/Danville	104,827	0	0.0	0	0.0	198	188.9
Roanoke City	99,428	1	1.0	1	1.0	185	186.1
West Piedmont	140,414	3	2.1	2	1.4	125	89.0
Southwest Region	1,355,465	24	1.8	31	2.3	913	67.4

Chesterfield	378,679	1	0.3	5	1.3	264	69.7
Chickahominy	150,898	2	1.3	1	0.7	53	35.1
Crater	155,789	0	0.0	2	1.3	434	278.6
Henrico	321,924	5	1.6	7	2.2	475	147.6
Piedmont	102,939	1	1.0	2	1.9	79	76.7
Richmond City	217,853	1	0.5	4	1.8	971	445.7
Southside	82,890	4	4.8	2	2.4	95	114.6
Central Region	1,410,972	14	1.0	23	1.6	2,371	168.0

Chesapeake	233,371	0	0.0	3	1.3	298	127.7
Eastern Shore	45,142	0	0.0	1	2.2	52	115.2
Hampton	136,879	1	0.7	1	0.7	431	314.9
Norfolk	245,428	1	0.4	7	2.9	793	323.1
Peninsula	348,629	3	0.9	12	3.4	656	188.2
Portsmouth	96,004	1	1.0	2	2.1	311	323.9
Three Rivers	140,811	1	0.7	2	1.4	48	34.1
Virginia Beach	450,980	3	0.7	18	4.0	594	131.7
Western Tidewater	149,398	0	0.0	4	2.7	235	157.3
Eastern Region	1,846,642	10	0.5	50	2.7	3,418	185.1

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:		***H. influenzae* Infection, Invasive**		**Hepatitis A**		**Hepatitis B, Acute**	
LOCALITY/DISTRICT/REGION	2014 POPULATION	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000
VIRGINIA TOTAL	8,326,289	121	1.5	50	0.6	69	0.8
LOCALITY							
Accomack County	33,021	0	0.0	0	0.0	0	0.0
Albemarle County	104,489	1	1.0	1	1.0	0	0.0
Alleghany County	15,820	0	0.0	0	0.0	0	0.0
Amelia County	12,855	0	0.0	0	0.0	0	0.0
Amherst County	32,041	0	0.0	0	0.0	0	0.0
Appomattox County	15,279	0	0.0	0	0.0	0	0.0
Arlington County	226,908	2	0.9	2	0.9	0	0.0
Augusta County	73,862	1	1.4	1	1.4	1	1.4
Bath County	4,563	0	0.0	0	0.0	0	0.0
Bedford County	76,583	1	1.3	1	1.3	0	0.0
Bland County	6,625	0	0.0	0	0.0	0	0.0
Botetourt County	33,100	1	3.0	0	0.0	1	3.0
Brunswick County	16,498	0	0.0	0	0.0	0	0.0
Buchanan County	23,106	0	0.0	1	4.3	1	4.3
Buckingham County	16,913	0	0.0	0	0.0	0	0.0
Campbell County	54,885	1	1.8	0	0.0	0	0.0
Caroline County	29,778	1	3.4	0	0.0	0	0.0
Carroll County	29,621	1	3.4	0	0.0	0	0.0
Charles City County	7,023	0	0.0	0	0.0	0	0.0
Charlotte County	12,225	0	0.0	0	0.0	0	0.0
Chesterfield County	332,499	2	0.6	0	0.0	5	1.5
Clarke County	14,423	0	0.0	0	0.0	0	0.0
Craig County	5,234	0	0.0	0	0.0	0	0.0
Culpeper County	49,166	0	0.0	1	2.0	0	0.0
Cumberland County	9,827	1	10.2	0	0.0	1	10.2
Dickenson County	15,308	2	13.1	0	0.0	3	19.6
Dinwiddie County	27,859	0	0.0	0	0.0	0	0.0
Essex County	11,103	0	0.0	0	0.0	0	0.0
Fairfax County	1,137,538	13	1.1	12	1.1	2	0.2
Fauquier County	68,248	0	0.0	1	1.5	0	0.0
Floyd County	15,578	0	0.0	0	0.0	0	0.0
Fluvanna County	26,092	1	3.8	0	0.0	0	0.0
Franklin County	56,358	0	0.0	1	1.8	0	0.0
Frederick County	82,377	0	0.0	0	0.0	0	0.0
Giles County	16,815	2	11.9	0	0.0	0	0.0
Gloucester County	37,141	0	0.0	0	0.0	0	0.0
Goochland County	21,936	0	0.0	0	0.0	0	0.0
Grayson County	15,093	0	0.0	0	0.0	0	0.0
Greene County	19,031	0	0.0	0	0.0	0	0.0
Greensville County	11,681	0	0.0	0	0.0	0	0.0
Halifax County	35,200	0	0.0	0	0.0	0	0.0
Hanover County	101,918	1	1.0	0	0.0	0	0.0
Henrico County	321,924	1	0.3	0	0.0	5	1.6
Henry County	52,081	0	0.0	0	0.0	1	1.9
Highland County	2,248	0	0.0	0	0.0	0	0.0
Isle of Wight County	36,007	0	0.0	0	0.0	0	0.0
James City County	72,583	0	0.0	0	0.0	0	0.0

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:		***H. influenzae* Infection, Invasive**		**Hepatitis A**		**Hepatitis B, Acute**	
LOCALITY/DISTRICT/REGION	2014 POPULATION	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000
VIRGINIA TOTAL	8,326,289	121	1.5	50	0.6	69	0.8
LOCALITY							
King and Queen County	7,175	0	0.0	0	0.0	0	0.0
King George County	25,371	1	3.9	0	0.0	0	0.0
King William County	16,186	0	0.0	0	0.0	0	0.0
Lancaster County	11,044	0	0.0	0	0.0	0	0.0
Lee County	24,951	1	4.0	0	0.0	6	24.0
Loudoun County	363,050	3	0.8	4	1.1	0	0.0
Louisa County	34,348	0	0.0	0	0.0	0	0.0
Lunenburg County	12,466	0	0.0	0	0.0	0	0.0
Madison County	13,157	0	0.0	0	0.0	0	0.0
Mathews County	8,836	0	0.0	0	0.0	0	0.0
Mecklenburg County	31,192	0	0.0	0	0.0	1	3.2
Middlesex County	10,696	0	0.0	0	0.0	0	0.0
Montgomery County	97,244	5	5.1	0	0.0	0	0.0
Nelson County	14,850	1	6.7	0	0.0	0	0.0
New Kent County	20,021	0	0.0	0	0.0	0	0.0
Northampton County	12,121	0	0.0	0	0.0	0	0.0
Northumberland County	12,251	0	0.0	0	0.0	0	0.0
Nottoway County	15,579	0	0.0	0	0.0	0	0.0
Orange County	35,026	1	2.9	0	0.0	0	0.0
Page County	23,848	0	0.0	0	0.0	0	0.0
Patrick County	18,264	0	0.0	0	0.0	0	0.0
Pittsylvania County	62,383	2	3.2	1	1.6	1	1.6
Powhatan County	28,449	0	0.0	0	0.0	0	0.0
Prince Edward County	23,074	1	4.3	0	0.0	0	0.0
Prince George County	37,333	0	0.0	0	0.0	0	0.0
Prince William County	446,094	7	1.6	1	0.2	2	0.4
Pulaski County	34,322	1	2.9	0	0.0	1	2.9
Rappahannock County	7,361	0	0.0	0	0.0	0	0.0
Richmond County	8,902	0	0.0	0	0.0	0	0.0
Roanoke County	93,785	3	3.2	1	1.1	0	0.0
Rockbridge County	22,327	0	0.0	1	4.5	0	0.0
Rockingham County	78,171	1	1.3	0	0.0	0	0.0
Russell County	28,023	1	3.6	1	3.6	0	0.0
Scott County	22,384	1	4.5	1	4.5	1	4.5
Shenandoah County	43,021	2	4.6	2	4.6	0	0.0
Smyth County	31,555	0	0.0	0	0.0	0	0.0
Southampton County	18,059	0	0.0	0	0.0	0	0.0
Spotsylvania County	129,188	0	0.0	0	0.0	1	0.8
Stafford County	139,992	0	0.0	0	0.0	0	0.0
Surry County	6,790	0	0.0	0	0.0	0	0.0
Sussex County	11,767	0	0.0	0	0.0	1	8.5
Tazewell County	43,452	2	4.6	0	0.0	1	2.3
Warren County	38,987	2	5.1	0	0.0	1	2.6
Washington County	54,729	2	3.7	1	1.8	1	1.8
Westmoreland County	17,477	2	11.4	0	0.0	0	0.0
Wise County	39,935	3	7.5	0	0.0	13	32.6
Wythe County	29,121	1	3.4	0	0.0	1	3.4
York County	66,342	0	0.0	0	0.0	0	0.0

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:		***H. influenzae* Infection, Invasive**		**Hepatitis A**		**Hepatitis B, Acute**	
LOCALITY/DISTRICT/REGION	2014 POPULATION	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000
VIRGINIA TOTAL	8,326,289	121	1.5	50	0.6	69	0.8
LOCALITY							
Alexandria	150,575	1	0.7	1	0.7	0	0.0
Bristol	17,184	0	0.0	0	0.0	0	0.0
Buena Vista	6,603	0	0.0	0	0.0	0	0.0
Charlottesville	45,593	0	0.0	1	2.2	1	2.2
Chesapeake	233,371	6	2.6	4	1.7	1	0.4
Colonial Heights	17,731	1	5.6	0	0.0	0	0.0
Covington	5,802	0	0.0	0	0.0	0	0.0
Danville	42,444	3	7.1	0	0.0	0	0.0
Emporia	5,462	0	0.0	0	0.0	0	0.0
Fairfax City	24,483	0	0.0	0	0.0	0	0.0
Falls Church	13,601	0	0.0	0	0.0	0	0.0
Franklin City	8,526	1	11.7	0	0.0	0	0.0
Fredericksburg	28,350	1	3.5	0	0.0	0	0.0
Galax	7,014	0	0.0	0	0.0	0	0.0
Hampton	136,879	3	2.2	0	0.0	1	0.7
Harrisonburg	52,478	0	0.0	0	0.0	1	1.9
Hopewell	22,196	0	0.0	0	0.0	0	0.0
Lexington	7,311	1	13.7	0	0.0	0	0.0
Lynchburg	79,047	0	0.0	1	1.3	1	1.3
Manassas	42,081	1	2.4	0	0.0	0	0.0
Manassas Park	15,174	0	0.0	0	0.0	0	0.0
Martinsville	13,711	1	7.3	0	0.0	0	0.0
Newport News	182,965	3	1.6	2	1.1	0	0.0
Norfolk	245,428	4	1.6	0	0.0	1	0.4
Norton	4,031	1	24.8	0	0.0	3	74.4
Petersburg	32,701	0	0.0	0	0.0	1	3.1
Poquoson	12,048	0	0.0	0	0.0	0	0.0
Portsmouth	96,004	1	1.0	1	1.0	0	0.0
Radford	17,646	1	5.7	0	0.0	0	0.0
Richmond City	217,853	1	0.5	2	0.9	4	1.8
Roanoke City	99,428	2	2.0	1	1.0	3	3.0
Salem	25,483	0	0.0	0	0.0	0	0.0
Staunton	24,538	1	4.1	0	0.0	0	0.0
Suffolk	86,806	1	1.2	1	1.2	0	0.0
Virginia Beach	450,980	9	2.0	1	0.2	1	0.2
Waynesboro	21,366	1	4.7	1	4.7	0	0.0
Williamsburg	14,691	0	0.0	0	0.0	0	0.0
Winchester	27,543	2	7.3	0	0.0	0	0.0

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:		***H. influenzae* Infection, Invasive**		**Hepatitis A**		**Hepatitis B, Acute**	
LOCALITY/DISTRICT/REGION	2014 POPULATION	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000
VIRGINIA TOTAL	8,326,289	121	1.5	50	0.6	69	0.8
DISTRICT/REGION							

Central Shenandoah	293,467	5	1.7	3	1.0	2	0.7
Lord Fairfax	230,199	6	2.6	2	0.9	1	0.4
Rappahannock	352,679	3	0.9	0	0.0	1	0.3
Rappahannock/Rapidan	172,958	1	0.6	2	1.2	0	0.0
Thomas Jefferson	244,403	3	1.2	2	0.8	1	0.4
Northwest Region	1,293,706	18	1.4	9	0.7	5	0.4

Alexandria	150,575	1	0.7	1	0.7	0	0.0
Arlington	226,908	2	0.9	2	0.9	0	0.0
Fairfax	1,175,622	13	1.1	12	1.0	2	0.2
Loudoun	363,050	3	0.8	4	1.1	0	0.0
Prince William	503,349	8	1.6	1	0.2	2	0.4
Northern Region	2,419,504	27	1.1	20	0.8	4	0.2

Alleghany	179,224	4	2.2	1	0.6	1	0.6
Central Virginia	257,835	2	0.8	2	0.8	1	0.4
Cumberland Plateau	109,889	5	4.6	2	1.8	5	4.6
Lenowisco	91,301	6	6.6	1	1.1	23	25.2
Mount Rogers	190,942	4	2.1	1	0.5	2	1.0
New River	181,605	9	5.0	0	0.0	1	0.6
Pittsylvania/Danville	104,827	5	4.8	1	1.0	1	1.0
Roanoke City	99,428	2	2.0	1	1.0	3	3.0
West Piedmont	140,414	1	0.7	1	0.7	1	0.7
Southwest Region	1,355,465	38	2.8	10	0.7	38	2.8

Chesterfield	378,679	3	0.8	0	0.0	5	1.3
Chickahominy	150,898	1	0.7	0	0.0	0	0.0
Crater	155,789	0	0.0	0	0.0	2	1.3
Henrico	321,924	1	0.3	0	0.0	5	1.6
Piedmont	102,939	2	1.9	0	0.0	1	1.0
Richmond City	217,853	1	0.5	2	0.9	4	1.8
Southside	82,890	0	0.0	0	0.0	1	1.2
Central Region	1,410,972	8	0.6	2	0.1	18	1.3

Chesapeake	233,371	6	2.6	4	1.7	1	0.4
Eastern Shore	45,142	0	0.0	0	0.0	0	0.0
Hampton	136,879	3	2.2	0	0.0	1	0.7
Norfolk	245,428	4	1.6	0	0.0	1	0.4
Peninsula	348,629	3	0.9	2	0.6	0	0.0
Portsmouth	96,004	1	1.0	1	1.0	0	0.0
Three Rivers	140,811	2	1.4	0	0.0	0	0.0
Virginia Beach	450,980	9	2.0	1	0.2	1	0.2
Western Tidewater	149,398	2	1.3	1	0.7	0	0.0
Eastern Region	1,846,642	30	1.6	9	0.5	4	0.2

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Hepatitis C, Acute: REPORTED CASES	Hepatitis C, Acute: RATE PER 100,000	HIV Disease*: REPORTED CASES	HIV Disease*: RATE PER 100,000	Lead-Elevated Blood Levels in Children Age 0-15 years**: REPORTED CASES	Lead-Elevated Blood Levels in Children Age 0-15 years**: RATE PER 100,000
VIRGINIA TOTAL	8,326,289	52	0.6	1,062	12.8	226	13.6
LOCALITY							
Accomack County	33,021	0	0.0	3	9.1	1	16.2
Albemarle County	104,489	0	0.0	6	5.7	0	0.0
Alleghany County	15,820	0	0.0	2	12.6	2	77.3
Amelia County	12,855	0	0.0	0	0.0	1	41.8
Amherst County	32,041	0	0.0	1	3.1	1	17.9
Appomattox County	15,279	0	0.0	0	0.0	0	0.0
Arlington County	226,908	0	0.0	39	17.2	3	8.4
Augusta County	73,862	0	0.0	7	9.5	0	0.0
Bath County	4,563	0	0.0	0	0.0	1	160.5
Bedford County	76,583	0	0.0	1	1.3	3	22.2
Bland County	6,625	0	0.0	0	0.0	0	0.0
Botetourt County	33,100	1	3.0	1	3.0	0	0.0
Brunswick County	16,498	0	0.0	6	36.4	0	0.0
Buchanan County	23,106	0	0.0	1	4.3	0	0.0
Buckingham County	16,913	0	0.0	3	17.7	1	35.5
Campbell County	54,885	0	0.0	1	1.8	1	10.4
Caroline County	29,778	1	3.4	3	10.1	1	15.9
Carroll County	29,621	0	0.0	1	3.4	1	20.0
Charles City County	7,023	0	0.0	0	0.0	0	0.0
Charlotte County	12,225	0	0.0	1	8.2	2	88.2
Chesterfield County	332,499	4	1.2	38	11.4	3	4.2
Clarke County	14,423	0	0.0	0	0.0	0	0.0
Craig County	5,234	0	0.0	0	0.0	0	0.0
Culpeper County	49,166	0	0.0	2	4.1	0	0.0
Cumberland County	9,827	0	0.0	2	20.4	0	0.0
Dickenson County	15,308	0	0.0	1	6.5	0	0.0
Dinwiddie County	27,859	1	3.6	6	21.5	0	0.0
Essex County	11,103	0	0.0	3	27.0	0	0.0
Fairfax County	1,137,538	0	0.0	110	9.7	21	8.7
Fauquier County	68,248	0	0.0	3	4.4	1	7.0
Floyd County	15,578	0	0.0	3	19.3	2	70.6
Fluvanna County	26,092	0	0.0	1	3.8	1	20.6
Franklin County	56,358	0	0.0	2	3.5	2	20.5
Frederick County	82,377	2	2.4	7	8.5	0	0.0
Giles County	16,815	1	5.9	3	17.8	0	0.0
Gloucester County	37,141	0	0.0	0	0.0	6	90.2
Goochland County	21,936	0	0.0	4	18.2	1	27.6
Grayson County	15,093	0	0.0	0	0.0	0	0.0
Greene County	19,031	0	0.0	1	5.3	0	0.0
Greensville County	11,681	0	0.0	2	17.1	0	0.0
Halifax County	35,200	0	0.0	1	2.8	1	15.6
Hanover County	101,918	0	0.0	9	8.8	1	5.0
Henrico County	321,924	1	0.3	60	18.6	13	19.4
Henry County	52,081	0	0.0	3	5.8	0	0.0
Highland County	2,248	0	0.0	0	0.0	0	0.0
Isle of Wight County	36,007	0	0.0	7	19.4	0	0.0
James City County	72,583	0	0.0	3	4.1	0	0.0

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Hepatitis C, Acute: REPORTED CASES	Hepatitis C, Acute: RATE PER 100,000	HIV Disease*: REPORTED CASES	HIV Disease*: RATE PER 100,000	Lead-Elevated Blood Levels in Children Age 0-15 years**: REPORTED CASES	Lead-Elevated Blood Levels in Children Age 0-15 years**: RATE PER 100,000
VIRGINIA TOTAL	8,326,289	52	0.6	1,062	12.8	226	13.6
LOCALITY							
King and Queen County	7,175	0	0.0	1	13.9	0	0.0
King George County	25,371	2	7.9	4	15.8	0	0.0
King William County	16,186	0	0.0	0	0.0	2	59.1
Lancaster County	11,044	0	0.0	2	18.1	0	0.0
Lee County	24,951	2	8.0	1	4.0	1	23.7
Loudoun County	363,050	0	0.0	25	6.9	4	4.2
Louisa County	34,348	0	0.0	1	2.9	0	0.0
Lunenburg County	12,466	0	0.0	1	8.0	2	97.8
Madison County	13,157	0	0.0	0	0.0	1	41.0
Mathews County	8,836	0	0.0	0	0.0	1	78.0
Mecklenburg County	31,192	0	0.0	7	22.4	3	58.0
Middlesex County	10,696	0	0.0	0	0.0	1	67.8
Montgomery County	97,244	2	2.1	1	1.0	0	0.0
Nelson County	14,850	0	0.0	1	6.7	0	0.0
New Kent County	20,021	0	0.0	0	0.0	0	0.0
Northampton County	12,121	0	0.0	2	16.5	0	0.0
Northumberland County	12,251	0	0.0	1	8.2	2	117.2
Nottoway County	15,579	0	0.0	7	44.9	2	70.7
Orange County	35,026	1	2.9	2	5.7	1	14.6
Page County	23,848	0	0.0	1	4.2	1	23.4
Patrick County	18,264	0	0.0	0	0.0	0	0.0
Pittsylvania County	62,383	1	1.6	3	4.8	3	27.8
Powhatan County	28,449	0	0.0	0	0.0	1	21.5
Prince Edward County	23,074	0	0.0	2	8.7	0	0.0
Prince George County	37,333	0	0.0	3	8.0	0	0.0
Prince William County	446,094	1	0.2	49	11.0	10	8.9
Pulaski County	34,322	1	2.9	3	8.7	0	0.0
Rappahannock County	7,361	0	0.0	0	0.0	0	0.0
Richmond County	8,902	0	0.0	0	0.0	0	0.0
Roanoke County	93,785	1	1.1	8	8.5	0	0.0
Rockbridge County	22,327	2	9.0	0	0.0	3	88.6
Rockingham County	78,171	0	0.0	1	1.3	0	0.0
Russell County	28,023	0	0.0	0	0.0	0	0.0
Scott County	22,384	1	4.5	0	0.0	0	0.0
Shenandoah County	43,021	0	0.0	0	0.0	1	12.3
Smyth County	31,555	2	6.3	1	3.2	0	0.0
Southampton County	18,059	0	0.0	5	27.7	0	0.0
Spotsylvania County	129,188	5	3.9	10	7.7	0	0.0
Stafford County	139,992	4	2.9	13	9.3	2	6.1
Surry County	6,790	0	0.0	0	0.0	0	0.0
Sussex County	11,767	1	8.5	1	8.5	0	0.0
Tazewell County	43,452	1	2.3	0	0.0	0	0.0
Warren County	38,987	0	0.0	1	2.6	0	0.0
Washington County	54,729	2	3.7	0	0.0	2	21.7
Westmoreland County	17,477	0	0.0	1	5.7	0	0.0
Wise County	39,935	1	2.5	2	5.0	0	0.0
Wythe County	29,121	0	0.0	2	6.9	1	19.2
York County	66,342	0	0.0	11	16.6	0	0.0

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Hepatitis C, Acute: REPORTED CASES	Hepatitis C, Acute: RATE PER 100,000	HIV Disease*: REPORTED CASES	HIV Disease*: RATE PER 100,000	Lead-Elevated Blood Levels in Children Age 0-15 years**: REPORTED CASES	Lead-Elevated Blood Levels in Children Age 0-15 years**: RATE PER 100,000
VIRGINIA TOTAL	8,326,289	52	0.6	1,062	12.8	226	13.6
LOCALITY							
Alexandria	150,575	0	0.0	44	29.2	18	73.2
Bristol	17,184	0	0.0	0	0.0	0	0.0
Buena Vista	6,603	0	0.0	1	15.1	0	0.0
Charlottesville	45,593	0	0.0	12	26.3	4	61.8
Chesapeake	233,371	1	0.4	24	10.3	6	12.0
Colonial Heights	17,731	0	0.0	5	28.2	0	0.0
Covington	5,802	0	0.0	1	17.2	0	0.0
Danville	42,444	0	0.0	7	16.5	2	23.5
Emporia	5,462	0	0.0	1	18.3	0	0.0
Fairfax City	24,483	0	0.0	0	0.0	0	0.0
Falls Church	13,601	0	0.0	0	0.0	0	0.0
Franklin City	8,526	0	0.0	3	35.2	0	0.0
Fredericksburg	28,350	0	0.0	9	31.7	6	114.0
Galax	7,014	0	0.0	0	0.0	0	0.0
Hampton	136,879	0	0.0	36	26.3	6	22.6
Harrisonburg	52,478	1	1.9	4	7.6	2	25.9
Hopewell	22,196	0	0.0	10	45.1	0	0.0
Lexington	7,311	0	0.0	0	0.0	0	0.0
Lynchburg	79,047	0	0.0	7	8.9	4	28.3
Manassas	42,081	0	0.0	7	16.6	0	0.0
Manassas Park	15,174	0	0.0	1	6.6	0	0.0
Martinsville	13,711	1	7.3	0	0.0	0	0.0
Newport News	182,965	0	0.0	46	25.1	13	33.5
Norfolk	245,428	0	0.0	78	31.8	6	13.2
Norton	4,031	0	0.0	0	0.0	0	0.0
Petersburg	32,701	0	0.0	30	91.7	2	30.4
Poquoson	12,048	0	0.0	1	8.3	0	0.0
Portsmouth	96,004	0	0.0	33	34.4	6	29.4
Radford	17,646	0	0.0	1	5.7	0	0.0
Richmond City	217,853	2	0.9	72	33.0	20	54.7
Roanoke City	99,428	3	3.0	14	14.1	10	50.3
Salem	25,483	0	0.0	1	3.9	0	0.0
Staunton	24,538	2	8.2	3	12.2	1	24.4
Suffolk	86,806	0	0.0	12	13.8	4	20.8
Virginia Beach	450,980	0	0.0	73	16.2	2	2.2
Waynesboro	21,366	1	4.7	1	4.7	0	0.0
Williamsburg	14,691	0	0.0	0	0.0	0	0.0
Winchester	27,543	0	0.0	5	18.2	0	0.0

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Hepatitis C, Acute REPORTED CASES	Hepatitis C, Acute RATE PER 100,000	HIV Disease* REPORTED CASES	HIV Disease* RATE PER 100,000	Lead-Elevated Blood Levels in Children Age 0-15 years** REPORTED CASES	Lead-Elevated Blood Levels in Children Age 0-15 years** RATE PER 100,000
VIRGINIA TOTAL	8,326,289	52	0.6	1,062	12.8	226	13.6
DISTRICT/REGION							

Central Shenandoah	293,467	6	2.0	17	5.8	7	13.8
Lord Fairfax	230,199	2	0.9	14	6.1	2	4.4
Rappahannock	352,679	12	3.4	39	11.1	9	11.4
Rappahannock/Rapidan	172,958	1	0.6	7	4.0	3	8.4
Thomas Jefferson	244,403	0	0.0	22	9.0	5	11.4
Northwest Region	1,293,706	21	1.6	99	7.7	26	10.2

Alexandria	150,575	0	0.0	44	29.2	18	73.2
Arlington	226,908	0	0.0	39	17.2	3	8.4
Fairfax	1,175,622	0	0.0	110	9.4	21	8.4
Loudoun	363,050	0	0.0	25	6.9	4	4.2
Prince William	503,349	1	0.2	57	11.3	10	8.0
Northern Region	2,419,504	1	0.0	275	11.4	56	10.5

Alleghany	179,224	2	1.1	13	7.3	2	6.3
Central Virginia	257,835	0	0.0	10	3.9	9	19.7
Cumberland Plateau	109,889	1	0.9	2	1.8	0	0.0
Lenowisco	91,301	4	4.4	3	3.3	1	6.3
Mount Rogers	190,942	4	2.1	4	2.1	4	12.2
New River	181,605	4	2.2	11	6.1	2	7.3
Pittsylvania/Danville	104,827	1	1.0	10	9.5	5	25.9
Roanoke City	99,428	3	3.0	14	14.1	10	50.3
West Piedmont	140,414	1	0.7	5	3.6	2	8.1
Southwest Region	1,355,465	20	1.5	72	5.3	35	14.8

Chesterfield	378,679	4	1.1	43	11.4	4	5.1
Chickahominy	150,898	0	0.0	13	8.6	2	7.1
Crater	155,789	2	1.3	53	34.0	2	6.8
Henrico	321,924	1	0.3	60	18.6	13	19.4
Piedmont	102,939	0	0.0	16	15.5	8	45.7
Richmond City	217,853	2	0.9	72	33.0	20	54.7
Southside	82,890	0	0.0	14	16.9	4	28.3
Central Region	1,410,972	9	0.6	271	19.2	53	19.5

Chesapeake	233,371	1	0.4	24	10.3	6	12.0
Eastern Shore	45,142	0	0.0	5	11.1	1	12.0
Hampton	136,879	0	0.0	36	26.3	6	22.6
Norfolk	245,428	0	0.0	78	31.8	6	13.2
Peninsula	348,629	0	0.0	61	17.5	13	18.7
Portsmouth	96,004	0	0.0	33	34.4	6	29.4
Three Rivers	140,811	0	0.0	8	5.7	12	51.4
Virginia Beach	450,980	0	0.0	73	16.2	2	2.2
Western Tidewater	149,398	0	0.0	27	18.1	4	12.9
Eastern Region	1,846,642	1	0.1	345	18.7	56	15.3

***** Beginning in 2009, HIV infection and AIDS data, formerly presented separately, are presented together as HIV disease. This category encompasses persons newly reported to VDH with HIV infection regardless of disease progression, including those with an AIDS-defining condition at first report.

