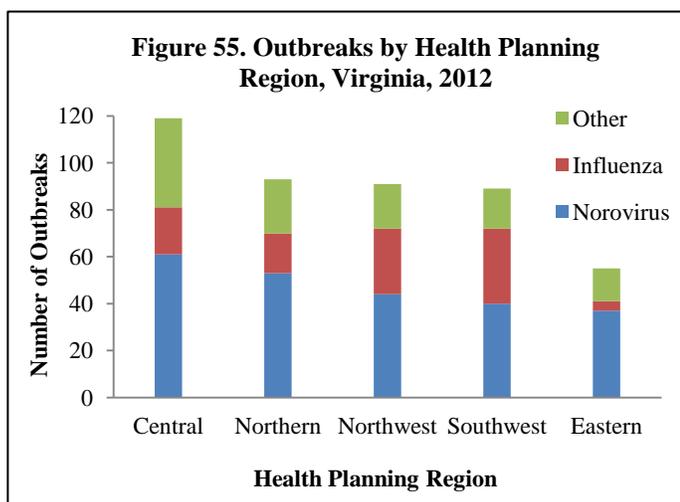


Outbreaks

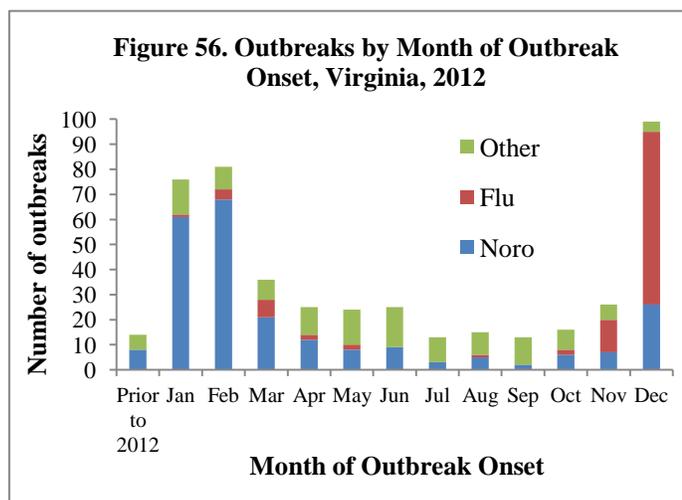
Introduction

In 2012, a total of 463 outbreaks were reported to the Virginia Department of Health (VDH). Nearly three-fourths of the outbreaks (337, 73%) were suspected or confirmed to be caused by norovirus (236, 51%) or influenza (101, 22%). Other etiologic agents were suspected or confirmed to contribute to the remaining outbreaks (126, 27%).

Geographically, 119 outbreaks (26%) were reported from the central health planning region, followed in frequency by the northern region (93, 20%), northwest region (91, 20%), southwest region (89, 19%), and eastern region (55, 12%) (Figure 55). In addition, the VDH Central Office led investigations in 14 multi-state or multi-jurisdictional outbreaks (3%) and two other states led the investigation in two out-of-state outbreaks in which VDH provided assistance.

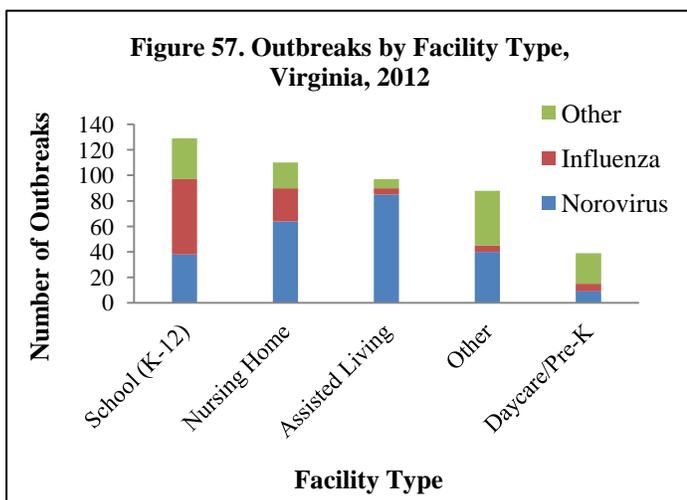


Outbreaks were reported throughout the year in 2012, but more outbreaks were reported in the colder months of December, January, and February when norovirus and influenza activity was high. In December 2012 alone, a quarter of the total outbreaks (115, 25%) were reported. Out of these 115 outbreaks, 80 were suspected or confirmed influenza outbreaks and 27 were suspected or confirmed norovirus outbreaks, totaling 93% of the 115 outbreaks. It is noteworthy to point out that influenza activity was unusually high in December 2012 compared to the same month in previous years. The number of outbreaks reported in January and February 2012 was also proportionally higher than other months (Figure 56).