** Rates are based on population figures for ages 0-15 years only

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Legionellosis REPORTED CASES	Legionellosis RATE PER 100,000	Listeriosis REPORTED CASES	Listeriosis RATE PER 100,000	Lyme Disease REPORTED CASES	Lyme Disease RATE PER 100,000
VIRGINIA TOTAL	8,326,289	139	1.7	22	0.3	1,539	18.5
LOCALITY							
Accomack County	33,021	0	0.0	0	0.0	6	18.2
Albemarle County	104,489	1	1.0	0	0.0	37	35.4
Alleghany County	15,820	1	6.3	0	0.0	1	6.3
Amelia County	12,855	1	7.8	0	0.0	1	7.8
Amherst County	32,041	0	0.0	0	0.0	9	28.1
Appomattox County	15,279	2	13.1	0	0.0	2	13.1
Arlington County	226,908	0	0.0	0	0.0	27	11.9
Augusta County	73,862	0	0.0	1	1.4	44	59.6
Bath County	4,563	0	0.0	0	0.0	1	21.9
Bedford County	76,583	0	0.0	2	2.6	10	13.1
Bland County	6,625	0	0.0	0	0.0	0	0.0
Botetourt County	33,100	0	0.0	0	0.0	5	15.1
Brunswick County	16,498	2	12.1	0	0.0	0	0.0
Buchanan County	23,106	0	0.0	0	0.0	0	0.0
Buckingham County	16,913	0	0.0	0	0.0	2	11.8
Campbell County	54,885	0	0.0	0	0.0	5	9.1
Caroline County	29,778	0	0.0	0	0.0	7	23.5
Carroll County	29,621	1	3.4	0	0.0	36	121.5
Charles City County	7,023	0	0.0	0	0.0	0	0.0
Charlotte County	12,225	0	0.0	0	0.0	1	8.2
Chesterfield County	332,499	6	1.8	0	0.0	24	7.2
Clarke County	14,423	0	0.0	0	0.0	11	76.3
Craig County	5,234	0	0.0	0	0.0	0	0.0
Culpeper County	49,166	1	2.0	0	0.0	16	32.5
Cumberland County	9,827	0	0.0	0	0.0	1	10.2
Dickenson County	15,308	1	6.5	0	0.0	0	0.0
Dinwiddie County	27,859	1	3.6	0	0.0	1	3.6
Essex County	11,103	0	0.0	0	0.0	0	0.0
Fairfax County	1,137,538	15	1.3	3	0.3	201	17.7
Fauquier County	68,248	0	0.0	0	0.0	41	60.1
Floyd County	15,578	0	0.0	0	0.0	53	340.2
Fluvanna County	26,092	0	0.0	0	0.0	3	11.5
Franklin County	56,358	1	1.8	0	0.0	3	5.3
Frederick County	82,377	4	4.9	0	0.0	40	48.6
Giles County	16,815	0	0.0	0	0.0	12	71.4
Gloucester County	37,141	0	0.0	0	0.0	2	5.4
Goochland County	21,936	0	0.0	0	0.0	1	4.6
Grayson County	15,093	0	0.0	0	0.0	14	92.8
Greene County	19,031	0	0.0	0	0.0	11	57.8
Greensville County	11,681	0	0.0	0	0.0	0	0.0
Halifax County	35,200	0	0.0	0	0.0	0	0.0
Hanover County	101,918	1	1.0	0	0.0	1	1.0
Henrico County	321,924	5	1.6	1	0.3	10	3.1
Henry County	52,081	1	1.9	1	1.9	3	5.8
Highland County	2,248	0	0.0	0	0.0	0	0.0
Isle of Wight County	36,007	0	0.0	0	0.0	3	8.3
James City County	72,583	0	0.0	0	0.0	2	2.8

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Legionellosis REPORTED CASES	Legionellosis RATE PER 100,000	Listeriosis REPORTED CASES	Listeriosis RATE PER 100,000	Lyme Disease REPORTED CASES	Lyme Disease RATE PER 100,000
VIRGINIA TOTAL	8,326,289	139	1.7	22	0.3	1,539	18.5
LOCALITY							
King and Queen County	7,175	0	0.0	0	0.0	0	0.0
King George County	25,371	0	0.0	0	0.0	8	31.5
King William County	16,186	0	0.0	1	6.2	2	12.4
Lancaster County	11,044	0	0.0	0	0.0	3	27.2
Lee County	24,951	0	0.0	0	0.0	0	0.0
Loudoun County	363,050	5	1.4	2	0.6	209	57.6
Louisa County	34,348	0	0.0	0	0.0	10	29.1
Lunenburg County	12,466	1	8.0	0	0.0	1	8.0
Madison County	13,157	0	0.0	0	0.0	5	38.0
Mathews County	8,836	0	0.0	0	0.0	1	11.3
Mecklenburg County	31,192	0	0.0	0	0.0	0	0.0
Middlesex County	10,696	0	0.0	0	0.0	2	18.7
Montgomery County	97,244	0	0.0	0	0.0	93	95.6
Nelson County	14,850	1	6.7	0	0.0	5	33.7
New Kent County	20,021	0	0.0	0	0.0	0	0.0
Northampton County	12,121	0	0.0	0	0.0	1	8.3
Northumberland County	12,251	0	0.0	0	0.0	1	8.2
Nottoway County	15,579	1	6.4	0	0.0	1	6.4
Orange County	35,026	1	2.9	0	0.0	9	25.7
Page County	23,848	0	0.0	0	0.0	19	79.7
Patrick County	18,264	1	5.5	0	0.0	1	5.5
Pittsylvania County	62,383	1	1.6	0	0.0	0	0.0
Powhatan County	28,449	0	0.0	0	0.0	6	21.1
Prince Edward County	23,074	0	0.0	1	4.3	5	21.7
Prince George County	37,333	0	0.0	0	0.0	1	2.7
Prince William County	446,094	6	1.3	0	0.0	62	13.9
Pulaski County	34,322	0	0.0	1	2.9	62	180.6
Rappahannock County	7,361	0	0.0	0	0.0	9	122.3
Richmond County	8,902	0	0.0	1	11.2	0	0.0
Roanoke County	93,785	2	2.1	0	0.0	16	17.1
Rockbridge County	22,327	0	0.0	0	0.0	12	53.7
Rockingham County	78,171	3	3.8	1	1.3	33	42.2
Russell County	28,023	1	3.6	0	0.0	0	0.0
Scott County	22,384	1	4.5	0	0.0	0	0.0
Shenandoah County	43,021	0	0.0	0	0.0	18	41.8
Smyth County	31,555	0	0.0	0	0.0	3	9.5
Southampton County	18,059	0	0.0	0	0.0	0	0.0
Spotsylvania County	129,188	1	0.8	0	0.0	23	17.8
Stafford County	139,992	1	0.7	0	0.0	21	15.0
Surry County	6,790	0	0.0	0	0.0	0	0.0
Sussex County	11,767	1	8.5	0	0.0	0	0.0
Tazewell County	43,452	2	4.6	0	0.0	1	2.3
Warren County	38,987	2	5.1	0	0.0	24	61.6
Washington County	54,729	1	1.8	1	1.8	1	1.8
Westmoreland County	17,477	0	0.0	0	0.0	1	5.7
Wise County	39,935	2	5.0	0	0.0	0	0.0
Wythe County	29,121	0	0.0	1	3.4	33	113.3
York County	66,342	0	0.0	0	0.0	2	3.0

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Legionellosis REPORTED CASES	Legionellosis RATE PER 100,000	Listeriosis REPORTED CASES	Listeriosis RATE PER 100,000	Lyme Disease REPORTED CASES	Lyme Disease RATE PER 100,000
VIRGINIA TOTAL	8,326,289	139	1.7	22	0.3	1,539	18.5
LOCALITY							
Alexandria	150,575	1	0.7	0	0.0	13	8.6
Bristol	17,184	0	0.0	0	0.0	0	0.0
Buena Vista	6,603	0	0.0	1	15.1	1	15.1
Charlottesville	45,593	0	0.0	0	0.0	18	39.5
Chesapeake	233,371	6	2.6	0	0.0	5	2.1
Colonial Heights	17,731	0	0.0	0	0.0	1	5.6
Covington	5,802	2	34.5	0	0.0	0	0.0
Danville	42,444	7	16.5	0	0.0	3	7.1
Emporia	5,462	1	18.3	0	0.0	0	0.0
Fairfax City	24,483	0	0.0	0	0.0	0	0.0
Falls Church	13,601	0	0.0	0	0.0	1	7.4
Franklin City	8,526	1	11.7	1	11.7	2	23.5
Fredericksburg	28,350	0	0.0	0	0.0	7	24.7
Galax	7,014	0	0.0	0	0.0	8	114.1
Hampton	136,879	6	4.4	0	0.0	5	3.7
Harrisonburg	52,478	0	0.0	0	0.0	7	13.3
Hopewell	22,196	0	0.0	0	0.0	1	4.5
Lexington	7,311	0	0.0	0	0.0	1	13.7
Lynchburg	79,047	1	1.3	0	0.0	21	26.6
Manassas	42,081	1	2.4	0	0.0	3	7.1
Manassas Park	15,174	0	0.0	0	0.0	2	13.2
Martinsville	13,711	1	7.3	0	0.0	0	0.0
Newport News	182,965	6	3.3	0	0.0	1	0.5
Norfolk	245,428	8	3.3	0	0.0	4	1.6
Norton	4,031	0	0.0	0	0.0	0	0.0
Petersburg	32,701	2	6.1	0	0.0	0	0.0
Poquoson	12,048	0	0.0	0	0.0	1	8.3
Portsmouth	96,004	1	1.0	0	0.0	0	0.0
Radford	17,646	0	0.0	0	0.0	13	73.7
Richmond City	217,853	2	0.9	0	0.0	7	3.2
Roanoke City	99,428	2	2.0	0	0.0	9	9.1
Salem	25,483	0	0.0	0	0.0	1	3.9
Staunton	24,538	0	0.0	0	0.0	18	73.4
Suffolk	86,806	3	3.5	0	0.0	3	3.5
Virginia Beach	450,980	9	2.0	2	0.4	12	2.7
Waynesboro	21,366	0	0.0	1	4.7	10	46.8
Williamsburg	14,691	1	6.8	0	0.0	0	0.0
Winchester	27,543	0	0.0	0	0.0	10	36.3

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Legionellosis REPORTED CASES	Legionellosis RATE PER 100,000	Listeriosis REPORTED CASES	Listeriosis RATE PER 100,000	Lyme Disease REPORTED CASES	Lyme Disease RATE PER 100,000
VIRGINIA TOTAL	8,326,289	139	1.7	22	0.3	1,539	18.5
DISTRICT/REGION							

Central Shenandoah	293,467	3	1.0	4	1.4	127	43.3
Lord Fairfax	230,199	6	2.6	0	0.0	122	53.0
Rappahannock	352,679	2	0.6	0	0.0	66	18.7
Rappahannock/Rapidan	172,958	2	1.2	0	0.0	80	46.3
Thomas Jefferson	244,403	2	0.8	0	0.0	84	34.4
Northwest Region	1,293,706	15	1.2	4	0.3	479	37.0

Alexandria	150,575	1	0.7	0	0.0	13	8.6
Arlington	226,908	0	0.0	0	0.0	27	11.9
Fairfax	1,175,622	15	1.3	3	0.3	202	17.2
Loudoun	363,050	5	1.4	2	0.6	209	57.6
Prince William	503,349	7	1.4	0	0.0	67	13.3
Northern Region	2,419,504	28	1.2	5	0.2	518	21.4

Alleghany	179,224	5	2.8	0	0.0	23	12.8
Central Virginia	257,835	3	1.2	2	0.8	47	18.2
Cumberland Plateau	109,889	4	3.6	0	0.0	1	0.9
Lenowisco	91,301	3	3.3	0	0.0	0	0.0
Mount Rogers	190,942	2	1.0	2	1.0	95	49.8
New River	181,605	0	0.0	1	0.6	233	128.3
Pittsylvania/Danville	104,827	8	7.6	0	0.0	3	2.9
Roanoke City	99,428	2	2.0	0	0.0	9	9.1
West Piedmont	140,414	4	2.8	1	0.7	7	5.0
Southwest Region	1,355,465	31	2.3	6	0.4	418	30.8

Chesterfield	378,679	6	1.6	0	0.0	31	8.2
Chickahominy	150,898	1	0.7	0	0.0	2	1.3
Crater	155,789	5	3.2	0	0.0	3	1.9
Henrico	321,924	5	1.6	1	0.3	10	3.1
Piedmont	102,939	3	2.9	1	1.0	12	11.7
Richmond City	217,853	2	0.9	0	0.0	7	3.2
Southside	82,890	2	2.4	0	0.0	0	0.0
Central Region	1,410,972	24	1.7	2	0.1	65	4.6

Chesapeake	233,371	6	2.6	0	0.0	5	2.1
Eastern Shore	45,142	0	0.0	0	0.0	7	15.5
Hampton	136,879	6	4.4	0	0.0	5	3.7
Norfolk	245,428	8	3.3	0	0.0	4	1.6
Peninsula	348,629	7	2.0	0	0.0	6	1.7
Portsmouth	96,004	1	1.0	0	0.0	0	0.0
Three Rivers	140,811	0	0.0	2	1.4	12	8.5
Virginia Beach	450,980	9	2.0	2	0.4	12	2.7
Western Tidewater	149,398	4	2.7	1	0.7	8	5.4
Eastern Region	1,846,642	41	2.2	5	0.3	59	3.2

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Malaria REPORTED CASES	Malaria RATE PER 100,000	Meningococcal Disease REPORTED CASES	Meningococcal Disease RATE PER 100,000	Mumps REPORTED CASES	Mumps RATE PER 100,000
VIRGINIA TOTAL	8,326,289	66	0.8	10	0.1	34	0.4
LOCALITY							
Accomack County	33,021	0	0.0	0	0.0	0	0.0
Albemarle County	104,489	1	1.0	0	0.0	3	2.9
Alleghany County	15,820	0	0.0	0	0.0	0	0.0
Amelia County	12,855	0	0.0	0	0.0	0	0.0
Amherst County	32,041	0	0.0	0	0.0	0	0.0
Appomattox County	15,279	0	0.0	0	0.0	0	0.0
Arlington County	226,908	7	3.1	0	0.0	0	0.0
Augusta County	73,862	0	0.0	0	0.0	0	0.0
Bath County	4,563	0	0.0	0	0.0	0	0.0
Bedford County	76,583	0	0.0	0	0.0	0	0.0
Bland County	6,625	0	0.0	0	0.0	0	0.0
Botetourt County	33,100	0	0.0	0	0.0	0	0.0
Brunswick County	16,498	0	0.0	0	0.0	0	0.0
Buchanan County	23,106	0	0.0	0	0.0	0	0.0
Buckingham County	16,913	0	0.0	0	0.0	1	5.9
Campbell County	54,885	0	0.0	0	0.0	0	0.0
Caroline County	29,778	0	0.0	0	0.0	0	0.0
Carroll County	29,621	0	0.0	0	0.0	0	0.0
Charles City County	7,023	0	0.0	0	0.0	0	0.0
Charlotte County	12,225	0	0.0	0	0.0	0	0.0
Chesterfield County	332,499	3	0.9	1	0.3	1	0.3
Clarke County	14,423	0	0.0	0	0.0	0	0.0
Craig County	5,234	0	0.0	0	0.0	0	0.0
Culpeper County	49,166	0	0.0	0	0.0	0	0.0
Cumberland County	9,827	0	0.0	0	0.0	0	0.0
Dickenson County	15,308	0	0.0	0	0.0	0	0.0
Dinwiddie County	27,859	0	0.0	0	0.0	0	0.0
Essex County	11,103	0	0.0	0	0.0	0	0.0
Fairfax County	1,137,538	17	1.5	0	0.0	4	0.4
Fauquier County	68,248	0	0.0	0	0.0	0	0.0
Floyd County	15,578	0	0.0	0	0.0	0	0.0
Fluvanna County	26,092	0	0.0	0	0.0	0	0.0
Franklin County	56,358	0	0.0	0	0.0	0	0.0
Frederick County	82,377	0	0.0	0	0.0	0	0.0
Giles County	16,815	0	0.0	0	0.0	0	0.0
Gloucester County	37,141	0	0.0	0	0.0	0	0.0
Goochland County	21,936	0	0.0	0	0.0	0	0.0
Grayson County	15,093	0	0.0	0	0.0	0	0.0
Greene County	19,031	0	0.0	0	0.0	0	0.0
Greensville County	11,681	0	0.0	0	0.0	0	0.0
Halifax County	35,200	0	0.0	1	2.8	0	0.0
Hanover County	101,918	0	0.0	0	0.0	0	0.0
Henrico County	321,924	4	1.2	0	0.0	0	0.0
Henry County	52,081	0	0.0	0	0.0	0	0.0
Highland County	2,248	0	0.0	0	0.0	0	0.0
Isle of Wight County	36,007	0	0.0	0	0.0	0	0.0
James City County	72,583	0	0.0	0	0.0	0	0.0

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Malaria REPORTED CASES	Malaria RATE PER 100,000	Meningococcal Disease REPORTED CASES	Meningococcal Disease RATE PER 100,000	Mumps REPORTED CASES	Mumps RATE PER 100,000
VIRGINIA TOTAL	8,326,289	66	0.8	10	0.1	34	0.4
LOCALITY							
King and Queen County	7,175	0	0.0	0	0.0	0	0.0
King George County	25,371	0	0.0	0	0.0	0	0.0
King William County	16,186	0	0.0	0	0.0	0	0.0
Lancaster County	11,044	0	0.0	0	0.0	0	0.0
Lee County	24,951	0	0.0	0	0.0	0	0.0
Loudoun County	363,050	5	1.4	1	0.3	1	0.3
Louisa County	34,348	0	0.0	0	0.0	0	0.0
Lunenburg County	12,466	0	0.0	0	0.0	0	0.0
Madison County	13,157	0	0.0	0	0.0	0	0.0
Mathews County	8,836	0	0.0	0	0.0	0	0.0
Mecklenburg County	31,192	0	0.0	0	0.0	0	0.0
Middlesex County	10,696	0	0.0	0	0.0	0	0.0
Montgomery County	97,244	0	0.0	0	0.0	0	0.0
Nelson County	14,850	0	0.0	0	0.0	0	0.0
New Kent County	20,021	0	0.0	1	5.0	0	0.0
Northampton County	12,121	0	0.0	0	0.0	0	0.0
Northumberland County	12,251	0	0.0	0	0.0	0	0.0
Nottoway County	15,579	0	0.0	1	6.4	0	0.0
Orange County	35,026	0	0.0	0	0.0	0	0.0
Page County	23,848	0	0.0	0	0.0	0	0.0
Patrick County	18,264	0	0.0	0	0.0	0	0.0
Pittsylvania County	62,383	1	1.6	0	0.0	0	0.0
Powhatan County	28,449	0	0.0	0	0.0	0	0.0
Prince Edward County	23,074	0	0.0	0	0.0	0	0.0
Prince George County	37,333	0	0.0	1	2.7	0	0.0
Prince William County	446,094	9	2.0	1	0.2	0	0.0
Pulaski County	34,322	0	0.0	0	0.0	0	0.0
Rappahannock County	7,361	0	0.0	0	0.0	0	0.0
Richmond County	8,902	0	0.0	0	0.0	0	0.0
Roanoke County	93,785	0	0.0	0	0.0	0	0.0
Rockbridge County	22,327	0	0.0	0	0.0	0	0.0
Rockingham County	78,171	0	0.0	0	0.0	0	0.0
Russell County	28,023	0	0.0	0	0.0	0	0.0
Scott County	22,384	0	0.0	0	0.0	0	0.0
Shenandoah County	43,021	0	0.0	0	0.0	0	0.0
Smyth County	31,555	0	0.0	0	0.0	0	0.0
Southampton County	18,059	0	0.0	0	0.0	0	0.0
Spotsylvania County	129,188	1	0.8	0	0.0	0	0.0
Stafford County	139,992	1	0.7	0	0.0	0	0.0
Surry County	6,790	0	0.0	0	0.0	0	0.0
Sussex County	11,767	0	0.0	0	0.0	0	0.0
Tazewell County	43,452	0	0.0	0	0.0	0	0.0
Warren County	38,987	0	0.0	0	0.0	0	0.0
Washington County	54,729	0	0.0	0	0.0	0	0.0
Westmoreland County	17,477	4	22.9	0	0.0	0	0.0
Wise County	39,935	0	0.0	0	0.0	0	0.0
Wythe County	29,121	0	0.0	0	0.0	0	0.0
York County	66,342	0	0.0	0	0.0	0	0.0

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Malaria REPORTED CASES	Malaria RATE PER 100,000	Meningococcal Disease REPORTED CASES	Meningococcal Disease RATE PER 100,000	Mumps REPORTED CASES	Mumps RATE PER 100,000
VIRGINIA TOTAL	8,326,289	66	0.8	10	0.1	34	0.4
LOCALITY							
Alexandria	150,575	4	2.7	0	0.0	1	0.7
Bristol	17,184	0	0.0	0	0.0	0	0.0
Buena Vista	6,603	0	0.0	0	0.0	0	0.0
Charlottesville	45,593	2	4.4	0	0.0	19	41.7
Chesapeake	233,371	1	0.4	0	0.0	1	0.4
Colonial Heights	17,731	0	0.0	0	0.0	0	0.0
Covington	5,802	0	0.0	0	0.0	0	0.0
Danville	42,444	0	0.0	0	0.0	0	0.0
Emporia	5,462	0	0.0	0	0.0	0	0.0
Fairfax City	24,483	0	0.0	0	0.0	0	0.0
Falls Church	13,601	0	0.0	0	0.0	0	0.0
Franklin City	8,526	0	0.0	0	0.0	0	0.0
Fredericksburg	28,350	0	0.0	0	0.0	0	0.0
Galax	7,014	0	0.0	0	0.0	0	0.0
Hampton	136,879	0	0.0	0	0.0	0	0.0
Harrisonburg	52,478	2	3.8	0	0.0	0	0.0
Hopewell	22,196	0	0.0	0	0.0	0	0.0
Lexington	7,311	0	0.0	0	0.0	0	0.0
Lynchburg	79,047	0	0.0	0	0.0	1	1.3
Manassas	42,081	1	2.4	0	0.0	0	0.0
Manassas Park	15,174	0	0.0	0	0.0	0	0.0
Martinsville	13,711	0	0.0	0	0.0	0	0.0
Newport News	182,965	0	0.0	1	0.5	0	0.0
Norfolk	245,428	0	0.0	1	0.4	0	0.0
Norton	4,031	0	0.0	0	0.0	0	0.0
Petersburg	32,701	0	0.0	0	0.0	0	0.0
Poquoson	12,048	0	0.0	0	0.0	0	0.0
Portsmouth	96,004	0	0.0	0	0.0	0	0.0
Radford	17,646	0	0.0	0	0.0	0	0.0
Richmond City	217,853	1	0.5	0	0.0	1	0.5
Roanoke City	99,428	0	0.0	0	0.0	0	0.0
Salem	25,483	0	0.0	0	0.0	0	0.0
Staunton	24,538	0	0.0	0	0.0	0	0.0
Suffolk	86,806	2	2.3	0	0.0	0	0.0
Virginia Beach	450,980	0	0.0	1	0.2	1	0.2
Waynesboro	21,366	0	0.0	0	0.0	0	0.0
Williamsburg	14,691	0	0.0	0	0.0	0	0.0
Winchester	27,543	0	0.0	0	0.0	0	0.0

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Malaria REPORTED CASES	Malaria RATE PER 100,000	Meningococcal Disease REPORTED CASES	Meningococcal Disease RATE PER 100,000	Mumps REPORTED CASES	Mumps RATE PER 100,000
VIRGINIA TOTAL	8,326,289	66	0.8	10	0.1	34	0.4
DISTRICT/REGION							

Central Shenandoah	293,467	2	0.7	0	0.0	0	0.0
Lord Fairfax	230,199	0	0.0	0	0.0	0	0.0
Rappahannock	352,679	2	0.6	0	0.0	0	0.0
Rappahannock/Rapidan	172,958	0	0.0	0	0.0	0	0.0
Thomas Jefferson	244,403	3	1.2	0	0.0	22	9.0
Northwest Region	1,293,706	7	0.5	0	0.0	22	1.7

Alexandria	150,575	4	2.7	0	0.0	1	0.7
Arlington	226,908	7	3.1	0	0.0	0	0.0
Fairfax	1,175,622	17	1.4	0	0.0	4	0.3
Loudoun	363,050	5	1.4	1	0.3	1	0.3
Prince William	503,349	10	2.0	1	0.2	0	0.0
Northern Region	2,419,504	43	1.8	2	0.1	6	0.2

Alleghany	179,224	0	0.0	0	0.0	0	0.0
Central Virginia	257,835	0	0.0	0	0.0	1	0.4
Cumberland Plateau	109,889	0	0.0	0	0.0	0	0.0
Lenowisco	91,301	0	0.0	0	0.0	0	0.0
Mount Rogers	190,942	0	0.0	0	0.0	0	0.0
New River	181,605	0	0.0	0	0.0	0	0.0
Pittsylvania/Danville	104,827	1	1.0	0	0.0	0	0.0
Roanoke City	99,428	0	0.0	0	0.0	0	0.0
West Piedmont	140,414	0	0.0	0	0.0	0	0.0
Southwest Region	1,355,465	1	0.1	0	0.0	1	0.1

Chesterfield	378,679	3	0.8	1	0.3	1	0.3
Chickahominy	150,898	0	0.0	1	0.7	0	0.0
Crater	155,789	0	0.0	1	0.6	0	0.0
Henrico	321,924	4	1.2	0	0.0	0	0.0
Piedmont	102,939	0	0.0	1	1.0	1	1.0
Richmond City	217,853	1	0.5	0	0.0	1	0.5
Southside	82,890	0	0.0	1	1.2	0	0.0
Central Region	1,410,972	8	0.6	5	0.4	3	0.2

Chesapeake	233,371	1	0.4	0	0.0	1	0.4
Eastern Shore	45,142	0	0.0	0	0.0	0	0.0
Hampton	136,879	0	0.0	0	0.0	0	0.0
Norfolk	245,428	0	0.0	1	0.4	0	0.0
Peninsula	348,629	0	0.0	1	0.3	0	0.0
Portsmouth	96,004	0	0.0	0	0.0	0	0.0
Three Rivers	140,811	4	2.8	0	0.0	0	0.0
Virginia Beach	450,980	0	0.0	1	0.2	1	0.2
Western Tidewater	149,398	2	1.3	0	0.0	0	0.0
Eastern Region	1,846,642	7	0.4	3	0.2	2	0.1

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Pertussis REPORTED CASES	Pertussis RATE PER 100,000	Rabies in Animals* NUMBER POSITIVE	Rabies in Animals* NUMBER TESTED	Salmonellosis REPORTED CASES	Salmonellosis RATE PER 100,000
VIRGINIA TOTAL	8,326,289	369	4.4	500	3,750	1,181	14.2
LOCALITY							
Accomack County	33,021	2	6.1	11	49	19	57.5
Albemarle County	104,489	45	43.1	9	64	18	17.2
Alleghany County, Clifton Forge	15,820	3	19.0	4	34	0	0.0
Amelia County	12,855	0	0.0	0	6	4	31.1
Amherst County	32,041	0	0.0	11	26	4	12.5
Appomattox County	15,279	0	0.0	4	10	3	19.6
Arlington County	226,908	1	0.4	3	46	34	15.0
Augusta County	73,862	0	0.0	11	72	15	20.3
Bath County	4,563	0	0.0	0	8	1	21.9
Bedford County, Bedford	76,583	4	5.2	4	41	9	11.8
Bland County	6,625	1	15.1	8	13	0	0.0
Botetourt County	33,100	1	3.0	1	16	5	15.1
Brunswick County	16,498	0	0.0	4	6	4	24.2
Buchanan County	23,106	0	0.0	0	4	1	4.3
Buckingham County	16,913	0	0.0	8	26	8	47.3
Campbell County	54,885	1	1.8	7	34	13	23.7
Caroline County	29,778	1	3.4	2	11	7	23.5
Carroll County	29,621	2	6.8	10	25	4	13.5
Charles City County	7,023	0	0.0	2	3	4	57.0
Charlotte County	12,225	0	0.0	6	10	3	24.5
Chesterfield County	332,499	6	1.8	10	141	51	15.3
Clarke County	14,423	4	27.7	1	18	4	27.7
Craig County	5,234	0	0.0	0	0	0	0.0
Culpeper County	49,166	15	30.5	6	19	9	18.3
Cumberland County	9,827	0	0.0	1	9	2	20.4
Dickenson County	15,308	0	0.0	0	7	5	32.7
Dinwiddie County	27,859	2	7.2	0	6	7	25.1
Essex County	11,103	0	0.0	0	4	10	90.1
Fairfax County	1,137,538	25	2.2	36	285	150	13.2
Fauquier County	68,248	4	5.9	12	97	10	14.7
Floyd County	15,578	0	0.0	0	12	4	25.7
Fluvanna County	26,092	2	7.7	0	7	4	15.3
Franklin County	56,358	0	0.0	2	18	3	5.3
Frederick County	82,377	0	0.0	13	71	14	17.0
Giles County	16,815	1	5.9	1	7	1	5.9
Gloucester County	37,141	0	0.0	2	24	7	18.8
Goochland County	21,936	0	0.0	5	32	4	18.2
Grayson County	15,093	0	0.0	4	14	0	0.0
Greene County	19,031	1	5.3	2	4	3	15.8
Greensville County	11,681	1	8.6	0	1	0	0.0
Halifax County, South Boston	35,200	0	0.0	6	13	5	14.2
Hanover County	101,918	4	3.9	16	72	17	16.7
Henrico County	321,924	4	1.2	12	184	25	7.8
Henry County	52,081	0	0.0	3	21	8	15.4
Highland County	2,248	0	0.0	1	2	0	0.0
Isle of Wight County	36,007	1	2.8	2	12	8	22.2
James City County	72,583	0	0.0	1	22	6	8.3

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Pertussis REPORTED CASES	Pertussis RATE PER 100,000	Rabies in Animals* NUMBER POSITIVE	Rabies in Animals* NUMBER TESTED	Salmonellosis REPORTED CASES	Salmonellosis RATE PER 100,000
VIRGINIA TOTAL	8,326,289	369	4.4	500	3,750	1,181	14.2
LOCALITY							
King and Queen County	7,175	0	0.0	0	0	1	13.9
King George County	25,371	0	0.0	2	17	6	23.6
King William County	16,186	0	0.0	2	6	7	43.2
Lancaster County	11,044	0	0.0	0	6	1	9.1
Lee County	24,951	2	8.0	0	8	3	12.0
Loudoun County	363,050	20	5.5	20	162	55	15.1
Louisa County	34,348	8	23.3	6	27	7	20.4
Lunenburg County	12,466	0	0.0	2	8	2	16.0
Madison County	13,157	2	15.2	3	11	4	30.4
Mathews County	8,836	0	0.0	7	11	5	56.6
Mecklenburg County	31,192	0	0.0	11	23	8	25.6
Middlesex County	10,696	0	0.0	2	8	2	18.7
Montgomery County	97,244	4	4.1	8	73	6	6.2
Nelson County	14,850	0	0.0	8	31	7	47.1
New Kent County	20,021	1	5.0	1	4	5	25.0
Northampton County	12,121	0	0.0	3	11	10	82.5
Northumberland County	12,251	0	0.0	3	8	3	24.5
Nottoway County	15,579	0	0.0	0	1	6	38.5
Orange County	35,026	69	197.0	0	14	4	11.4
Page County	23,848	0	0.0	7	27	5	21.0
Patrick County	18,264	0	0.0	3	18	1	5.5
Pittsylvania County	62,383	8	12.8	5	34	9	14.4
Powhatan County	28,449	0	0.0	1	14	13	45.7
Prince Edward County	23,074	0	0.0	2	18	6	26.0
Prince George County	37,333	0	0.0	3	10	4	10.7
Prince William County	446,094	8	1.8	6	98	48	10.8
Pulaski County	34,322	4	11.7	2	22	3	8.7
Rappahannock County	7,361	0	0.0	6	16	1	13.6
Richmond County	8,902	0	0.0	0	7	5	56.2
Roanoke County	93,785	4	4.3	3	7	8	8.5
Rockbridge County	22,327	7	31.4	8	34	3	13.4
Rockingham County	78,171	4	5.1	10	52	17	21.7
Russell County	28,023	0	0.0	3	24	2	7.1
Scott County	22,384	0	0.0	0	5	2	8.9
Shenandoah County	43,021	4	9.3	5	32	4	9.3
Smyth County	31,555	1	3.2	6	36	4	12.7
Southampton County	18,059	0	0.0	2	9	1	5.5
Spotsylvania County	129,188	10	7.7	4	44	24	18.6
Stafford County	139,992	17	12.1	2	35	18	12.9
Surry County	6,790	0	0.0	1	1	0	0.0
Sussex County	11,767	0	0.0	0	0	3	25.5
Tazewell County	43,452	1	2.3	0	10	3	6.9
Warren County	38,987	1	2.6	6	46	2	5.1
Washington County	54,729	0	0.0	5	40	3	5.5
Westmoreland County	17,477	0	0.0	2	8	5	28.6
Wise County	39,935	0	0.0	0	6	7	17.5
Wythe County	29,121	0	0.0	12	34	3	10.3
York County	66,342	0	0.0	4	24	7	10.6

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Pertussis REPORTED CASES	Pertussis RATE PER 100,000	Rabies in Animals* NUMBER POSITIVE	Rabies in Animals* NUMBER TESTED	Salmonellosis REPORTED CASES	Salmonellosis RATE PER 100,000
VIRGINIA TOTAL	8,326,289	369	4.4	500	3,750	1,181	14.2
LOCALITY							
Alexandria	150,575	7	4.6	1	27	28	18.6
Bristol	17,184	0	0.0	0	9	1	5.8
Buena Vista	6,603	3	45.4	0	1	1	15.1
Charlottesville	45,593	15	32.9	2	22	8	17.5
Chesapeake	233,371	3	1.3	1	41	37	15.9
Colonial Heights	17,731	0	0.0	0	9	1	5.6
Covington	5,802	4	68.9	0	2	0	0.0
Danville	42,444	4	9.4	0	25	6	14.1
Emporia	5,462	1	18.3	0	0	3	54.9
Fairfax City	24,483	0	0.0	5	37	0	0.0
Falls Church	13,601	0	0.0	2	23	0	0.0
Franklin City	8,526	0	0.0	0	2	2	23.5
Fredericksburg	28,350	1	3.5	0	15	7	24.7
Galax	7,014	0	0.0	1	14	1	14.3
Hampton	136,879	0	0.0	5	32	8	5.8
Harrisonburg	52,478	0	0.0	0	0	2	3.8
Hopewell	22,196	0	0.0	1	16	2	9.0
Lexington	7,311	3	41.0	0	3	0	0.0
Lynchburg	79,047	0	0.0	9	92	7	8.9
Manassas	42,081	1	2.4	4	29	7	16.6
Manassas Park	15,174	0	0.0	0	1	1	6.6
Martinsville	13,711	0	0.0	0	0	2	14.6
Newport News	182,965	0	0.0	2	24	16	8.7
Norfolk	245,428	1	0.4	2	31	29	11.8
Norton	4,031	0	0.0	0	0	2	49.6
Petersburg	32,701	3	9.2	1	7	3	9.2
Poquoson	12,048	1	8.3	3	6	1	8.3
Portsmouth	96,004	0	0.0	0	19	14	14.6
Radford	17,646	2	11.3	0	4	1	5.7
Richmond City	217,853	3	1.4	4	210	31	14.2
Roanoke City	99,428	2	2.0	14	159	11	11.1
Salem	25,483	0	0.0	0	4	2	7.8
Staunton	24,538	0	0.0	0	7	3	12.2
Suffolk	86,806	0	0.0	2	33	14	16.1
Virginia Beach	450,980	7	1.6	14	86	49	10.9
Waynesboro	21,366	2	9.4	0	7	1	4.7
Williamsburg	14,691	0	0.0	0	3	12	81.7
Winchester	27,543	0	0.0	0	4	2	7.3

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Pertussis REPORTED CASES	Pertussis RATE PER 100,000	Rabies in Animals* NUMBER POSITIVE	Rabies in Animals* NUMBER TESTED	Salmonellosis REPORTED CASES	Salmonellosis RATE PER 100,000
VIRGINIA TOTAL	8,326,289	369	4.4	500	3,750	1,181	14.2
DISTRICT/REGION							

Central Shenandoah	293,467	19	6.5	30	186	43	14.7
Lord Fairfax	230,199	9	3.9	32	198	31	13.5
Rappahannock	352,679	29	8.2	10	122	62	17.6
Rappahannock/Rapidan	172,958	90	52.0	27	157	28	16.2
Thomas Jefferson	244,403	71	29.1	27	155	47	19.2
Northwest Region	1,293,706	218	16.9	126	818	211	16.3

Alexandria	150,575	7	4.6	1	27	28	18.6
Arlington	226,908	1	0.4	3	46	34	15.0
Fairfax	1,175,622	25	2.1	43	345	150	12.8
Loudoun	363,050	20	5.5	20	162	55	15.1
Prince William	503,349	9	1.8	10	128	56	11.1
Northern Region	2,419,504	62	2.6	77	708	323	13.3

Alleghany	179,224	12	6.7	8	63	15	8.4
Central Virginia	257,835	5	1.9	35	203	36	14.0
Cumberland Plateau	109,889	1	0.9	3	45	11	10.0
Lenowisco	91,301	2	2.2	0	19	14	15.3
Mount Rogers	190,942	4	2.1	46	185	16	8.4
New River	181,605	11	6.1	11	118	15	8.3
Pittsylvania/Danville	104,827	12	11.4	5	59	15	14.3
Roanoke City	99,428	2	2.0	14	159	11	11.1
West Piedmont	140,414	0	0.0	8	57	14	10.0
Southwest Region	1,355,465	49	3.6	130	908	147	10.8

Chesterfield	378,679	6	1.6	11	164	65	17.2
Chickahominy	150,898	5	3.3	24	111	30	19.9
Crater	155,789	7	4.5	6	41	22	14.1
Henrico	321,924	4	1.2	12	184	25	7.8
Piedmont	102,939	0	0.0	19	78	31	30.1
Richmond City	217,853	3	1.4	4	210	31	14.2
Southside	82,890	0	0.0	21	42	17	20.5
Central Region	1,410,972	25	1.8	97	830	221	15.7

Chesapeake	233,371	3	1.3	1	41	37	15.9
Eastern Shore	45,142	2	4.4	14	60	29	64.2
Hampton	136,879	0	0.0	5	32	8	5.8
Norfolk	245,428	1	0.4	2	31	29	11.8
Peninsula	348,629	1	0.3	10	79	42	12.0
Portsmouth	96,004	0	0.0	0	19	14	14.6
Three Rivers	140,811	0	0.0	18	82	46	32.7
Virginia Beach	450,980	7	1.6	14	86	49	10.9
Western Tidewater	149,398	1	0.7	6	56	25	16.7
Eastern Region	1,846,642	15	0.8	70	486	279	15.1

---

* Population rate is not applicable for rabies in animals. Data reflect number of positive rabies results versus total number of animals tested

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Shigellosis REPORTED CASES	Shigellosis RATE PER 100,000	Spotted Fever Rickettsiosis, including RMSF REPORTED CASES	Spotted Fever Rickettsiosis, including RMSF RATE PER 100,000	*Staphylococcus aureus* Infection, Invasive (MRSA) REPORTED CASES	*Staphylococcus aureus* Infection, Invasive (MRSA) RATE PER 100,000
VIRGINIA TOTAL	8,326,289	317	3.8	296	3.6	1,142	13.7
LOCALITY							
Accomack County	33,021	0	0.0	5	15.1	1	3.0
Albemarle County	104,489	2	1.9	8	7.7	8	7.7
Alleghany County, Clifton Forge	15,820	0	0.0	1	6.3	2	12.6
Amelia County	12,855	0	0.0	0	0.0	4	31.1
Amherst County	32,041	1	3.1	7	21.8	1	3.1
Appomattox County	15,279	0	0.0	3	19.6	1	6.5
Arlington County	226,908	9	4.0	4	1.8	11	4.8
Augusta County	73,862	1	1.4	1	1.4	13	17.6
Bath County	4,563	0	0.0	0	0.0	0	0.0
Bedford County, Bedford	76,583	1	1.3	12	15.7	0	0.0
Bland County	6,625	0	0.0	0	0.0	1	15.1
Botetourt County	33,100	0	0.0	1	3.0	16	48.3
Brunswick County	16,498	0	0.0	0	0.0	3	18.2
Buchanan County	23,106	0	0.0	0	0.0	1	4.3
Buckingham County	16,913	0	0.0	1	5.9	2	11.8
Campbell County	54,885	0	0.0	6	10.9	2	3.6
Caroline County	29,778	0	0.0	3	10.1	5	16.8
Carroll County	29,621	0	0.0	1	3.4	4	13.5
Charles City County	7,023	0	0.0	0	0.0	0	0.0
Charlotte County	12,225	0	0.0	0	0.0	1	8.2
Chesterfield County	332,499	8	2.4	24	7.2	35	10.5
Clarke County	14,423	0	0.0	1	6.9	5	34.7
Craig County	5,234	0	0.0	0	0.0	2	38.2
Culpeper County	49,166	0	0.0	5	10.2	10	20.3
Cumberland County	9,827	0	0.0	0	0.0	1	10.2
Dickenson County	15,308	0	0.0	0	0.0	5	32.7
Dinwiddie County	27,859	0	0.0	3	10.8	2	7.2
Essex County	11,103	3	27.0	0	0.0	5	45.0
Fairfax County	1,137,538	33	2.9	14	1.2	103	9.1
Fauquier County	68,248	0	0.0	2	2.9	14	20.5
Floyd County	15,578	0	0.0	3	19.3	6	38.5
Fluvanna County	26,092	0	0.0	3	11.5	1	3.8
Franklin County	56,358	0	0.0	2	3.5	15	26.6
Frederick County	82,377	2	2.4	1	1.2	13	15.8
Giles County	16,815	0	0.0	2	11.9	5	29.7
Gloucester County	37,141	1	2.7	0	0.0	3	8.1
Goochland County	21,936	1	4.6	1	4.6	0	0.0
Grayson County	15,093	0	0.0	1	6.6	2	13.3
Greene County	19,031	0	0.0	0	0.0	3	15.8
Greensville County	11,681	0	0.0	1	8.6	2	17.1
Halifax County, South Boston	35,200	3	8.5	1	2.8	6	17.0
Hanover County	101,918	0	0.0	0	0.0	0	0.0
Henrico County	321,924	13	4.0	7	2.2	63	19.6
Henry County	52,081	0	0.0	16	30.7	37	71.0
Highland County	2,248	0	0.0	0	0.0	1	44.5
Isle of Wight County	36,007	0	0.0	4	11.1	1	2.8
James City County	72,583	0	0.0	2	2.8	3	4.1

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Shigellosis REPORTED CASES	Shigellosis RATE PER 100,000	Spotted Fever Rickettsiosis, including RMSF REPORTED CASES	Spotted Fever Rickettsiosis, including RMSF RATE PER 100,000	*Staphylococcus aureus* Infection, Invasive (MRSA) REPORTED CASES	*Staphylococcus aureus* Infection, Invasive (MRSA) RATE PER 100,000
VIRGINIA TOTAL	8,326,289	317	3.8	296	3.6	1,142	13.7
LOCALITY							
King and Queen County	7,175	3	41.8	0	0.0	0	0.0
King George County	25,371	1	3.9	3	11.8	2	7.9
King William County	16,186	0	0.0	0	0.0	1	6.2
Lancaster County	11,044	0	0.0	6	54.3	4	36.2
Lee County	24,951	0	0.0	0	0.0	9	36.1
Loudoun County	363,050	17	4.7	10	2.8	23	6.3
Louisa County	34,348	1	2.9	4	11.6	3	8.7
Lunenburg County	12,466	0	0.0	2	16.0	1	8.0
Madison County	13,157	0	0.0	2	15.2	0	0.0
Mathews County	8,836	0	0.0	0	0.0	1	11.3
Mecklenburg County	31,192	1	3.2	0	0.0	4	12.8
Middlesex County	10,696	0	0.0	0	0.0	5	46.7
Montgomery County	97,244	0	0.0	1	1.0	10	10.3
Nelson County	14,850	0	0.0	5	33.7	2	13.5
New Kent County	20,021	0	0.0	0	0.0	0	0.0
Northampton County	12,121	0	0.0	2	16.5	1	8.3
Northumberland County	12,251	1	8.2	2	16.3	1	8.2
Nottoway County	15,579	0	0.0	2	12.8	3	19.3
Orange County	35,026	0	0.0	1	2.9	4	11.4
Page County	23,848	0	0.0	1	4.2	5	21.0
Patrick County	18,264	0	0.0	4	21.9	3	16.4
Pittsylvania County	62,383	1	1.6	11	17.6	10	16.0
Powhatan County	28,449	1	3.5	6	21.1	6	21.1
Prince Edward County	23,074	3	13.0	2	8.7	8	34.7
Prince George County	37,333	0	0.0	1	2.7	3	8.0
Prince William County	446,094	19	4.3	10	2.2	17	3.8
Pulaski County	34,322	0	0.0	3	8.7	15	43.7
Rappahannock County	7,361	0	0.0	0	0.0	1	13.6
Richmond County	8,902	0	0.0	0	0.0	3	33.7
Roanoke County	93,785	1	1.1	2	2.1	36	38.4
Rockbridge County	22,327	0	0.0	0	0.0	6	26.9
Rockingham County	78,171	1	1.3	1	1.3	18	23.0
Russell County	28,023	1	3.6	0	0.0	11	39.3
Scott County	22,384	0	0.0	0	0.0	7	31.3
Shenandoah County	43,021	3	7.0	0	0.0	15	34.9
Smyth County	31,555	0	0.0	1	3.2	5	15.8
Southampton County	18,059	1	5.5	1	5.5	1	5.5
Spotsylvania County	129,188	1	0.8	7	5.4	25	19.4
Stafford County	139,992	0	0.0	5	3.6	20	14.3
Surry County	6,790	0	0.0	0	0.0	0	0.0
Sussex County	11,767	0	0.0	1	8.5	1	8.5
Tazewell County	43,452	0	0.0	0	0.0	3	6.9
Warren County	38,987	0	0.0	4	10.3	12	30.8
Washington County	54,729	0	0.0	0	0.0	15	27.4
Westmoreland County	17,477	1	5.7	0	0.0	3	17.2
Wise County	39,935	4	10.0	0	0.0	17	42.6
Wythe County	29,121	0	0.0	0	0.0	2	6.9
York County	66,342	0	0.0	0	0.0	7	10.6