Schools (K-12) reported the most outbreaks (129, 28%) in 2012, followed by nursing homes (110, 24%) and assisted living facilities (97, 21%). The majority of outbreaks reported from these facilities were caused by influenza or norovirus. Outbreaks were also reported from other settings, including daycare facilities, medical facilities, restaurants, and workplaces (Figure 57).

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 caused by other types of illnesses.



Person-to-Person Norovirus Outbreaks

In 2012, norovirus was suspected or confirmed to cause over half of all outbreaks (236, 51%) that were reported in Virginia. Among these 236 outbreaks, norovirus was transmitted through person-to-person contact in 219 outbreaks and through food in 17 outbreaks.

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

The average number of persons who became ill in person-to-person norovirus outbreaks was 42 with a range of 2 to 372 persons per outbreak (only Virginia cases were counted in outbreaks led by CDC or another state). Norovirus was confirmed by laboratory testing in over half (118, 54%) of the 219 person-to-person norovirus outbreaks.

Person-to-person norovirus outbreaks were reported from all regions in Virginia in 2012. The central, northern, northwest, eastern, and southwest regions reported 55 (25%), 47 (22%), 43 (20%), 37 (17%), and 36 (17%) person-to-person norovirus outbreaks in 2012, respectively. The investigation of one person-to-person norovirus outbreak involving Virginia residents was led by another state.

The most frequent settings for person-to-person norovirus outbreaks were assisted living facilities (85, 39%), followed by nursing homes (64, 29%) and schools (K-12) (36, 17%). Outbreaks from these three setting types accounted for 85% of all person-to-person norovirus outbreaks in 2012. Occasionally, person-to-person norovirus outbreaks were reported in other types of settings, including daycare facilities (9, 4%), medical facilities (7, 3%), restaurants (4, 2%), camps (3, 1%), workplaces (2, 1%), and hotels (2, 1%). In addition, a college, correctional facility, independent living facility, non-residential day program for the elderly, residential support services facility, and private household each reported one person-to-person norovirus outbreak. One out-of-state norovirus outbreak was associated with a wedding.

Although person-to-person norovirus outbreaks were reported throughout the year in 2012, over half of these outbreaks were reported in January or February. In January 2012, 56 (26%) person-to-person norovirus outbreaks were reported and in February 2012, 66 (30%) such outbreaks were reported.

Among the 219 person-to-person norovirus outbreaks, 118 (54%) were confirmed by laboratory testing. Sequencing analysis showed that norovirus genotype *New Orleans* (37, 31%) predominated among all norovirus that circulated in 2012. Other strains identified included *Shindlesham*, *Potsdam*, *Koblenz*, *Beijing*, *Ascension*, *Vaals*, *Minerva*, *Sydney*, *Shizuoka*, *Seacroft*, and *Miami*, although the numbers were small. Sequencing data were not available for 42 (36%) of the confirmed outbreaks.