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Shigellosis REPORTED CASES	Shigellosis RATE PER 100,000	Spotted Fever Rickettsiosis, including RMSF REPORTED CASES	Spotted Fever Rickettsiosis, including RMSF RATE PER 100,000	*Staphylococcus aureus* Infection, Invasive (MRSA) REPORTED CASES	*Staphylococcus aureus* Infection, Invasive (MRSA) RATE PER 100,000
VIRGINIA TOTAL	8,326,289	317	3.8	296	3.6	1,142	13.7
LOCALITY							
Alexandria	150,575	6	4.0	2	1.3	18	12.0
Bristol	17,184	0	0.0	0	0.0	8	46.6
Buena Vista	6,603	0	0.0	0	0.0	2	30.3
Charlottesville	45,593	0	0.0	3	6.6	6	13.2
Chesapeake	233,371	53	22.7	4	1.7	43	18.4
Colonial Heights	17,731	1	5.6	2	11.3	2	11.3
Covington	5,802	0	0.0	0	0.0	0	0.0
Danville	42,444	1	2.4	4	9.4	14	33.0
Emporia	5,462	0	0.0	1	18.3	0	0.0
Fairfax City	24,483	0	0.0	0	0.0	1	4.1
Falls Church	13,601	0	0.0	0	0.0	1	7.4
Franklin City	8,526	3	35.2	1	11.7	2	23.5
Fredericksburg	28,350	0	0.0	1	3.5	7	24.7
Galax	7,014	0	0.0	0	0.0	0	0.0
Hampton	136,879	3	2.2	2	1.5	11	8.0
Harrisonburg	52,478	1	1.9	0	0.0	9	17.2
Hopewell	22,196	0	0.0	0	0.0	6	27.0
Lexington	7,311	0	0.0	0	0.0	1	13.7
Lynchburg	79,047	1	1.3	9	11.4	3	3.8
Manassas	42,081	0	0.0	0	0.0	2	4.8
Manassas Park	15,174	0	0.0	0	0.0	2	13.2
Martinsville	13,711	0	0.0	1	7.3	11	80.2
Newport News	182,965	0	0.0	0	0.0	9	4.9
Norfolk	245,428	31	12.6	2	0.8	14	5.7
Norton	4,031	0	0.0	0	0.0	1	24.8
Petersburg	32,701	0	0.0	3	9.2	2	6.1
Poquoson	12,048	0	0.0	1	8.3	1	8.3
Portsmouth	96,004	25	26.0	0	0.0	51	53.1
Radford	17,646	0	0.0	0	0.0	6	34.0
Richmond City	217,853	19	8.7	2	0.9	65	29.8
Roanoke City	99,428	1	1.0	5	5.0	50	50.3
Salem	25,483	0	0.0	0	0.0	1	3.9
Staunton	24,538	0	0.0	1	4.1	11	44.8
Suffolk	86,806	10	11.5	4	4.6	1	1.2
Virginia Beach	450,980	21	4.7	1	0.2	5	1.1
Waynesboro	21,366	1	4.7	1	4.7	3	14.0
Williamsburg	14,691	1	6.8	0	0.0	1	6.8
Winchester	27,543	0	0.0	0	0.0	4	14.5

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:		**Shigellosis**		**Spotted Fever Rickettsiosis, including RMSF**		***Staphylococcus aureus* Infection, Invasive (MRSA)**	
LOCALITY/DISTRICT/REGION	2014 POPULATION	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000
VIRGINIA TOTAL	8,326,289	317	3.8	296	3.6	1,142	13.7
DISTRICT/REGION							

Central Shenandoah	293,467	4	1.4	4	1.4	64	21.8
Lord Fairfax	230,199	5	2.2	7	3.0	54	23.5
Rappahannock	352,679	2	0.6	19	5.4	59	16.7
Rappahannock/Rapidan	172,958	0	0.0	10	5.8	29	16.8
Thomas Jefferson	244,403	3	1.2	23	9.4	23	9.4
Northwest Region	1,293,706	14	1.1	63	4.9	229	17.7

Alexandria	150,575	6	4.0	2	1.3	18	12.0
Arlington	226,908	9	4.0	4	1.8	11	4.8
Fairfax	1,175,622	33	2.8	14	1.2	105	8.9
Loudoun	363,050	17	4.7	10	2.8	23	6.3
Prince William	503,349	19	3.8	10	2.0	21	4.2
Northern Region	2,419,504	84	3.5	40	1.7	178	7.4

Alleghany	179,224	1	0.6	4	2.2	57	31.8
Central Virginia	257,835	3	1.2	37	14.4	7	2.7
Cumberland Plateau	109,889	1	0.9	0	0.0	20	18.2
Lenowisco	91,301	4	4.4	0	0.0	34	37.2
Mount Rogers	190,942	0	0.0	3	1.6	37	19.4
New River	181,605	0	0.0	9	5.0	42	23.1
Pittsylvania/Danville	104,827	2	1.9	15	14.3	24	22.9
Roanoke City	99,428	1	1.0	5	5.0	50	50.3
West Piedmont	140,414	0	0.0	23	16.4	66	47.0
Southwest Region	1,355,465	12	0.9	96	7.1	337	24.9

Chesterfield	378,679	10	2.6	32	8.5	43	11.4
Chickahominy	150,898	1	0.7	1	0.7	0	0.0
Crater	155,789	0	0.0	10	6.4	16	10.3
Henrico	321,924	13	4.0	7	2.2	63	19.6
Piedmont	102,939	3	2.9	7	6.8	20	19.4
Richmond City	217,853	19	8.7	2	0.9	65	29.8
Southside	82,890	4	4.8	1	1.2	13	15.7
Central Region	1,410,972	50	3.5	60	4.3	220	15.6

Chesapeake	233,371	53	22.7	4	1.7	43	18.4
Eastern Shore	45,142	0	0.0	7	15.5	2	4.4
Hampton	136,879	3	2.2	2	1.5	11	8.0
Norfolk	245,428	31	12.6	2	0.8	14	5.7
Peninsula	348,629	1	0.3	3	0.9	21	6.0
Portsmouth	96,004	25	26.0	0	0.0	51	53.1
Three Rivers	140,811	9	6.4	8	5.7	26	18.5
Virginia Beach	450,980	21	4.7	1	0.2	5	1.1
Western Tidewater	149,398	14	9.4	10	6.7	5	3.3
Eastern Region	1,846,642	157	8.5	37	2.0	178	9.6

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:		**Streptococcal Disease, Group A, Invasive or TSS**		**Syphilis, Early**		**Tuberculosis**	
LOCALITY/DISTRICT/REGION	2014 POPULATION	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000
VIRGINIA TOTAL	8,326,289	222	2.7	745	8.9	212	2.5
LOCALITY							
Accomack County	33,021	0	0.0	1	3.0	2	6.1
Albemarle County	104,489	4	3.8	1	1.0	3	2.9
Alleghany County, Clifton Forge	15,820	0	0.0	0	0.0	0	0.0
Amelia County	12,855	0	0.0	0	0.0	0	0.0
Amherst County	32,041	0	0.0	2	6.2	0	0.0
Appomattox County	15,279	1	6.5	1	6.5	0	0.0
Arlington County	226,908	4	1.8	43	19.0	11	4.8
Augusta County	73,862	2	2.7	1	1.4	0	0.0
Bath County	4,563	0	0.0	0	0.0	0	0.0
Bedford County, Bedford	76,583	2	2.6	1	1.3	0	0.0
Bland County	6,625	0	0.0	0	0.0	0	0.0
Botetourt County	33,100	2	6.0	0	0.0	0	0.0
Brunswick County	16,498	1	6.1	2	12.1	0	0.0
Buchanan County	23,106	0	0.0	0	0.0	0	0.0
Buckingham County	16,913	0	0.0	0	0.0	1	5.9
Campbell County	54,885	1	1.8	3	5.5	0	0.0
Caroline County	29,778	2	6.7	0	0.0	1	3.4
Carroll County	29,621	0	0.0	0	0.0	0	0.0
Charles City County	7,023	0	0.0	0	0.0	0	0.0
Charlotte County	12,225	0	0.0	0	0.0	0	0.0
Chesterfield County	332,499	9	2.7	15	4.5	3	0.9
Clarke County	14,423	0	0.0	0	0.0	0	0.0
Craig County	5,234	1	19.1	0	0.0	0	0.0
Culpeper County	49,166	0	0.0	1	2.0	1	2.0
Cumberland County	9,827	2	20.4	1	10.2	0	0.0
Dickenson County	15,308	4	26.1	0	0.0	0	0.0
Dinwiddie County	27,859	0	0.0	3	10.8	0	0.0
Essex County	11,103	0	0.0	0	0.0	1	9.0
Fairfax County	1,137,538	25	2.2	41	3.6	66	5.8
Fauquier County	68,248	0	0.0	0	0.0	1	1.5
Floyd County	15,578	0	0.0	0	0.0	0	0.0
Fluvanna County	26,092	5	19.2	0	0.0	1	3.8
Franklin County	56,358	5	8.9	1	1.8	0	0.0
Frederick County	82,377	3	3.6	0	0.0	1	1.2
Giles County	16,815	0	0.0	2	11.9	0	0.0
Gloucester County	37,141	0	0.0	0	0.0	0	0.0
Goochland County	21,936	1	4.6	3	13.7	0	0.0
Grayson County	15,093	0	0.0	0	0.0	0	0.0
Greene County	19,031	0	0.0	0	0.0	1	5.3
Greensville County	11,681	0	0.0	1	8.6	0	0.0
Halifax County, South Boston	35,200	0	0.0	3	8.5	0	0.0
Hanover County	101,918	2	2.0	3	2.9	0	0.0
Henrico County	321,924	5	1.6	26	8.1	8	2.5
Henry County	52,081	2	3.8	2	3.8	1	1.9
Highland County	2,248	0	0.0	0	0.0	0	0.0
Isle of Wight County	36,007	0	0.0	4	11.1	0	0.0
James City County	72,583	0	0.0	3	4.1	0	0.0

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:

LOCALITY/DISTRICT/REGION	2014 POPULATION	Streptococcal Disease, Group A, Invasive or TSS: REPORTED CASES	Streptococcal Disease, Group A, Invasive or TSS: RATE PER 100,000	Syphilis, Early: REPORTED CASES	Syphilis, Early: RATE PER 100,000	Tuberculosis: REPORTED CASES	Tuberculosis: RATE PER 100,000
VIRGINIA TOTAL	8,326,289	222	2.7	745	8.9	212	2.5
LOCALITY							
King and Queen County	7,175	0	0.0	0	0.0	0	0.0
King George County	25,371	1	3.9	2	7.9	0	0.0
King William County	16,186	0	0.0	0	0.0	0	0.0
Lancaster County	11,044	0	0.0	1	9.1	1	9.1
Lee County	24,951	0	0.0	1	4.0	0	0.0
Loudoun County	363,050	5	1.4	8	2.2	10	2.8
Louisa County	34,348	1	2.9	0	0.0	0	0.0
Lunenburg County	12,466	0	0.0	0	0.0	0	0.0
Madison County	13,157	2	15.2	0	0.0	0	0.0
Mathews County	8,836	0	0.0	1	11.3	0	0.0
Mecklenburg County	31,192	1	3.2	2	6.4	1	3.2
Middlesex County	10,696	0	0.0	0	0.0	0	0.0
Montgomery County	97,244	2	2.1	4	4.1	0	0.0
Nelson County	14,850	0	0.0	0	0.0	0	0.0
New Kent County	20,021	0	0.0	1	5.0	0	0.0
Northampton County	12,121	0	0.0	0	0.0	0	0.0
Northumberland County	12,251	0	0.0	0	0.0	0	0.0
Nottoway County	15,579	0	0.0	2	12.8	0	0.0
Orange County	35,026	0	0.0	0	0.0	0	0.0
Page County	23,848	2	8.4	0	0.0	0	0.0
Patrick County	18,264	0	0.0	0	0.0	0	0.0
Pittsylvania County	62,383	2	3.2	3	4.8	0	0.0
Powhatan County	28,449	0	0.0	0	0.0	0	0.0
Prince Edward County	23,074	2	8.7	1	4.3	1	4.3
Prince George County	37,333	0	0.0	5	13.4	0	0.0
Prince William County	446,094	7	1.6	33	7.4	26	5.8
Pulaski County	34,322	0	0.0	0	0.0	0	0.0
Rappahannock County	7,361	2	27.2	0	0.0	0	0.0
Richmond County	8,902	0	0.0	1	11.2	0	0.0
Roanoke County	93,785	14	14.9	4	4.3	1	1.1
Rockbridge County	22,327	0	0.0	0	0.0	1	4.5
Rockingham County	78,171	1	1.3	3	3.8	1	1.3
Russell County	28,023	0	0.0	0	0.0	0	0.0
Scott County	22,384	2	8.9	1	4.5	0	0.0
Shenandoah County	43,021	2	4.6	0	0.0	0	0.0
Smyth County	31,555	1	3.2	0	0.0	0	0.0
Southampton County	18,059	1	5.5	3	16.6	0	0.0
Spotsylvania County	129,188	3	2.3	13	10.1	2	1.5
Stafford County	139,992	2	1.4	5	3.6	3	2.1
Surry County	6,790	1	14.7	0	0.0	0	0.0
Sussex County	11,767	0	0.0	4	34.0	0	0.0
Tazewell County	43,452	1	2.3	0	0.0	1	2.3
Warren County	38,987	3	7.7	3	7.7	0	0.0
Washington County	54,729	1	1.8	1	1.8	1	1.8
Westmoreland County	17,477	0	0.0	1	5.7	0	0.0
Wise County	39,935	0	0.0	0	0.0	0	0.0
Wythe County	29,121	0	0.0	0	0.0	0	0.0
York County	66,342	1	1.5	4	6.0	1	1.5

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:		**Streptococcal Disease, Group A, Invasive or TSS**		**Syphilis, Early**		**Tuberculosis**	
LOCALITY/DISTRICT/REGION	2014 POPULATION	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000
VIRGINIA TOTAL	8,326,289	222	2.7	745	8.9	212	2.5
LOCALITY							
Alexandria	150,575	6	4.0	21	13.9	16	10.6
Bristol	17,184	0	0.0	0	0.0	0	0.0
Buena Vista	6,603	0	0.0	0	0.0	1	15.1
Charlottesville	45,593	3	6.6	3	6.6	1	2.2
Chesapeake	233,371	6	2.6	20	8.6	2	0.9
Colonial Heights	17,731	0	0.0	2	11.3	0	0.0
Covington	5,802	0	0.0	0	0.0	0	0.0
Danville	42,444	1	2.4	10	23.6	0	0.0
Emporia	5,462	0	0.0	3	54.9	0	0.0
Fairfax City	24,483	0	0.0	0	0.0	0	0.0
Falls Church	13,601	0	0.0	1	7.4	0	0.0
Franklin City	8,526	0	0.0	0	0.0	1	11.7
Fredericksburg	28,350	1	3.5	5	17.6	0	0.0
Galax	7,014	0	0.0	0	0.0	0	0.0
Hampton	136,879	4	2.9	29	21.2	4	2.9
Harrisonburg	52,478	0	0.0	6	11.4	1	1.9
Hopewell	22,196	1	4.5	9	40.5	0	0.0
Lexington	7,311	0	0.0	0	0.0	0	0.0
Lynchburg	79,047	3	3.8	10	12.7	1	1.3
Manassas	42,081	1	2.4	4	9.5	0	0.0
Manassas Park	15,174	0	0.0	2	13.2	0	0.0
Martinsville	13,711	0	0.0	1	7.3	0	0.0
Newport News	182,965	5	2.7	52	28.4	5	2.7
Norfolk	245,428	7	2.9	54	22.0	5	2.0
Norton	4,031	0	0.0	0	0.0	0	0.0
Petersburg	32,701	0	0.0	9	27.5	0	0.0
Poquoson	12,048	0	0.0	0	0.0	0	0.0
Portsmouth	96,004	3	3.1	28	29.2	1	1.0
Radford	17,646	1	5.7	0	0.0	0	0.0
Richmond City	217,853	12	5.5	91	41.8	2	0.9
Roanoke City	99,428	6	6.0	15	15.1	3	3.0
Salem	25,483	1	3.9	6	23.5	1	3.9
Staunton	24,538	2	8.2	1	4.1	0	0.0
Suffolk	86,806	2	2.3	17	19.6	1	1.2
Virginia Beach	450,980	12	2.7	71	15.7	13	2.9
Waynesboro	21,366	2	9.4	1	4.7	1	4.7
Williamsburg	14,691	0	0.0	1	6.8	1	6.8
Winchester	27,543	0	0.0	2	7.3	0	0.0

Number of Cases and Rate for each Locality, District, and Region for these Diseases in 2015:		**Streptococcal Disease, Group A, Invasive or TSS**		**Syphilis, Early**		**Tuberculosis**	
LOCALITY/DISTRICT/REGION	2014 POPULATION	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000	REPORTED CASES	RATE PER 100,000
VIRGINIA TOTAL	8,326,289	222	2.7	745	8.9	212	2.5
DISTRICT/REGION							

Central Shenandoah	293,467	7	2.4	12	4.1	5	1.7
Lord Fairfax	230,199	10	4.3	5	2.2	1	0.4
Rappahannock	352,679	9	2.6	25	7.1	6	1.7
Rappahannock/Rapidan	172,958	4	2.3	1	0.6	2	1.2
Thomas Jefferson	244,403	13	5.3	4	1.6	6	2.5
Northwest Region	1,293,706	43	3.3	47	3.6	20	1.5

Alexandria	150,575	6	4.0	21	13.9	16	10.6
Arlington	226,908	4	1.8	43	19.0	11	4.8
Fairfax	1,175,622	25	2.1	42	3.6	66	5.6
Loudoun	363,050	5	1.4	8	2.2	10	2.8
Prince William	503,349	8	1.6	39	7.7	26	5.2
Northern Region	2,419,504	48	2.0	153	6.3	129	5.3

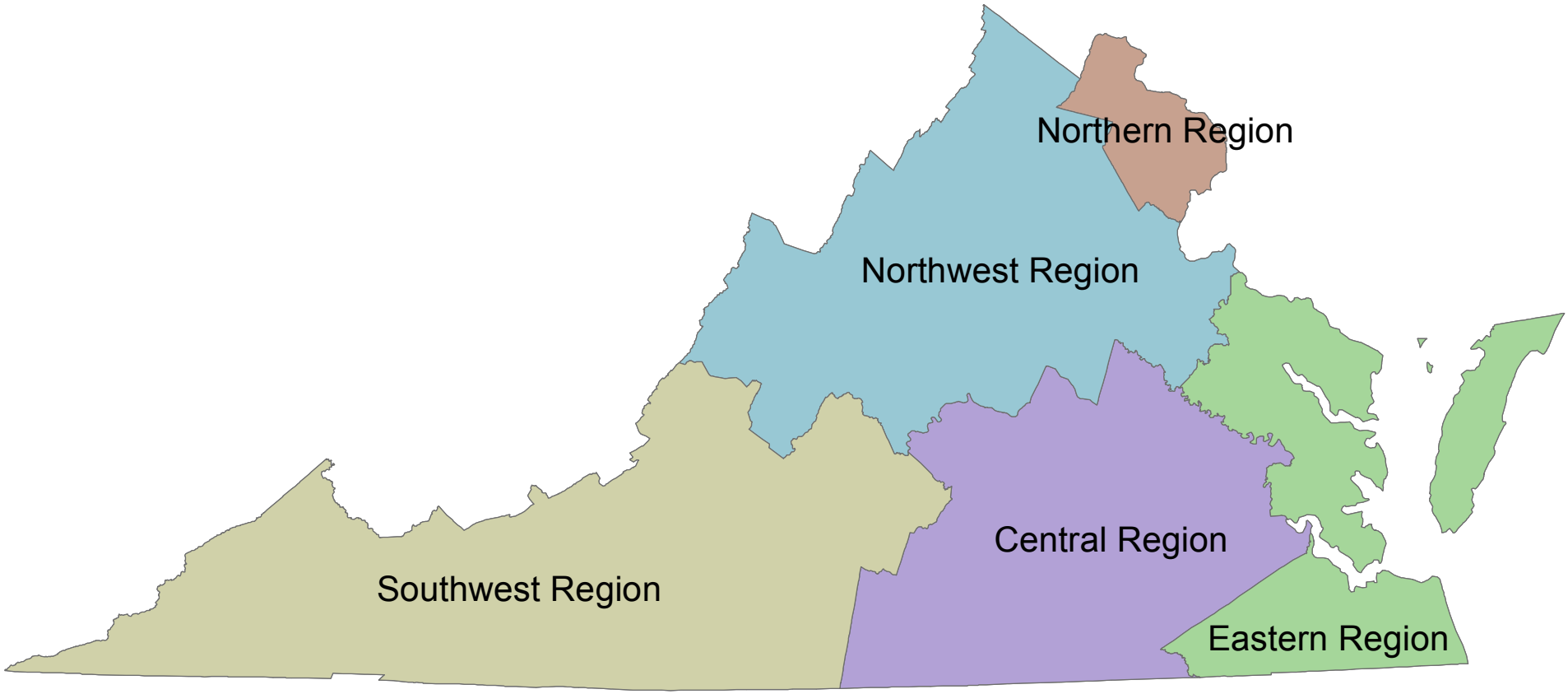
Alleghany	179,224	18	10.0	10	5.6	2	1.1
Central Virginia	257,835	7	2.7	17	6.6	1	0.4
Cumberland Plateau	109,889	5	4.6	0	0.0	1	0.9
Lenowisco	91,301	2	2.2	2	2.2	0	0.0
Mount Rogers	190,942	2	1.0	1	0.5	1	0.5
New River	181,605	3	1.7	6	3.3	0	0.0
Pittsylvania/Danville	104,827	3	2.9	13	12.4	0	0.0
Roanoke City	99,428	6	6.0	15	15.1	3	3.0
West Piedmont	140,414	7	5.0	4	2.8	1	0.7
Southwest Region	1,355,465	53	3.9	68	5.0	9	0.7

Chesterfield	378,679	9	2.4	17	4.5	3	0.8
Chickahominy	150,898	3	2.0	7	4.6	0	0.0
Crater	155,789	2	1.3	34	21.8	0	0.0
Henrico	321,924	5	1.6	26	8.1	8	2.5
Piedmont	102,939	4	3.9	4	3.9	2	1.9
Richmond City	217,853	12	5.5	91	41.8	2	0.9
Southside	82,890	2	2.4	7	8.4	1	1.2
Central Region	1,410,972	37	2.6	186	13.2	16	1.1