Influenza Outbreaks

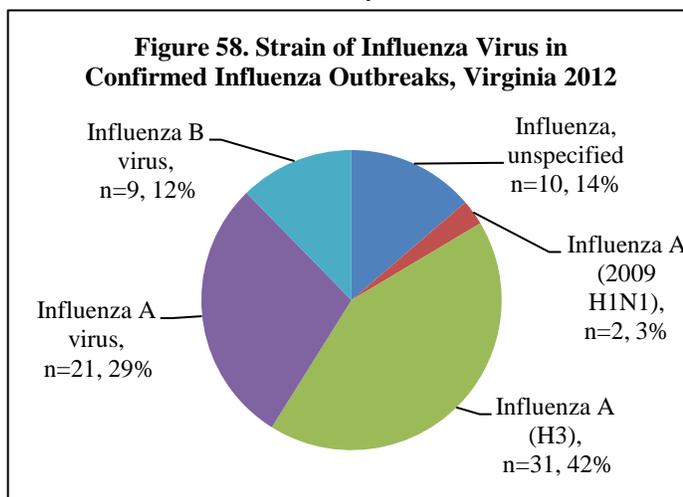
After norovirus, influenza was the most common suspected or confirmed etiologic agent responsible for causing outbreaks in Virginia in 2012. Throughout the calendar year, 101 influenza outbreaks were reported, 73 (72%) of which were confirmed by laboratory testing. The average number of persons who became ill in influenza outbreaks was 46, with a range of 4 to 194.

Influenza outbreaks were reported from all regions in Virginia in 2012, but the western area of the state reported more influenza outbreaks than other areas. The southwest and the northwest regions had 32 (32%) and 28 (28%) influenza outbreaks, respectively, accounting for 60% of all influenza outbreaks in the year. The central, northern, and eastern regions reported 20 (20%), 17 (17%), and 4 (4%) influenza outbreaks, respectively.

Schools (K-12) reported the most influenza outbreaks in 2012, accounting for over half of influenza outbreaks (59, 58%). Second to schools, nursing homes reported 26 (26%) influenza outbreaks. Influenza outbreaks were also occasionally reported by other facilities including daycare facilities, assisted living facilities, colleges/universities, and medical facilities.

2012 appeared to be an unusual year for influenza outbreaks, occurring more frequently and later in the calendar year (but earlier in the influenza season) than in recent years. Scattered influenza outbreaks were reported from January to November (21, 21%), accounting for less than a quarter of 2012's influenza outbreaks. A high number of influenza outbreaks (80, 79%) were reported in December.

Among the 101 influenza outbreaks, 73 (72%) were confirmed by laboratory testing. Influenza A virus (54, 74%) predominated among all viruses identified. Specifically, among laboratory-confirmed influenza outbreaks, influenza A (H3) was



identified in 31 (42%) outbreaks, influenza A (not further specified) was identified in 21 (29%) outbreaks, influenza A (2009 H1N1) was identified in 2 (3%) outbreaks, and influenza B was identified in 9 (12%) outbreaks. Influenza was identified by rapid test in another 10 (14%) outbreaks but information on the virus subtype was not available (Figure 58).

For information on influenza outbreaks that occurred in the 2012-2013 influenza season (rather than calendar year 2012 as described above), please see the “Outbreaks” section of the “Influenza” chapter of the annual report.

Foodborne Outbreaks

During 2012, 32 foodborne outbreaks were reported in Virginia, nearly double the 19 outbreaks reported in 2011 (Table 8). This includes multi-state outbreaks with one or more cases occurring in Virginia residents. The average number of ill persons per outbreak was 13, and ranged from one to 49 Virginians affected. The etiologic agent was confirmed or suspected as norovirus for 17 (53%) of the foodborne outbreaks and attributed to a bacterial agent for 12 (38%). Of the bacterial foodborne outbreaks, eight were attributed to *Salmonella*, two to *Escherichia coli* (*E. coli*), and one each to *Campylobacter jejuni* and *Listeria monocytogenes*. Histamine (scombroid) and *Trichinella spiralis* were each responsible for one outbreak, and in one foodborne outbreak, the etiologic agent could not be determined. Eight outbreaks were multi-state (an increase from three in 2011), of which five were attributed to *Salmonella*, two were attributed to *E. coli*, and one was attributed to *Listeria monocytogenes*. Most foodborne outbreaks occurred in a restaurant (17, 53%), private home (7, 22%), or business/workplace (4, 12%). The remaining outbreak settings included two schools (K-12), a church, a country club, and one out of country setting. Factors that contributed to the outbreak were identified in nine (28%) of the outbreaks. Factors included contaminated raw product, cross-contamination of ingredients, bare-hand or glove-hand contact by an infected food handler, food preparation practices that supported proliferation of pathogens, failure to control temperature or the length of time food was out of temperature control, improper hot holding due to improper procedure or protocol, prolonged cold storage, and insufficient time and/or temperature control during initial cooking/heat processing. The foodborne outbreaks were spread fairly evenly throughout the year, although February (6, 19%) and January (5, 16%) were the most frequently reported months of illness onset.

Table 8. Foodborne Outbreaks Reported in Virginia, 2012

Onset Date	Health District	Number of Cases	Etiologic Agent	Vehicle	Place Where Outbreak Occurred
12/30/2011	Loudoun	47	Norovirus suspected	Food vehicle undetermined	Church
1/8/2012	Fairfax	2	<i>Trichinella spiralis</i>	Pork	Restaurant
1/23/2012	Chickahominy	7	Norovirus GII.4 Minerva	Cole slaw; food handler implicated	Restaurant
1/23/2012	Chesterfield	15	Norovirus GI.6A Beijing	Food vehicle undetermined	Restaurant

Onset Date	Health District	Number of Cases	Etiologic Agent	Vehicle	Place Where Outbreak Occurred
1/28/2012	Henrico	3	Norovirus GII.4 New Orleans	Food handler implicated	Restaurant
1/30/2012	Chesterfield	17	Norovirus GII.4 New Orleans	Food vehicle undetermined	School (K-12)
2/1/2012	Lord Fairfax	14	Norovirus GII.4 New Orleans	Food vehicle undetermined	Business/Workplace
2/4/2012	Central Virginia	13	Norovirus	Food handler implicated	Restaurant
2/4/2012	Multi-state	34 VA 425 US	<i>Salmonella</i> ser. Bareilly & Nchanga	Raw scraped tuna	Restaurant
2/8/2012	Fairfax	17	Norovirus GII.4 New Orleans	Food vehicle undetermined	Restaurant
2/11/2012	Arlington	20	Norovirus GII.2 Vaals	Fruit salad; food handler implicated	School (K-12)
2/12/2012	Chesterfield	8	Norovirus suspected	Food vehicle undetermined	Restaurant
3/26/2012	Henrico	16	Norovirus GII.1 Ascension	Sandwiches	Restaurant
3/28/2012	Multi-state	1 VA 21 US	<i>Escherichia coli</i> O45	Frozen pizza products suspected	Private Home
4/18/2012	Fairfax	5	<i>Salmonella</i> ser. I 4,[5],12:i:-	Food vehicle undetermined	Business/Workplace
4/19/2012	Prince William	8	Norovirus suspected	Salad	Restaurant
5/5/2012	Richmond	2	<i>Salmonella</i> ser. Montevideo	Food vehicle undetermined	Restaurant
5/9/2012	Alleghany	24	Norovirus GII.1 Ascension	Food handler implicated	Restaurant
6/6/2012	Multi-state	2 VA 46 US	<i>Salmonella</i> ser. Enteritidis	Ground beef	Private Home
6/17/2012	Henrico	4	<i>Campylobacter jejuni</i>	Lamb tacos suspected	Out of country
7/5/2012	Multi-state	2 VA 22 US	<i>Listeria monocytogenes</i>	Ricotta salata cheese	Private Home
7/28/2012	Fairfax	7	Histamine (scombroid)	Tuna	Restaurant
7/29/2012	Multi-state	2 VA 42 US	<i>Salmonella</i> ser. Bredeney	Peanut butter	Private Home
8/8/2012	Multi-state	1 VA 33 US	<i>Salmonella</i> ser. Newport	Cantaloupe	Private Home
8/26/2012	Multi-state	1 VA 134 US	<i>Salmonella</i> ser. Heidelberg	Chicken	Private Home
10/9/2012	Eastern Shore	26	<i>Salmonella</i> ser. Javiana	Food handler implicated	Restaurant
10/11/2012	Central Virginia	15	Norovirus GI.6A Beijing	Pizza; food handler implicated	Restaurant