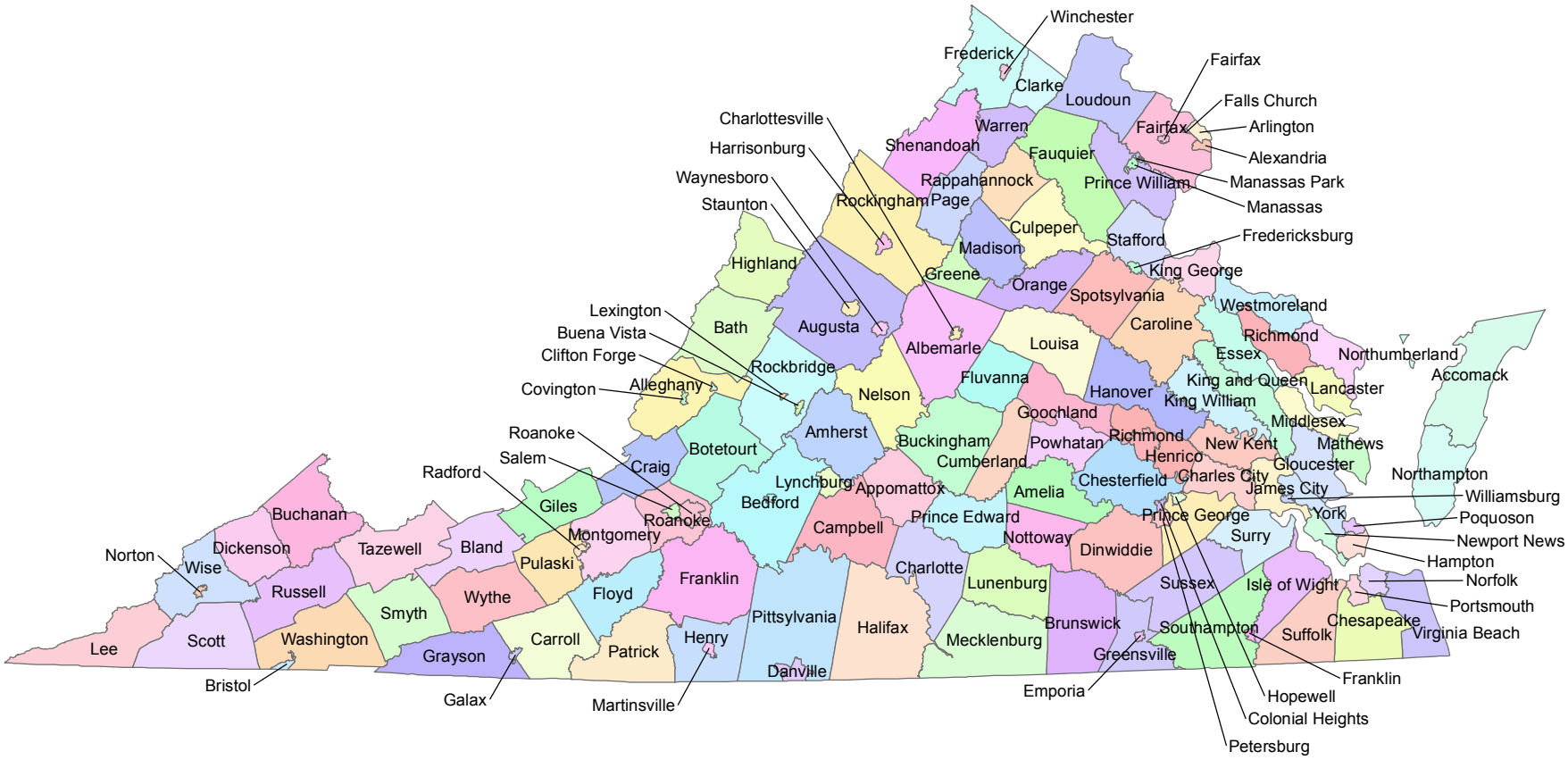
Chesapeake	233,371	6	2.6	20	8.6	2	0.9
Eastern Shore	45,142	0	0.0	1	2.2	2	4.4
Hampton	136,879	4	2.9	29	21.2	4	2.9
Norfolk	245,428	7	2.9	54	22.0	5	2.0
Peninsula	348,629	6	1.7	60	17.2	7	2.0
Portsmouth	96,004	3	3.1	28	29.2	1	1.0
Three Rivers	140,811	0	0.0	4	2.8	2	1.4
Virginia Beach	450,980	12	2.7	71	15.7	13	2.9
Western Tidewater	149,398	3	2.0	24	16.1	2	1.3
Eastern Region	1,846,642	41	2.2	291	15.8	38	2.1

MAPS OF INCIDENCE RATES FOR SELECTED DISEASES BY LOCALITY

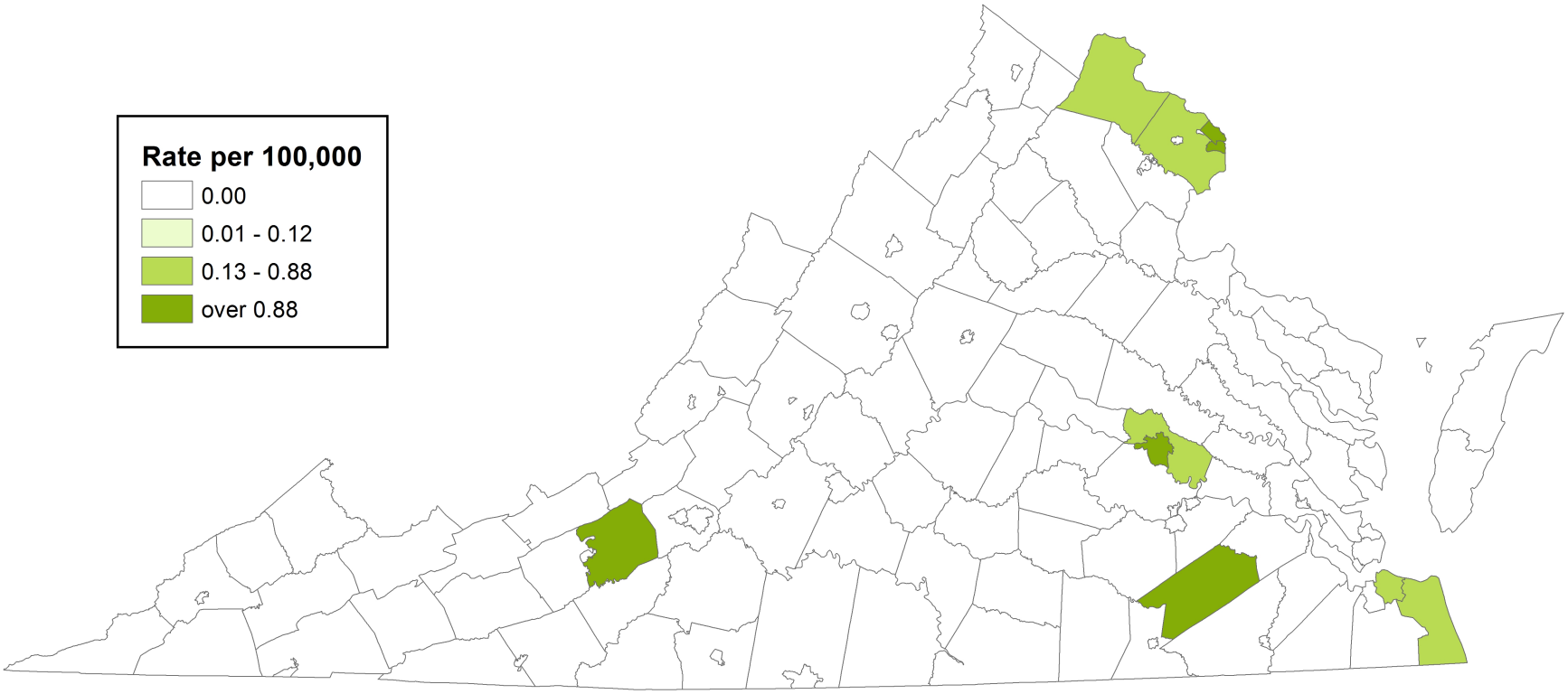
Health Planning Regions in Virginia



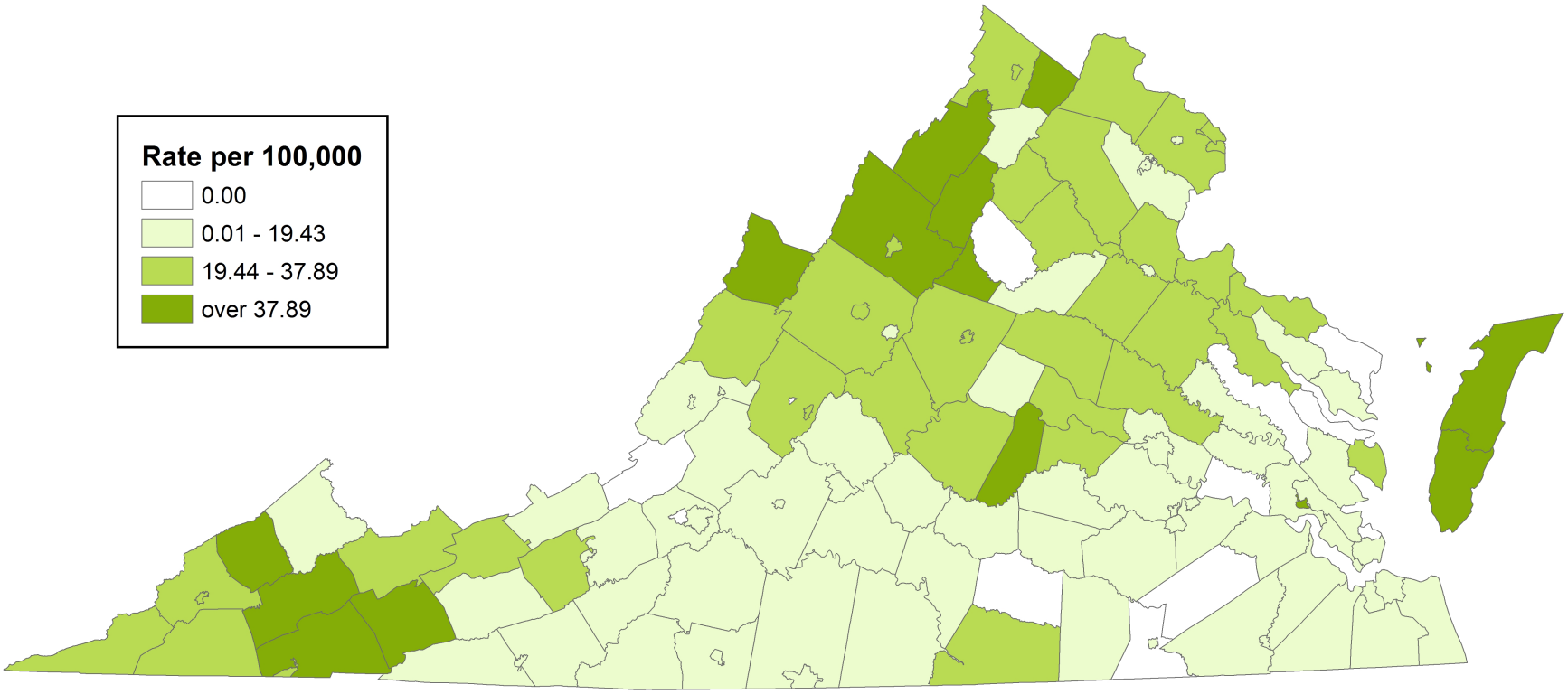
Virginia Localities



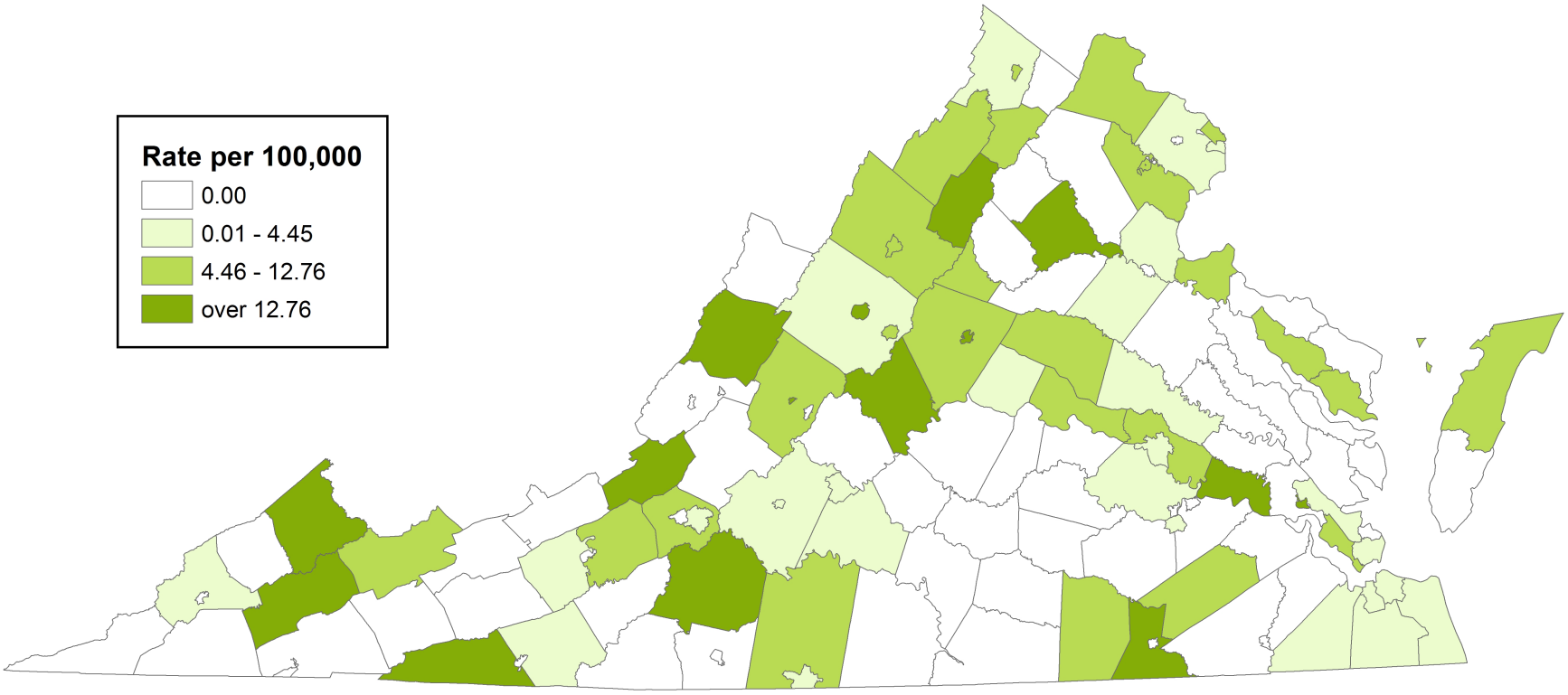
Amebiasis Incidence Rate by Locality
Virginia, 2015



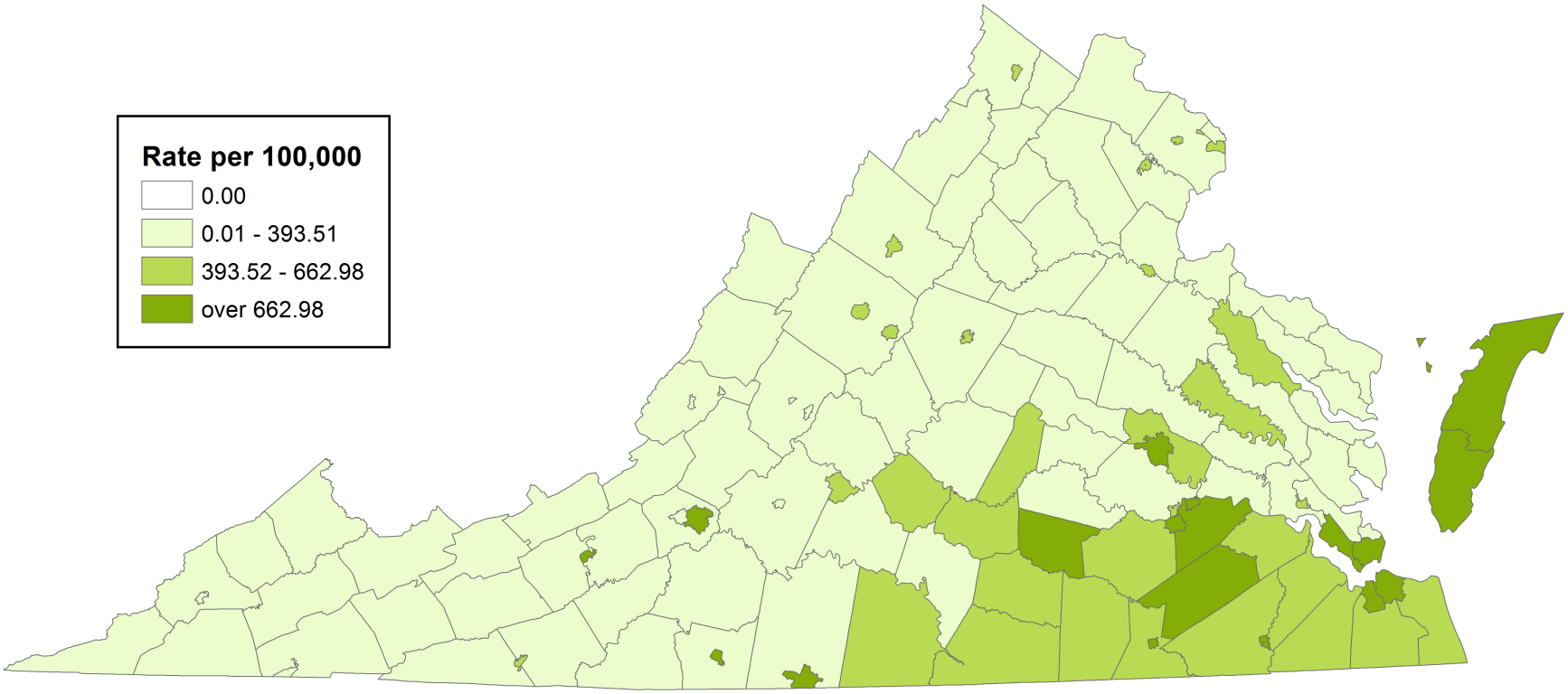
Campylobacteriosis Incidence Rate by Locality
Virginia, 2015



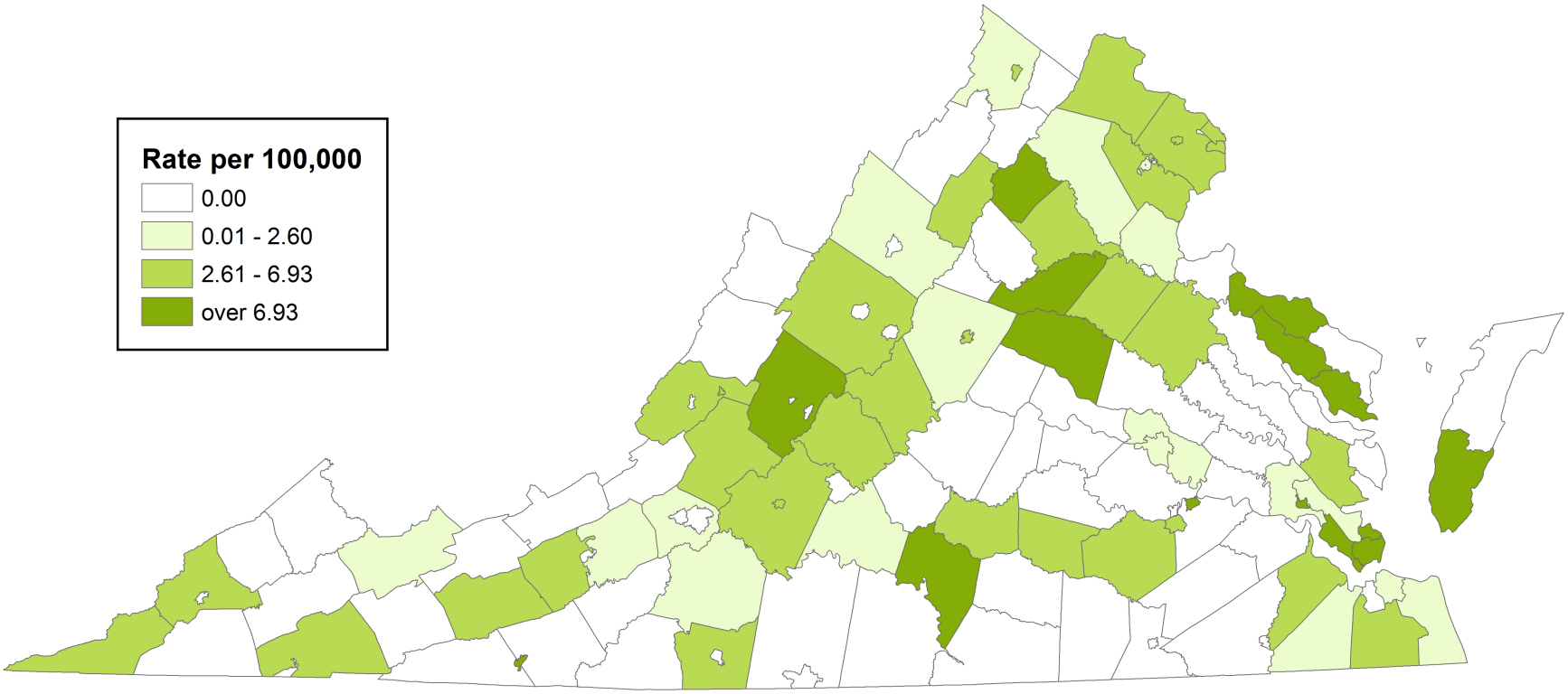
Chickenpox Incidence Rate by Locality
Virginia, 2015



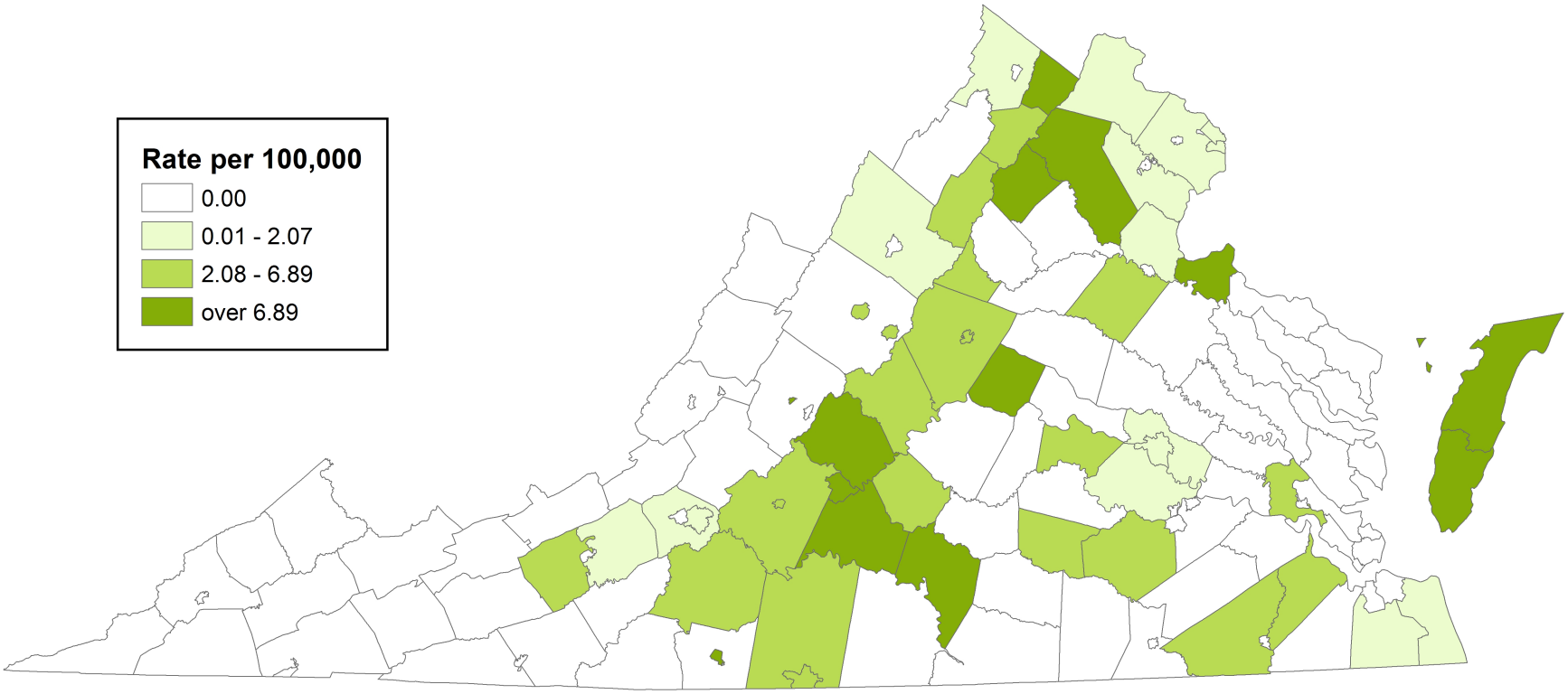
Chlamydia trachomatis Infection Incidence Rate by Locality Virginia, 2015