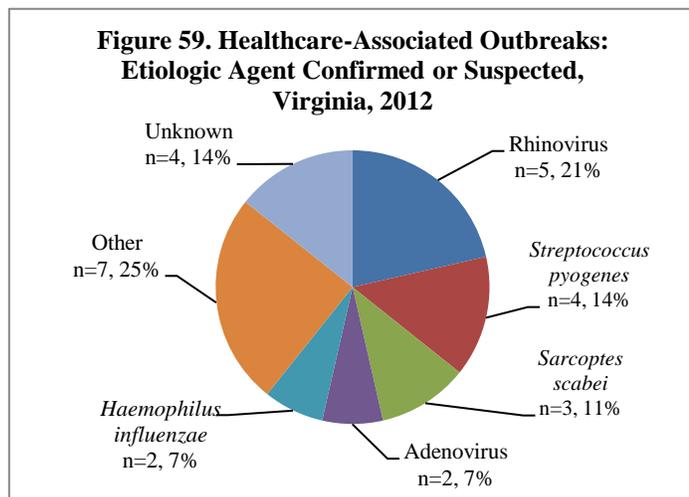
Onset Date	Health District	Number of Cases	Etiologic Agent	Vehicle	Place Where Outbreak Occurred
10/25/2012	Fairfax	9	Norovirus	Chicken pizza, Mediterranean salad	Business/Workplace
10/26/2012	Multi-state	1 VA 33 US	<i>Escherichia coli</i> O157:H7	Spinach/spring mix salad	Private Home
11/15/2012	Central Virginia	49	Unknown	Smoked turkey	Business/Workplace
11/29/2012	Fairfax	6	Norovirus	Food vehicle undetermined	Restaurant
12/2/2012	Mount Rogers	29	Norovirus GII.6B Miami	Food vehicle undetermined	Country Club

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 occurring in hospitals and nursing homes (facilities meeting the definition of a medical care facility in 12VAC5-90-10) were included in statistics.

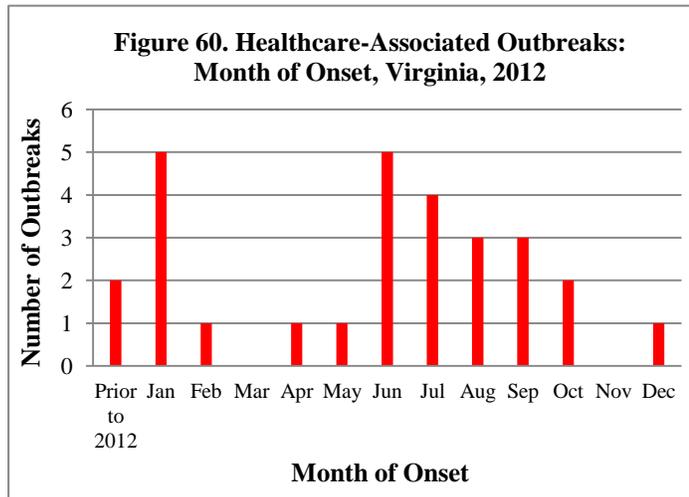
During 2012, 28 healthcare-associated outbreaks with suspected or confirmed etiologic agents other than norovirus or influenza were reported in Virginia. This is nearly two times as many non-norovirus, non-influenza outbreaks as were reported from healthcare facilities in 2011 (n=15). The average number of ill persons per healthcare-associated outbreak in 2012 was 16, and ranged from three to 55. The majority of healthcare-associated outbreaks occurred in nursing homes (20, 71%) and the remaining events occurred in medical facilities, including hospitals, psychiatric facilities, imaging centers, urgent care facilities, or inpatient rehabilitation facilities. All but three healthcare-associated outbreaks were attributed to person-to-person transmission.

Etiologic agents were confirmed in 75% (n=21) of the outbreaks, suspected in 11% (n=3) and unknown in 14% (n=4). Rhinovirus (5, 21%), *Streptococcus pyogenes* (4, 14%), *Sarcoptes scabiei* (scabies) (3, 11%), adenovirus (2, 7%), and *Haemophilus influenzae* (2, 7%) were each suspected or confirmed in multiple outbreaks. *Acinetobacter*, *Exserohilum*, metapneumovirus, pediculus (head lice), respiratory syncytial virus, *Salmonella*, and methicillin-resistant *Staphylococcus aureus* were each responsible for one outbreak (Figure 59).



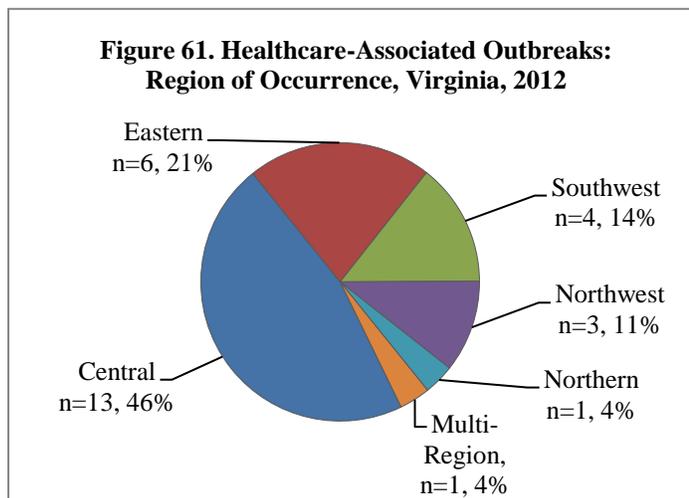
Although healthcare-associated outbreaks were reported throughout the year, 43% (n=12) of the outbreaks had onsets during the summer months (June, July, and August) (Figure 60).

In 2012, healthcare-associated outbreaks were reported most frequently from the central (13, 46%) and eastern (6, 21%) health planning regions. Only one outbreak (4%) was reported from the northern region (Figure 61).



Outbreak spotlight: *Streptococcus pyogenes*

Four outbreaks caused by *Streptococcus pyogenes* (invasive group A streptococcal infection, or Group A Strep) were reported from healthcare facilities in 2012, including two from hospitals and two from nursing homes, accounting for 30 cases. Three of the four Group A Strep outbreaks occurred in the central region. The largest investigation occurred in a nursing home in the northwest region, spanning several months and necessitating considerable time and effort with



enhanced surveillance, medical record review, observation of infection prevention practices, and screening to determine carriage. In this outbreak, seven invasive and four serious non-invasive Group A Strep infections were identified. Screening showed that approximately 6% of staff (13/203) and 4% of residents (7/173) were asymptomatic carriers of group A *Streptococcus* in the facility. After administering appropriate antibiotics to all positive persons, no additional cases of invasive infection were found. Chart review and staffing analysis did not reveal a definitive common source for the infections.

Outbreak spotlight: multi-state fungal infections outbreak

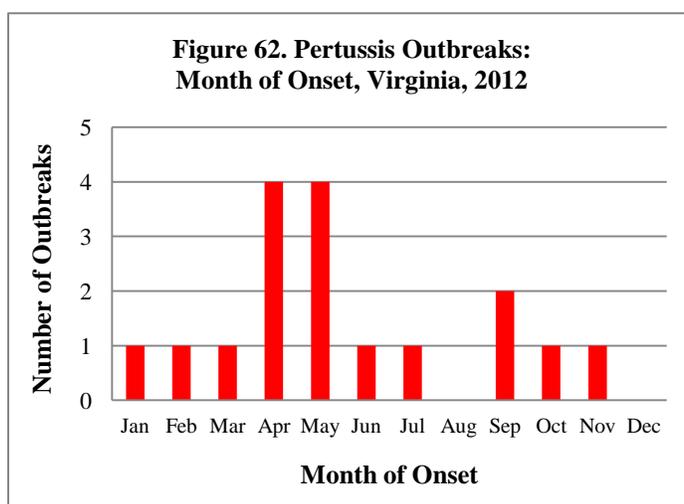
One healthcare-associated outbreak of note in 2012 was an outbreak of fungal infections due to steroid injections of preservative-free methylprednisolone acetate (MPA) contaminated with *Exserohilum* and other fungal pathogens. Two Virginia imaging centers received implicated lots of the product. This outbreak primarily affected residents in the southwest health planning region, where the facilities were located. Among the 675 persons who received injections from the implicated lots in the Virginia imaging centers, 54 individuals (51 Virginia residents, 3 West Virginia residents) experienced illnesses associated with the injections, with 41 (76%) diagnosed with fungal meningitis only, 9 (17%) with both meningitis and spinal/paraspinal infection, and 4 (7%) with spinal/paraspinal infection only. The case-fatality rate was 9% (5 deaths) in Virginia. Nationally, approximately 14,000 people were exposed in the outbreak, resulting in 750 infections, and 64 deaths.