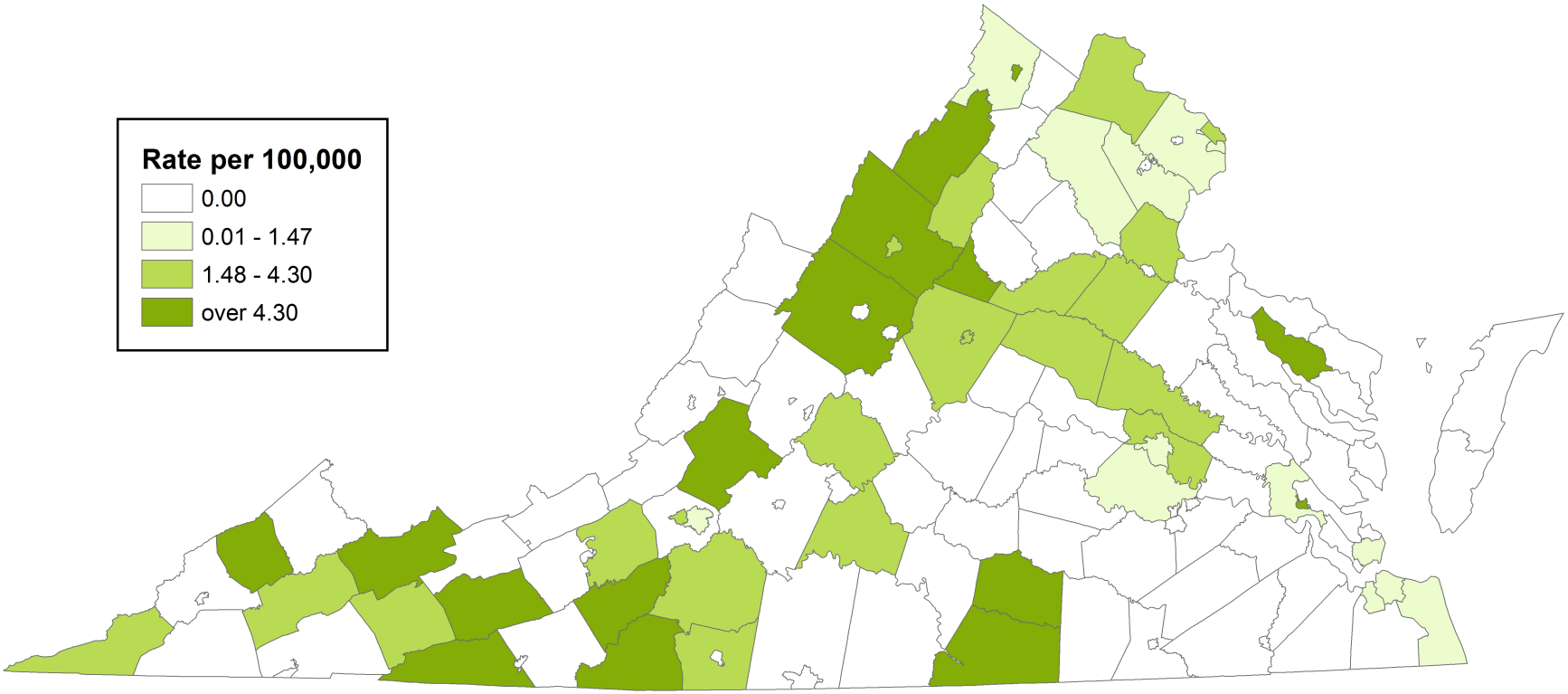
Cryptosporidiosis Incidence Rate by Locality
Virginia, 2015



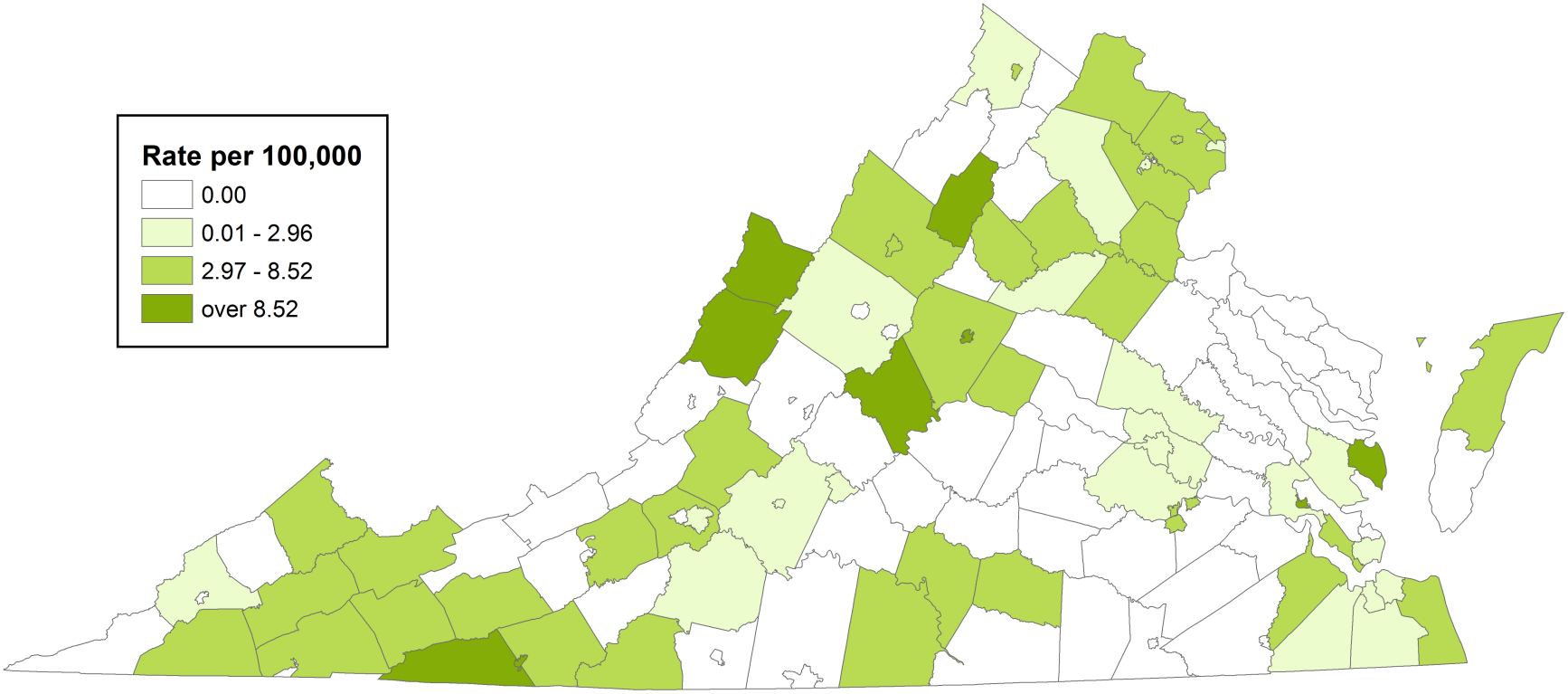
Ehrlichiosis / Anaplasmosis Incidence Rate by Locality
Virginia, 2015



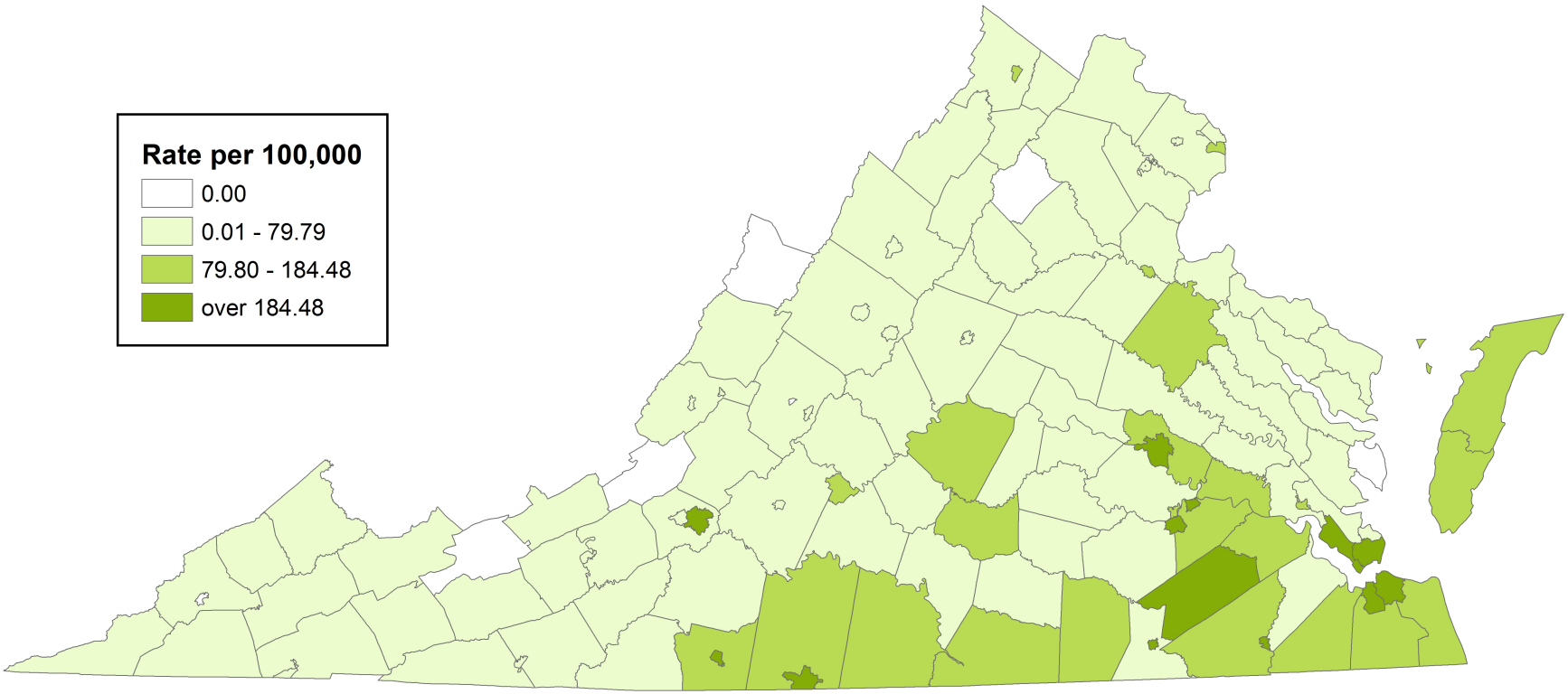
Escherichia coli Infection, Shiga Toxin-Producing Incidence Rate by Locality, Virginia, 2015



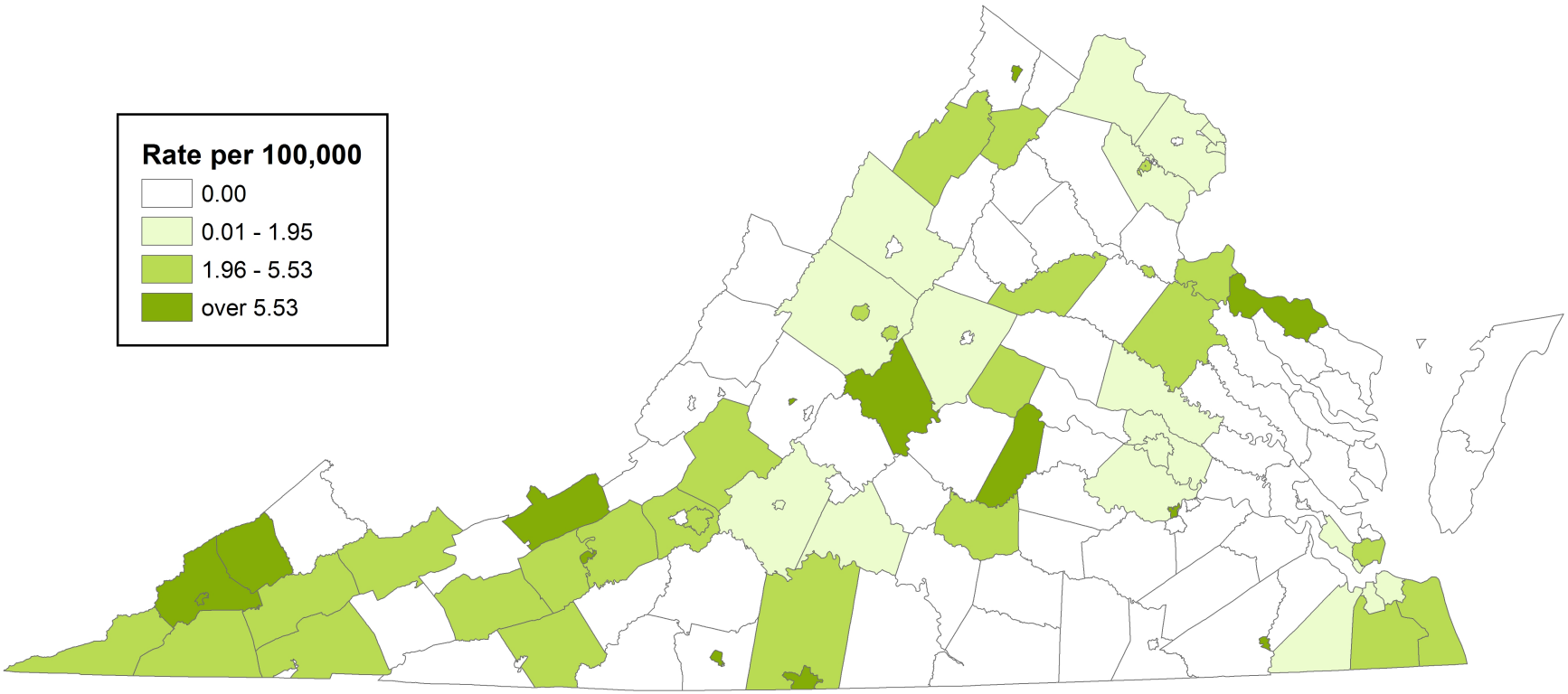
Giardiasis Incidence Rate by Locality
Virginia, 2015



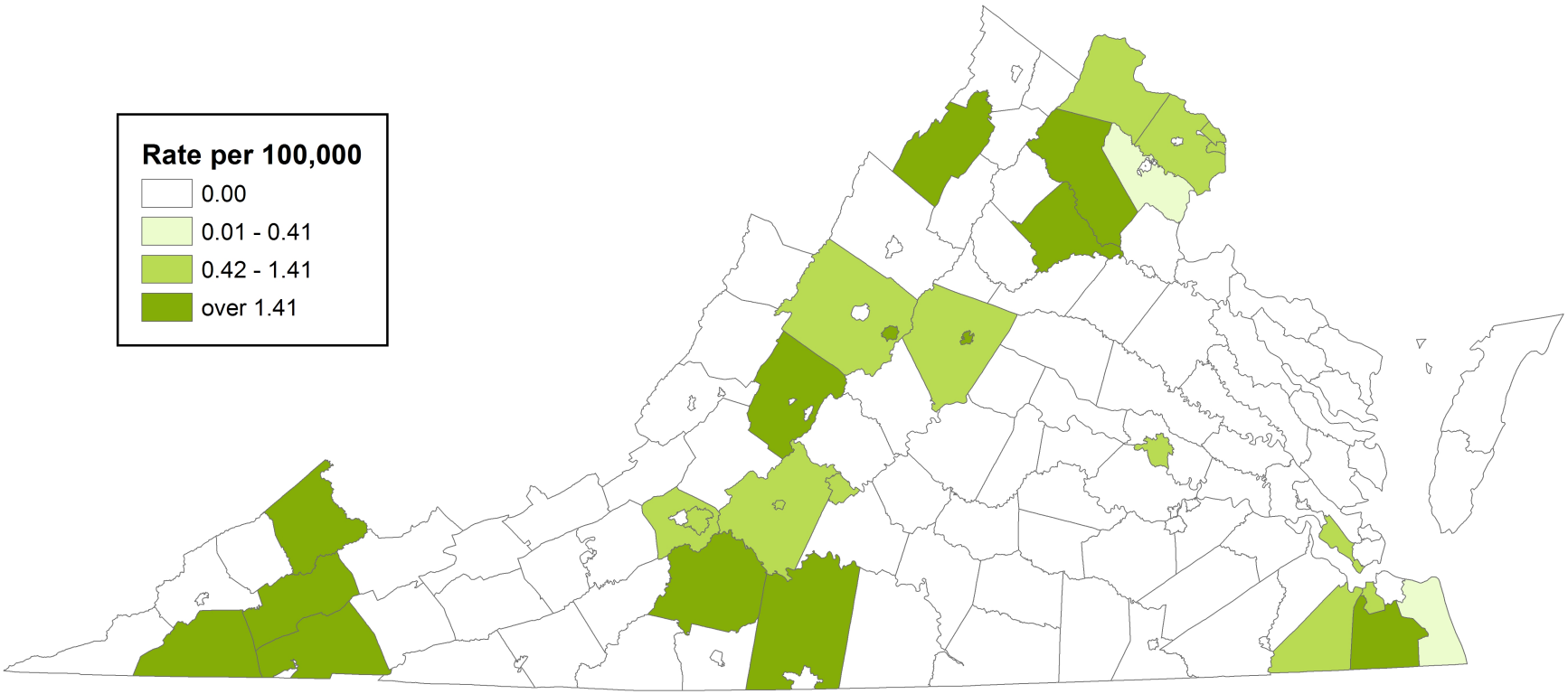
Gonorrhea Incidence Rate by Locality
Virginia, 2015



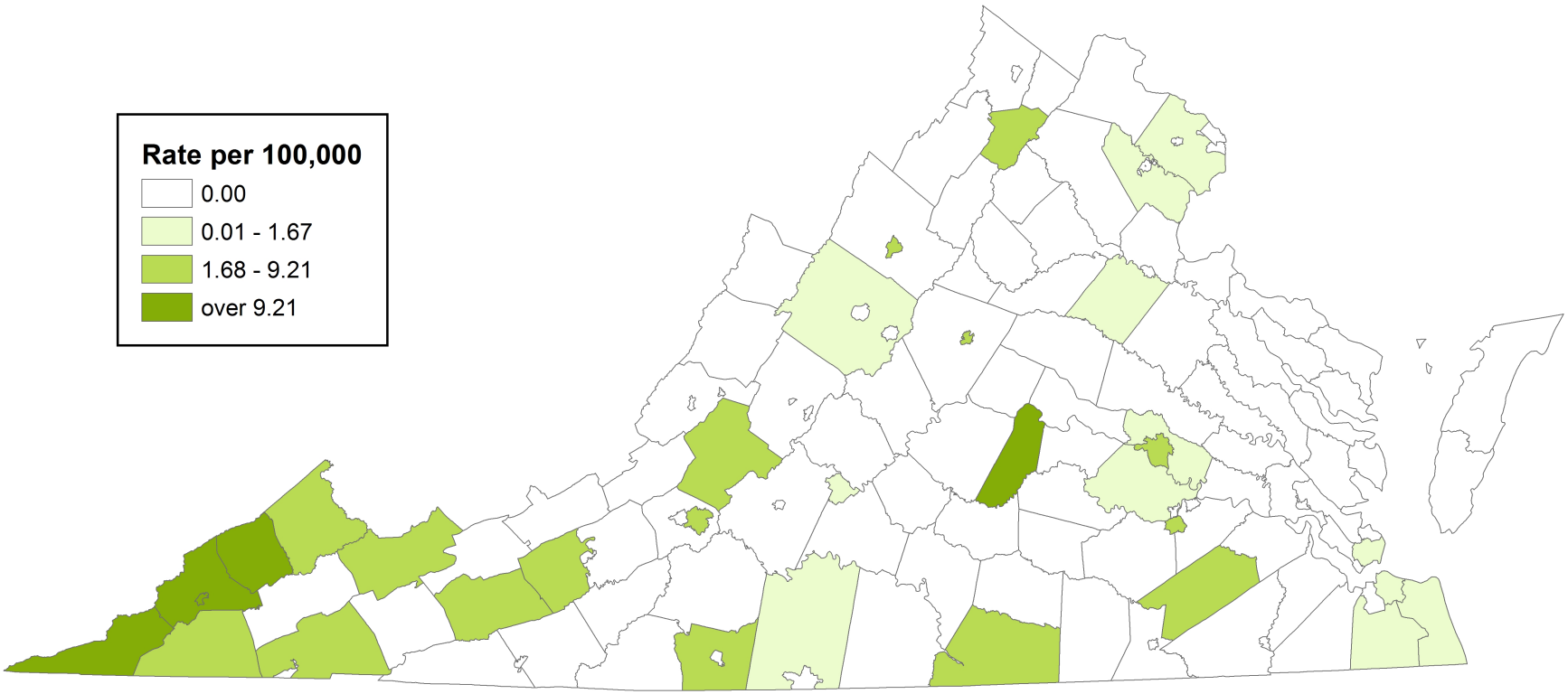
Haemophilus influenzae Infection, Invasive Incidence Rate by Locality, Virginia, 2015



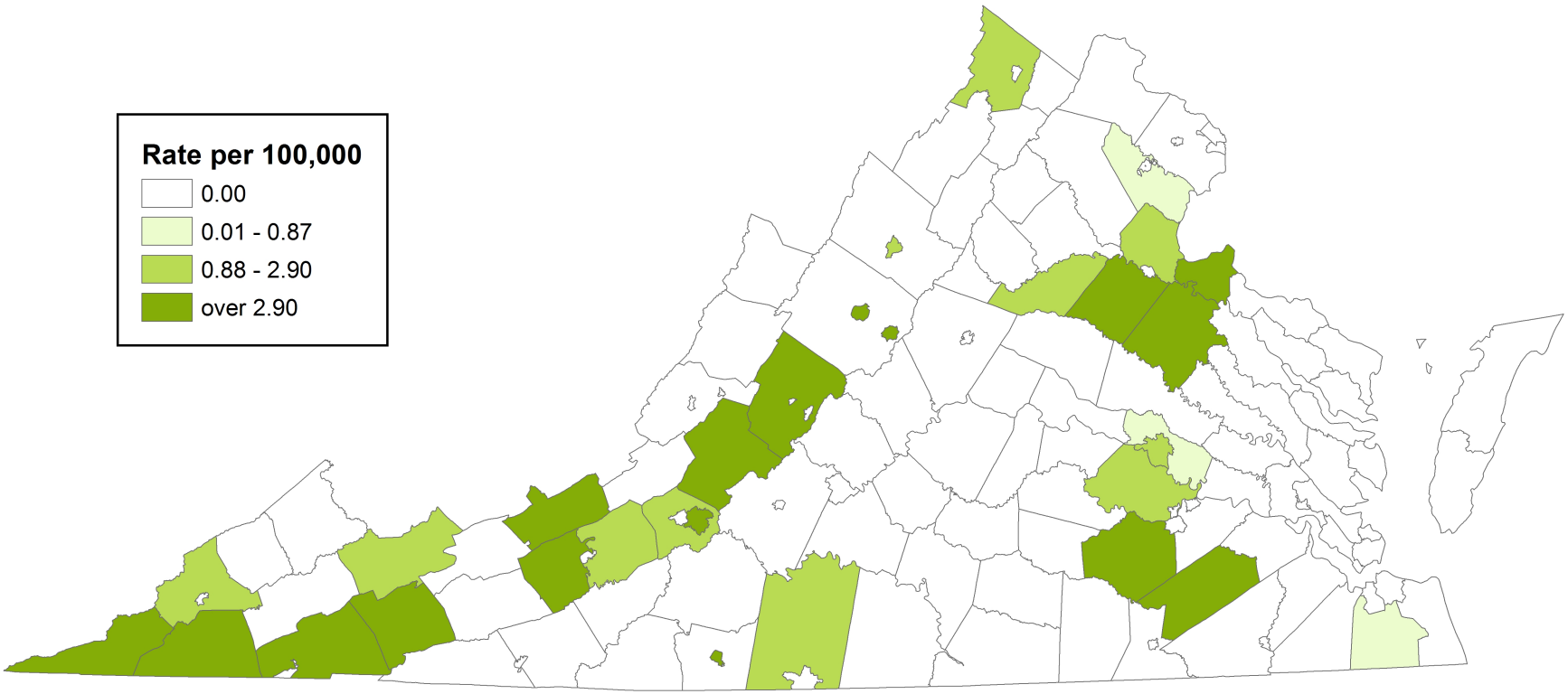
Hepatitis A Incidence Rate by Locality
Virginia, 2015



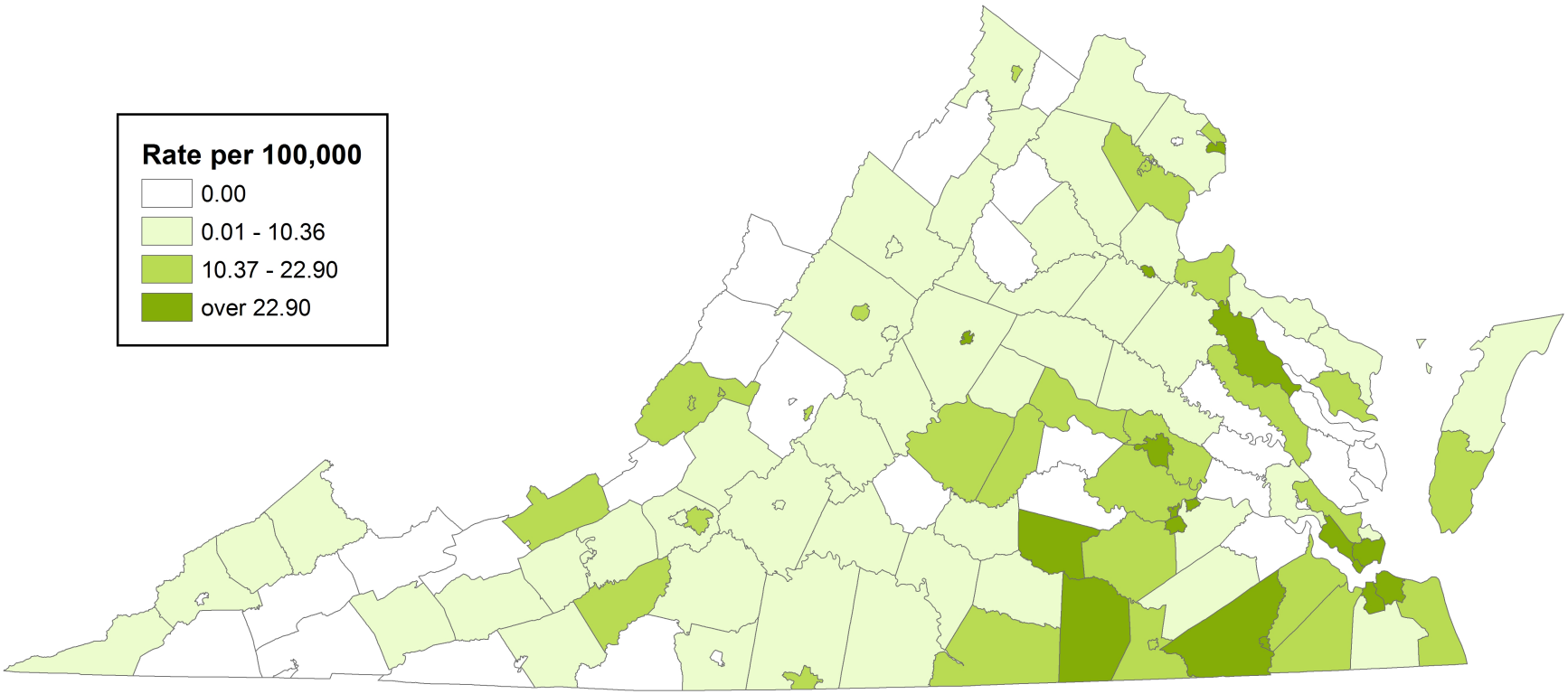
Hepatitis B, Acute, Incidence Rate by Locality
Virginia, 2015



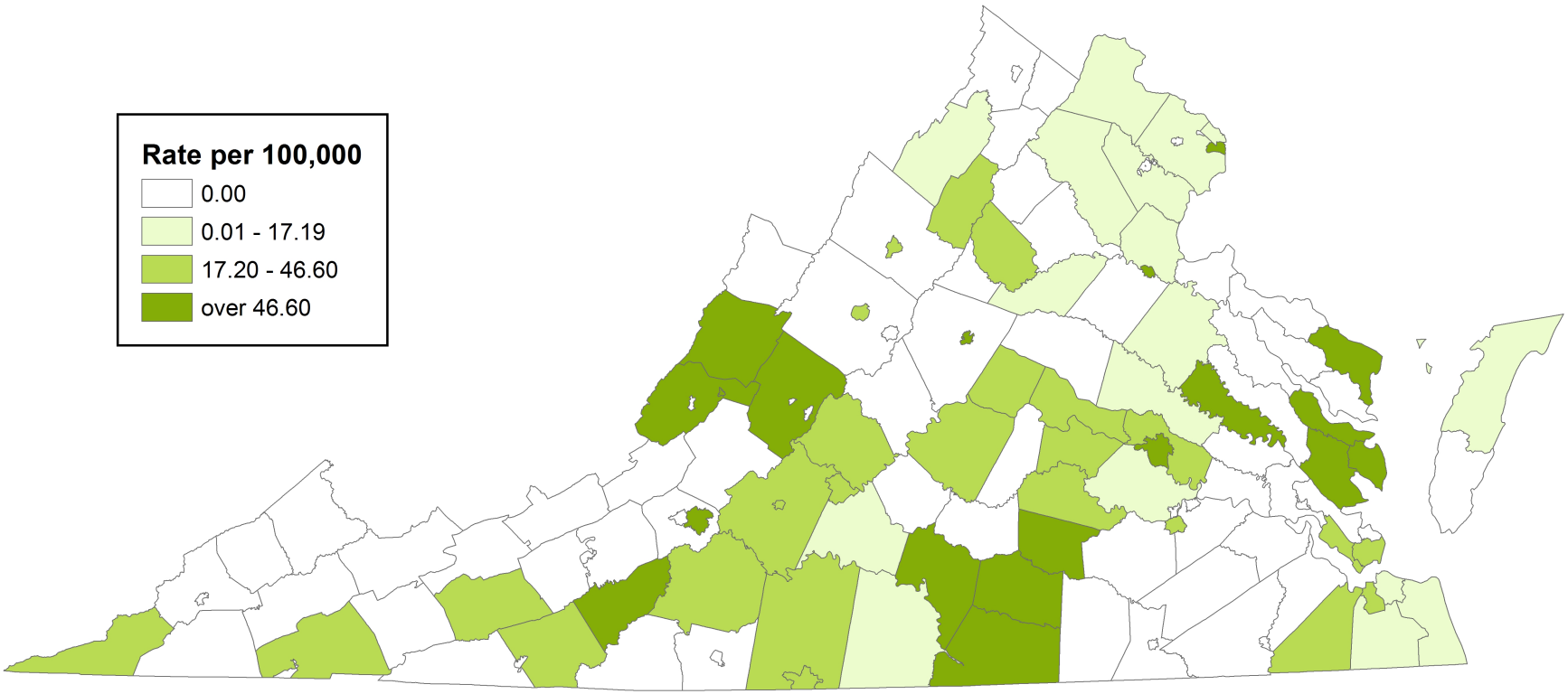
Hepatitis C, Acute, Incidence Rate by Locality
Virginia, 2015



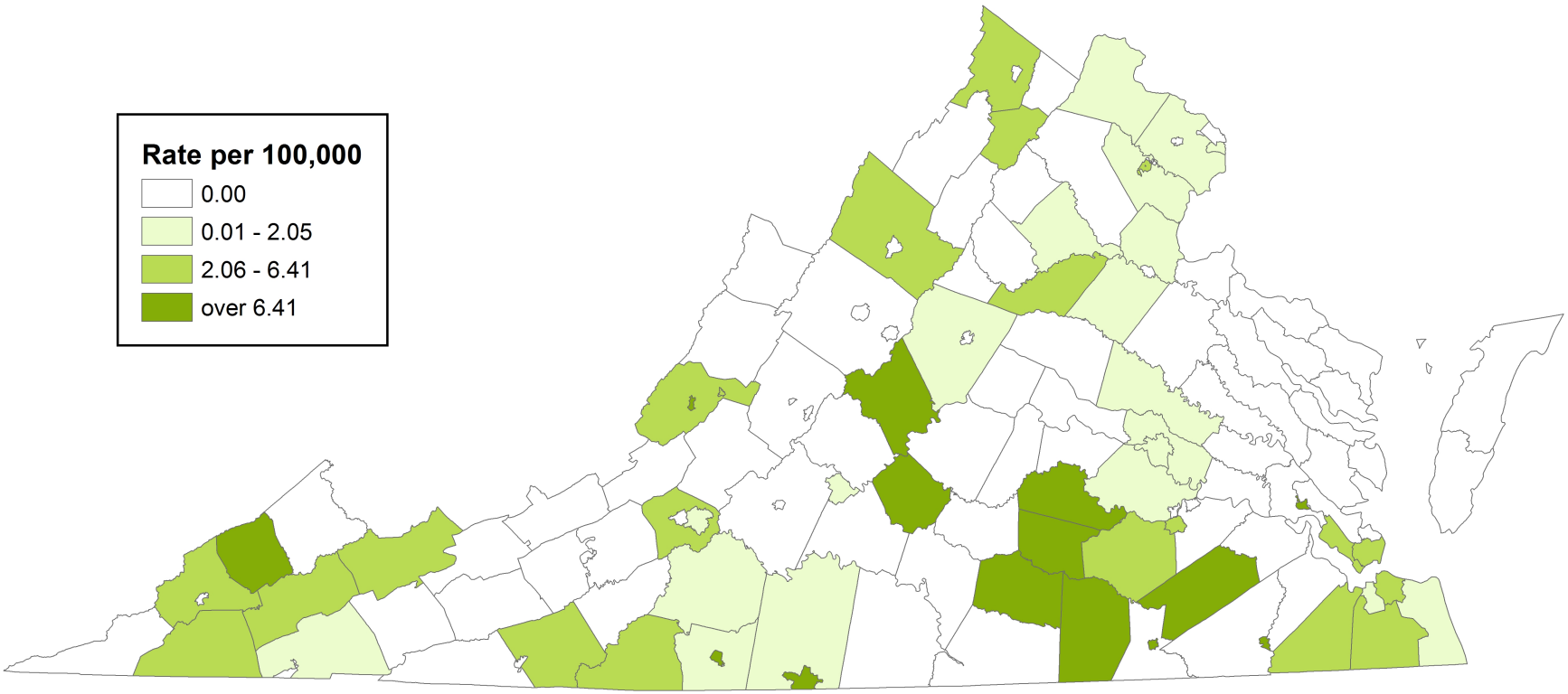
HIV Disease Incidence Rate by Locality
Virginia, 2015



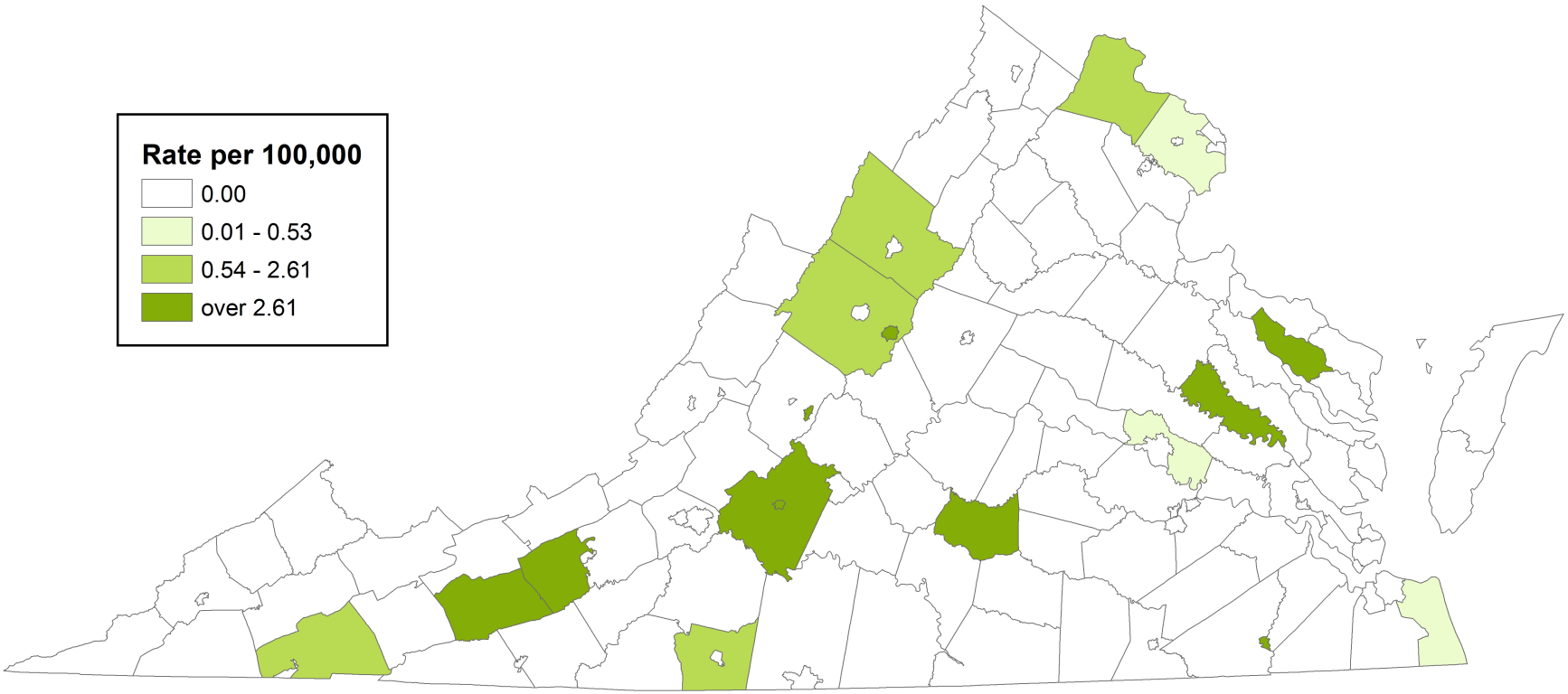
Lead - Elevated Blood Levels in Children
Incidence Rate by Locality, Virginia, 2015



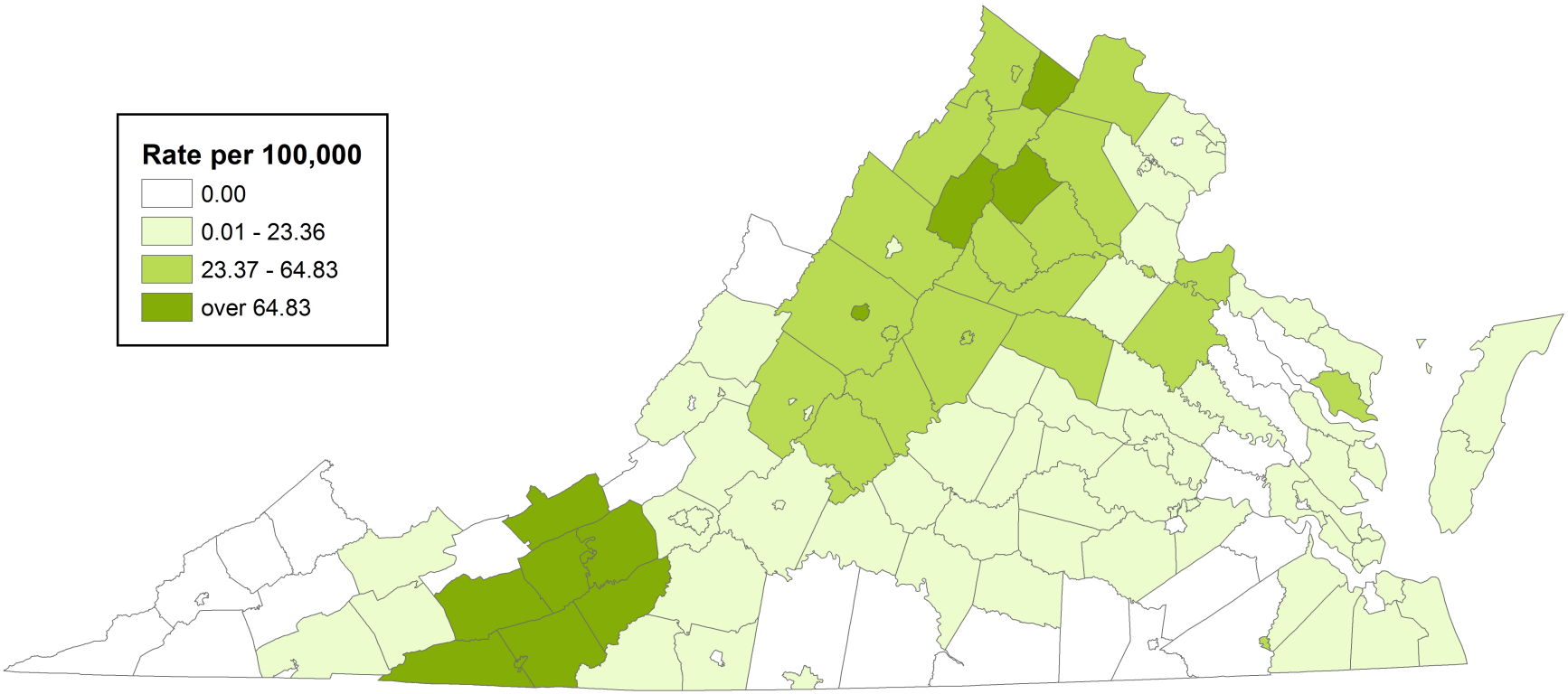
Legionellosis Incidence Rate by Locality
Virginia, 2015



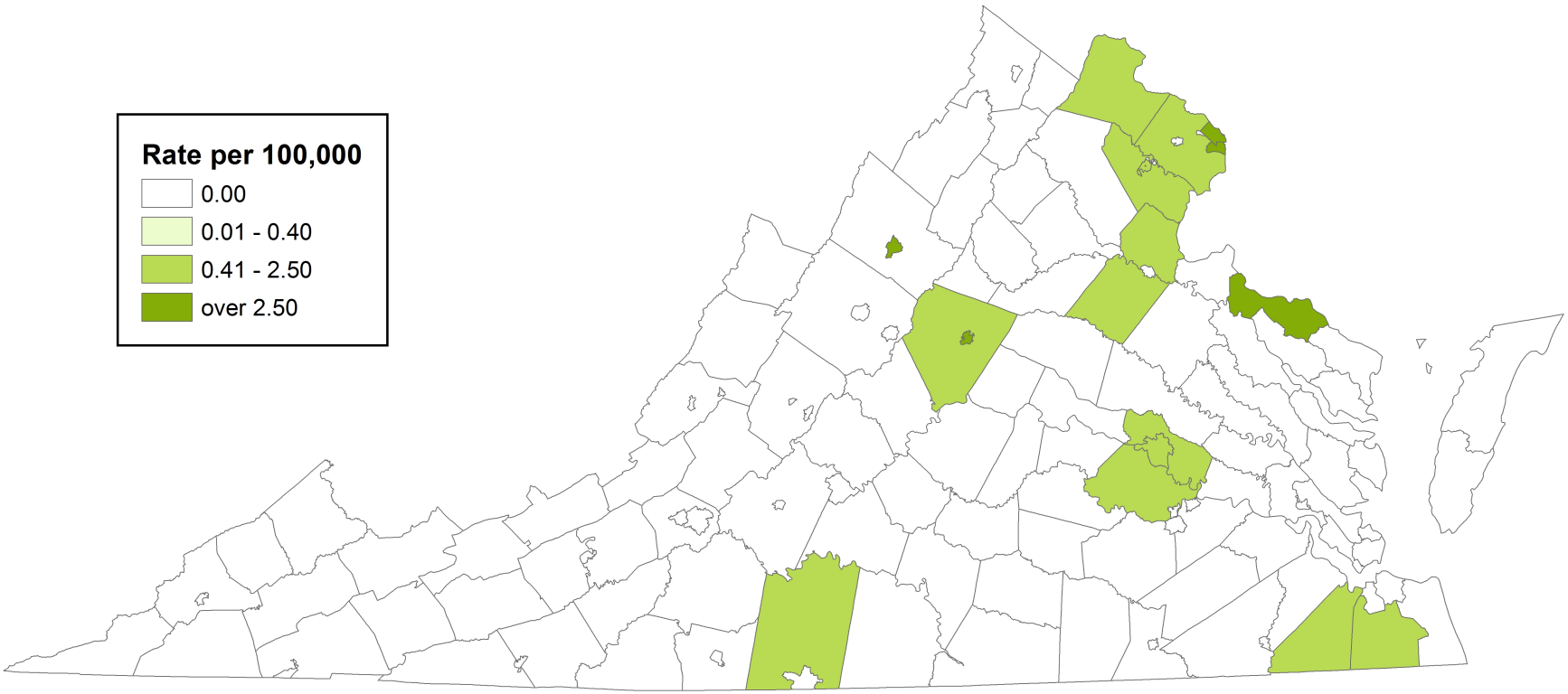
Listeriosis Incidence Rate by Locality
Virginia, 2015



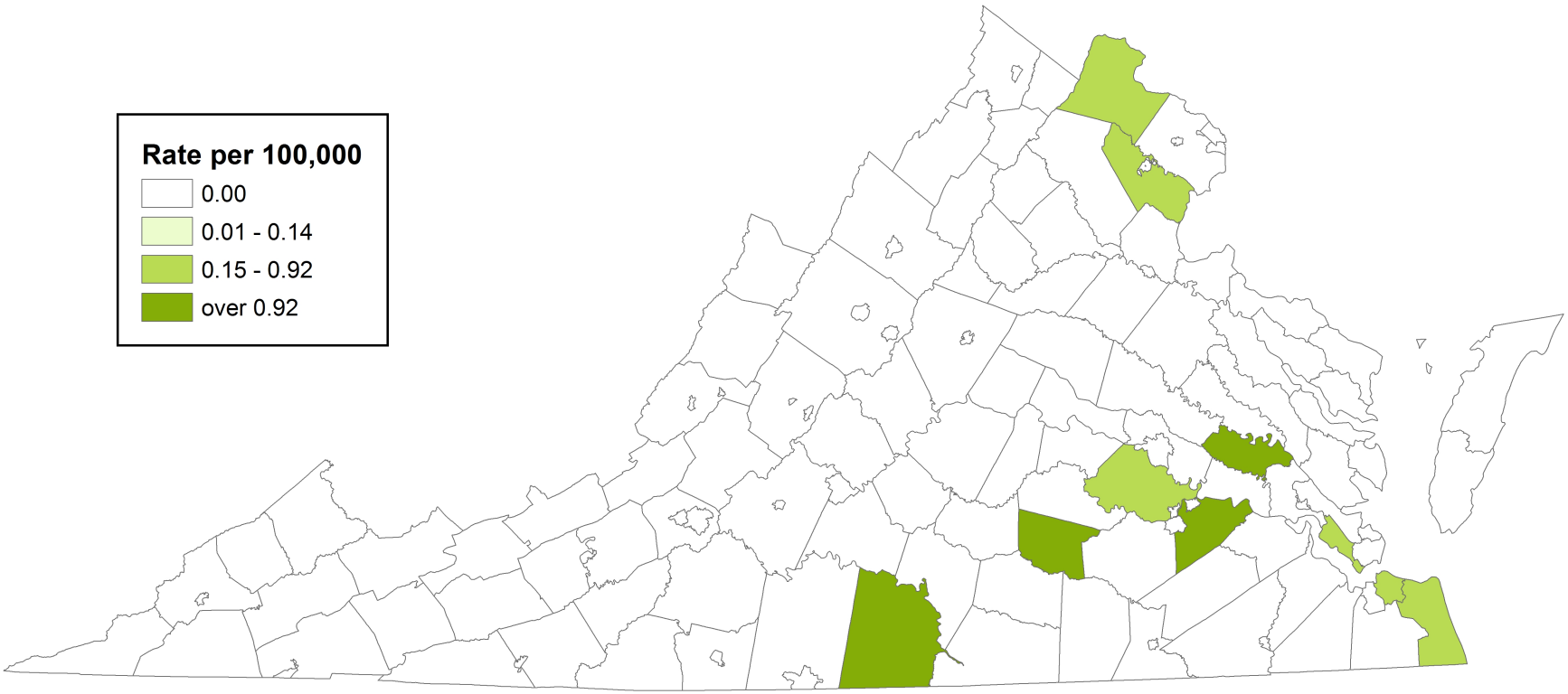
Lyme Disease Incidence Rate by Locality
Virginia, 2015



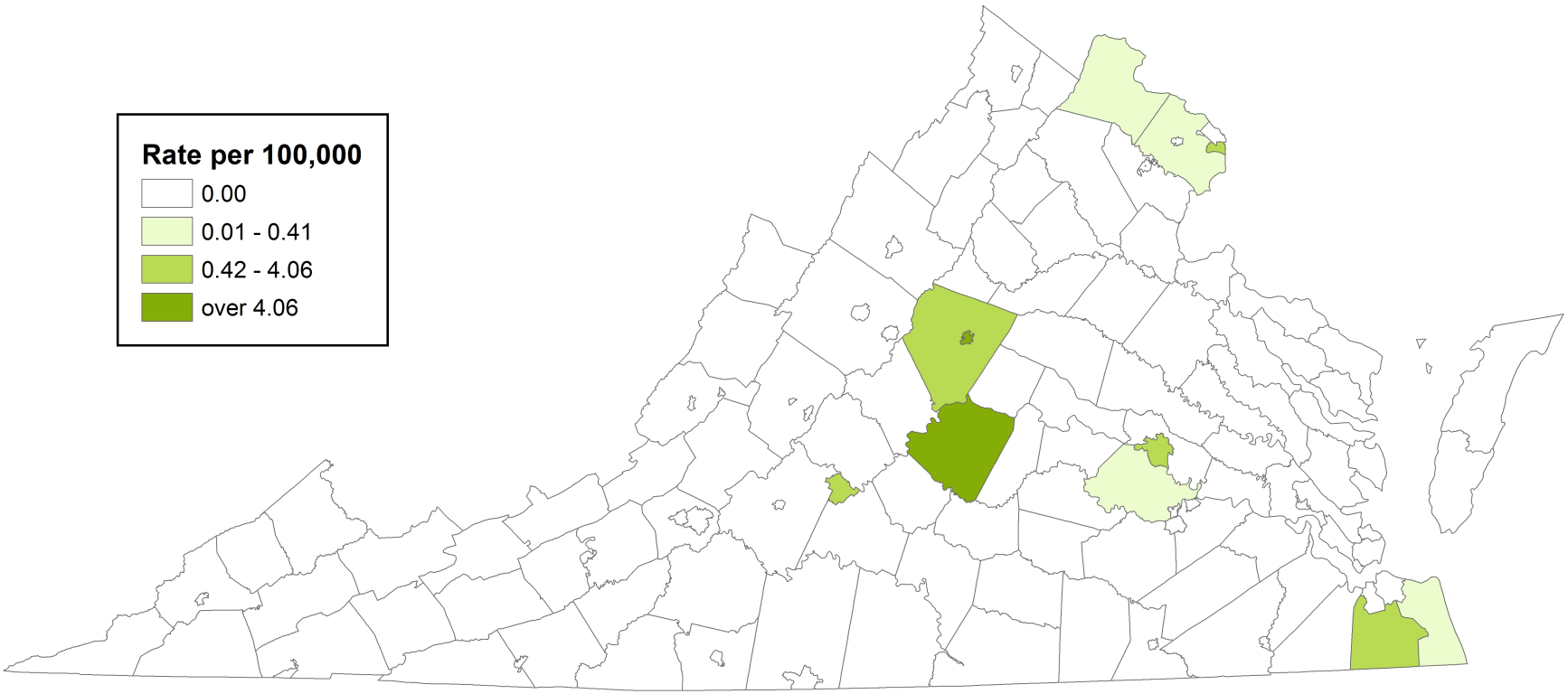
Malaria Incidence Rate by Locality
Virginia, 2015



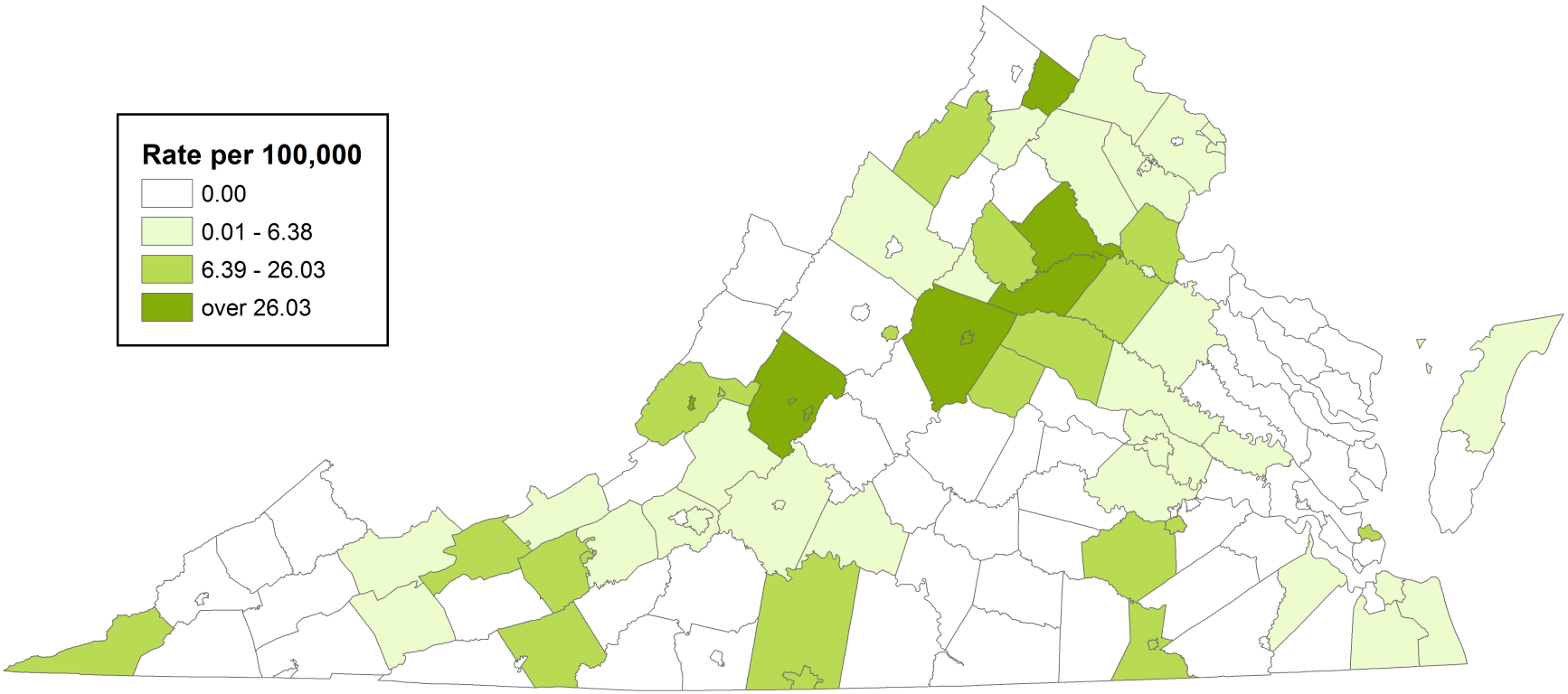
Meningococcal Disease Incidence Rate by Locality
Virginia, 2015



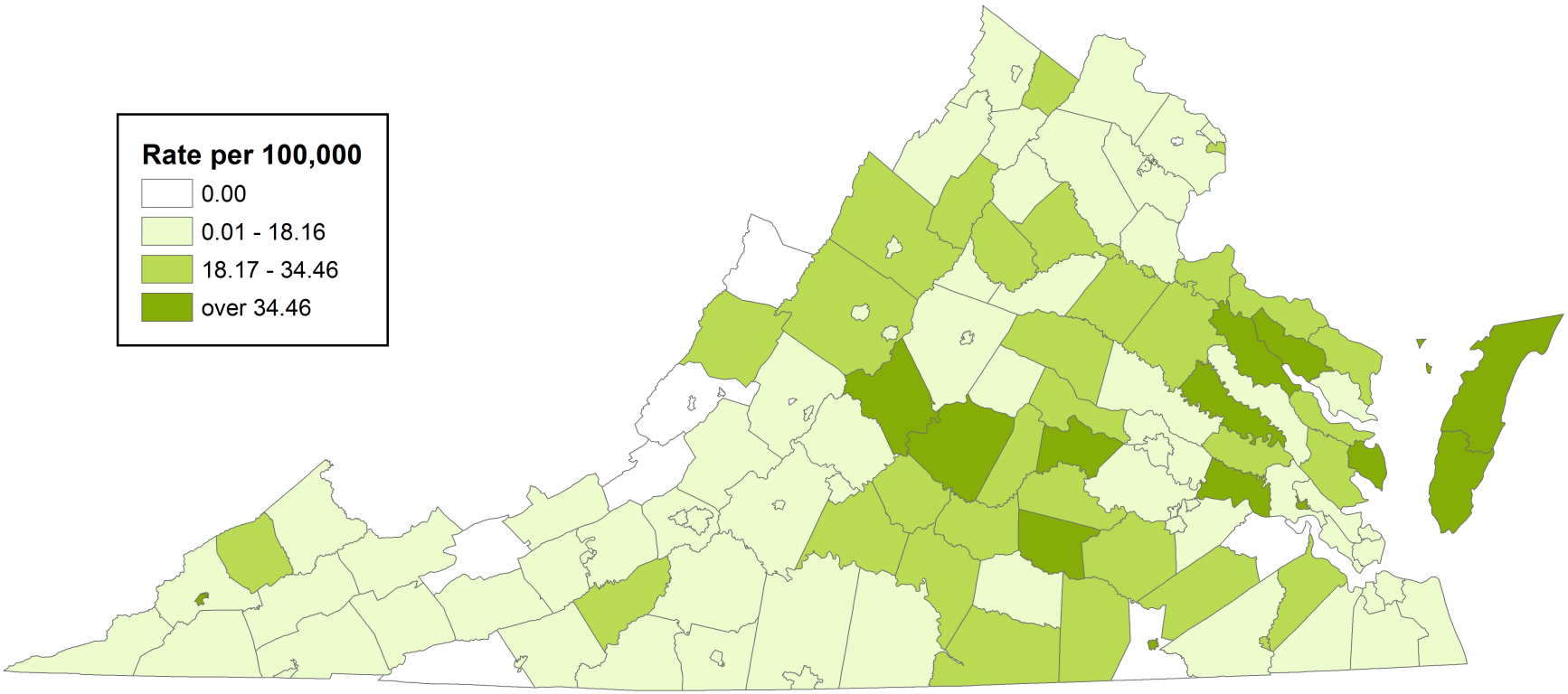
Mumps Incidence Rate by Locality
Virginia, 2015



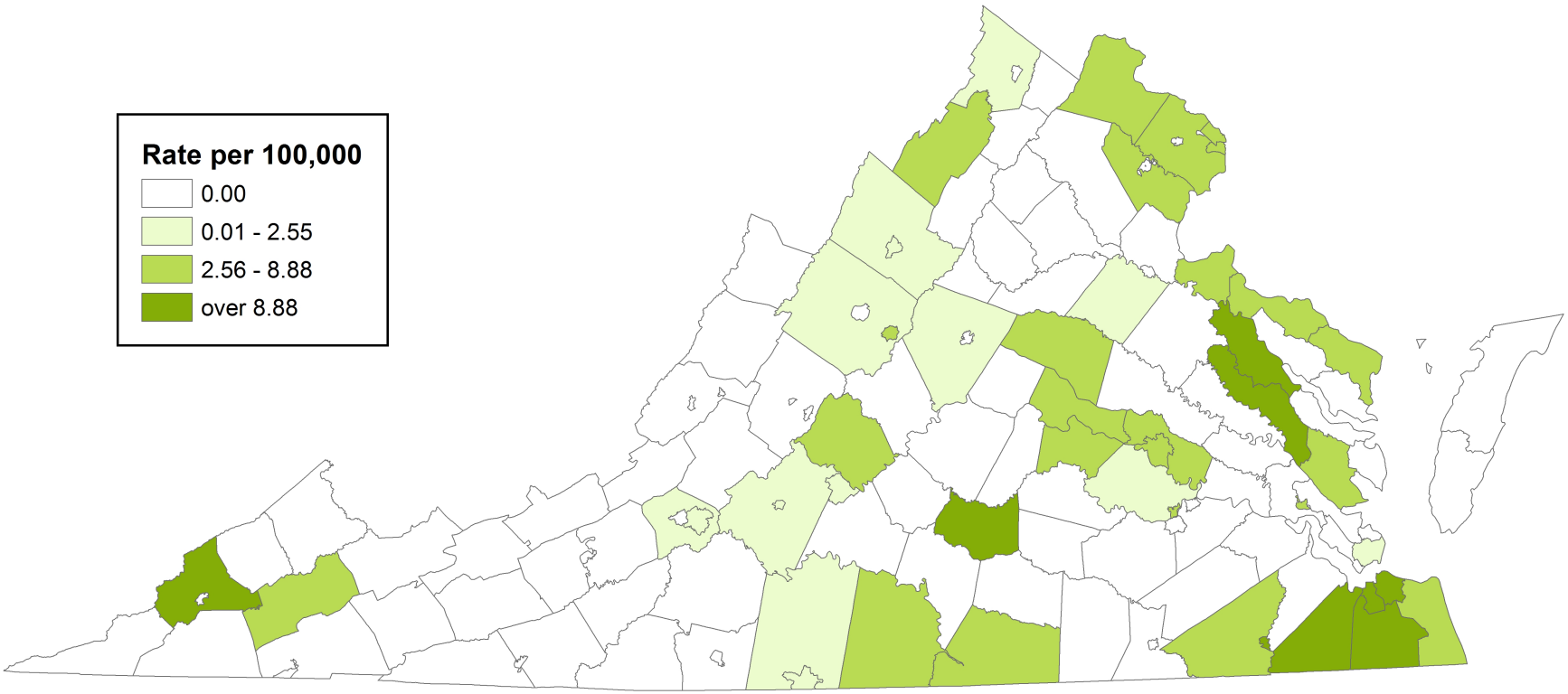
Pertussis Incidence Rate by Locality
Virginia, 2015



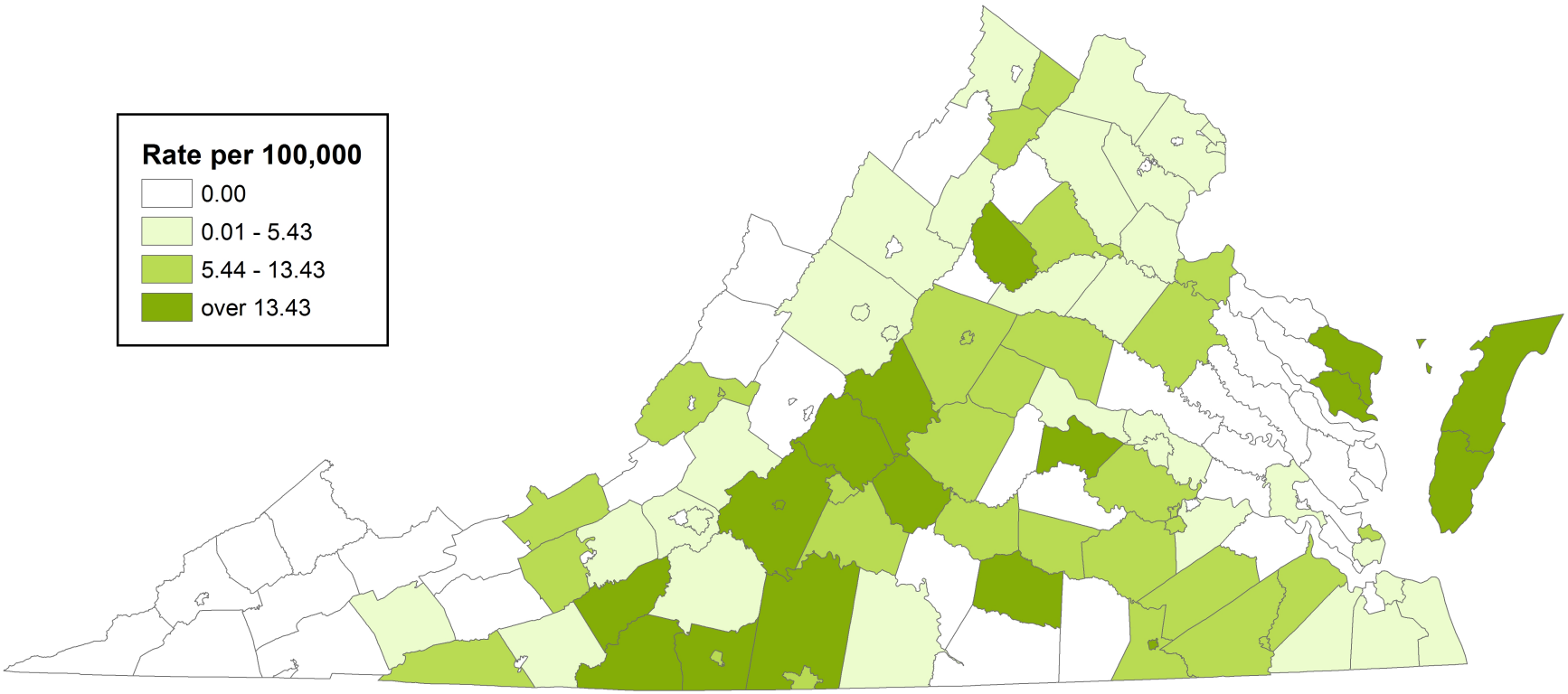
Salmonellosis Incidence Rate by Locality
Virginia, 2015



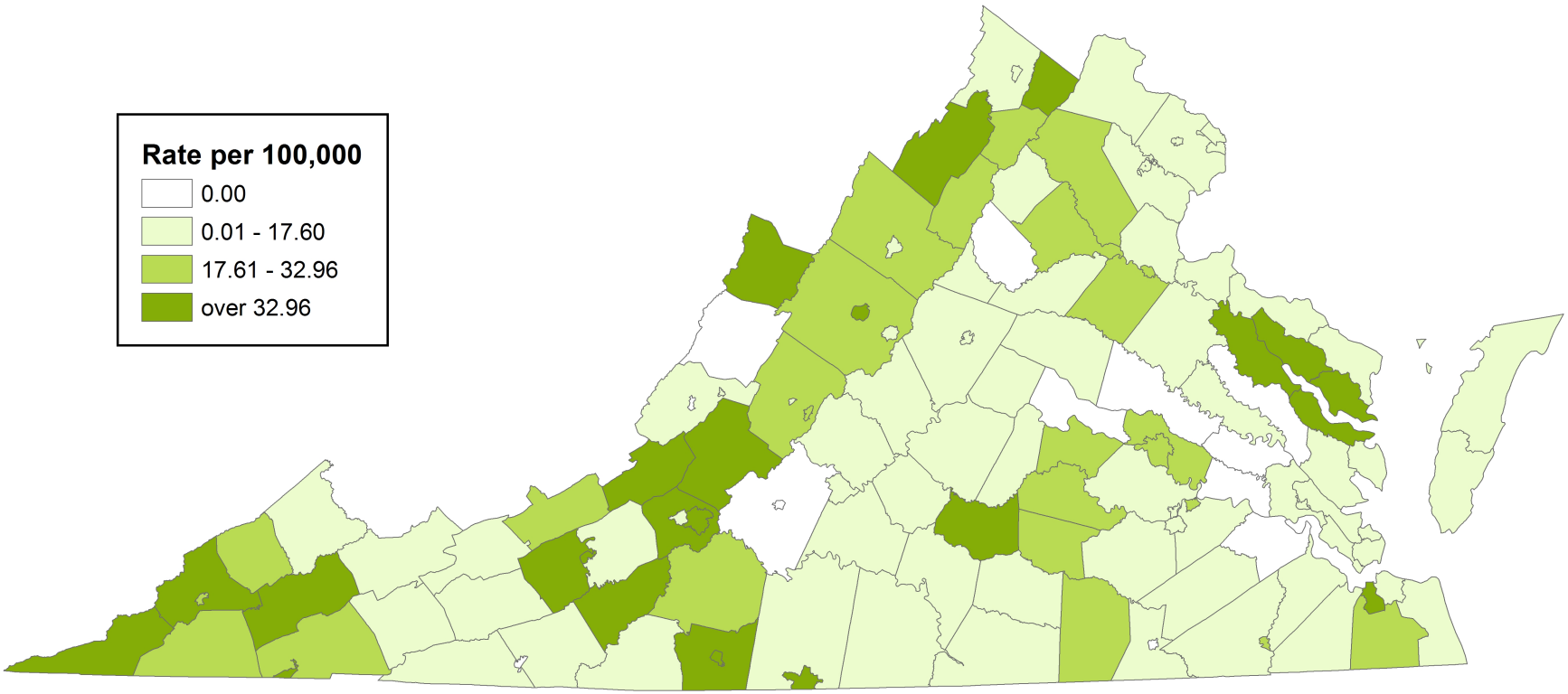
Shigellosis Incidence Rate by Locality
Virginia, 2015



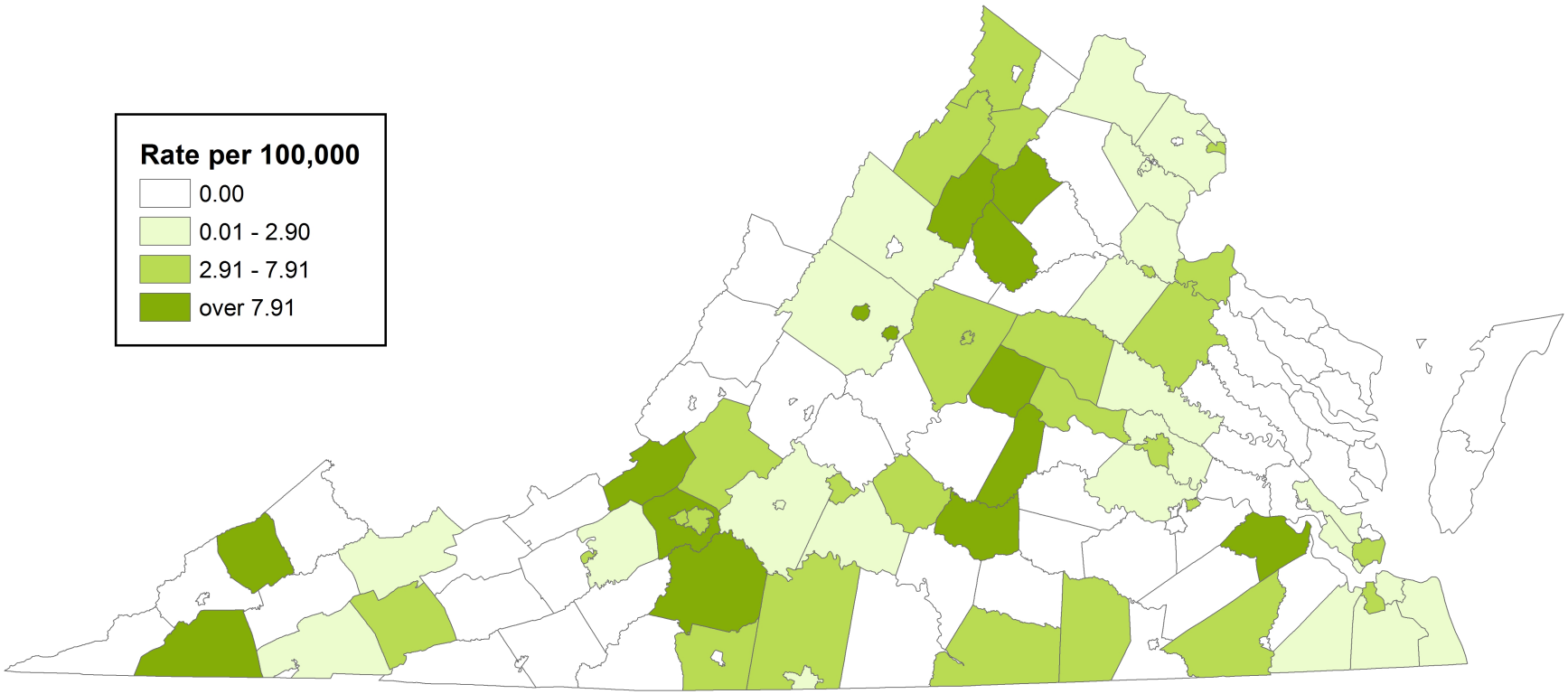
Spotted Fever Rickettsiosis, including RMSF, Incidence Rate by Locality, Virginia, 2015



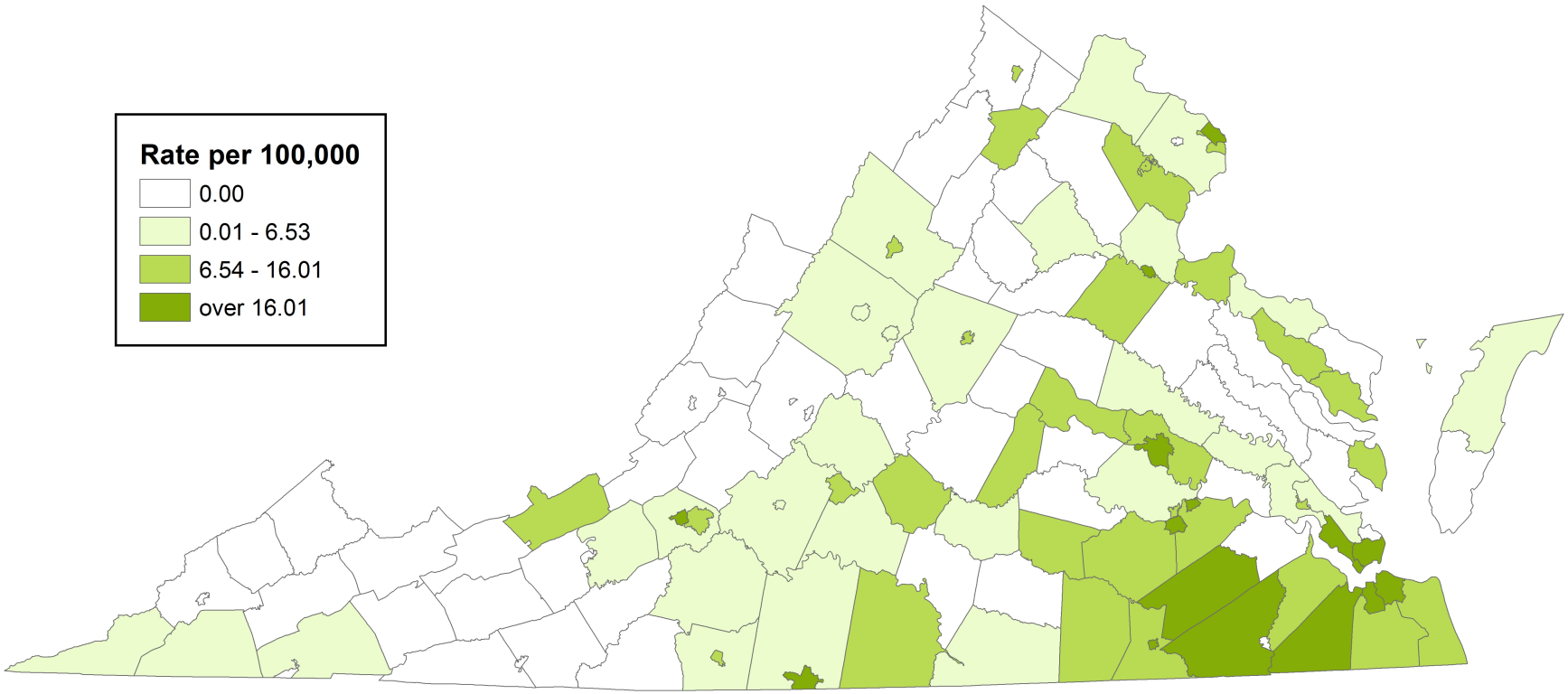
Staphylococcus aureus Infection, Invasive, Methicillin-Resistant (MRSA), Incidence Rate by Locality, Virginia, 2015



Streptococcal Disease, Group A, Invasive or TSS Incidence Rate by Locality, Virginia, 2015



Syphilis, Early Stage, Incidence Rate by Locality
Virginia, 2015



Tuberculosis Incidence Rate by Locality
Virginia, 2015