This outbreak of fungal infections was unprecedented in terms of the magnitude of exposed persons, cases, and deaths. *Exserohilum* became a newly identified cause of meningitis. The Virginia Department of Health's response to this outbreak required that all levels of public health (local, regional, and state) work together and effectively coordinate with laboratory and clinical partners on the local, state, and federal levels.

Vaccine-Preventable Disease Outbreaks

During 2012, a total of 22 vaccine-preventable disease outbreaks were reported. This is similar to the 18 vaccine-preventable disease outbreaks reported in 2011. Of these outbreaks, 17 were due to pertussis and five were due to varicella (chickenpox).

Of the 17 pertussis outbreaks reported in 2012, all were confirmed by laboratory testing. The average number of ill persons per outbreak was six, and ranged from two to 21. The majority of pertussis outbreaks occurred in schools (10, 59%), while the other pertussis outbreaks occurred in daycare settings (2, 12%), private homes (2, 12%), churches (2, 12%), or the community (1, 6%). Pertussis outbreaks occurred throughout the year, but about half of the outbreaks (8, 47%) were reported in the spring months of April and May (Figure 62). The highest proportion



of pertussis outbreaks (7, 41%) was reported from the northwest health planning region, followed by the eastern (4, 24%), central (3, 18%), southwest (2, 12%), and northern (1, 6%) regions.

During 2012, five chickenpox outbreaks were reported in Virginia. Only one of the five outbreaks was confirmed by laboratory testing. The average number of ill persons per outbreak was 12, and ranged from seven to 25. Four of the five chickenpox outbreaks occurred in schools and one occurred in a church. Three of the five chickenpox outbreaks occurred in January and the remaining two occurred in February. Geographically, the northern and southwest health planning regions each had two chickenpox outbreaks and one occurred in the eastern region.

Lack of compliance with the recommended immunization schedule contributed to these outbreaks. In only five of the 22 outbreaks were all case-patients reported to be up-to-date on their immunizations. The other 17 outbreaks affected persons who were either unvaccinated or had not received all recommended doses of vaccine. No other outbreaks caused by vaccine-preventable diseases such as measles, mumps, rubella, or *Haemophilus influenzae* type B were reported in 2012.

Waterborne Outbreaks

Two waterborne outbreaks were reported in 2012. This is an increase from 2011, when none was reported. In one outbreak, five out of eight individuals developed red rash after exposure to hot tub water at a private home in Virginia. Three individuals were diagnosed with folliculitis with *Pseudomonas* as the suspected etiologic agent, and two individuals were diagnosed with a rash caused by an unknown etiologic agent.

The other outbreak was a multi-state legionellosis outbreak associated with an out-of-state hotel. The investigation was led by the health department in the out-of-state jurisdiction. Three Virginia cases were reported for this outbreak, including one laboratory-confirmed case and two epidemiologically linked cases. In this out-of-state outbreak, a total of 114 cases of legionellosis were identified, including 11 confirmed cases of Legionnaires' disease, 29 suspect cases of Legionnaires' disease, and 74 cases of Pontiac Fever (a milder flu-like illness). *Legionella pneumophila* serogroup 1 (Lp1) was confirmed in clinical specimens; *Legionella* bacteria were also isolated from samples collected from the hotel fountain, spa, and women's locker room fixtures.

Zoonotic Outbreaks

In 2012, three zoonotic outbreaks that involved residents of Virginia were reported. All were due to *Salmonella* and were multi-state events. The number of Virginia cases in these outbreaks ranged from two to nine. Two of the outbreaks were associated with live poultry and the third was associated with pet turtles (Table 9).

Table 9. Zoonotic Outbreaks Reported in Virginia, 2012

Onset Date	Health District	Number of Cases	Etiologic Agent	Vehicle	Place Where Outbreak Occurred
2/6/2012	Multi-state	5 VA 223* US	<i>Salmonella</i>	Turtles	Private Home
4/1/2012	Multi-state	9 VA 195 US	<i>Salmonella</i> ser. Newport**	Live Poultry	Retail Location
9/6/2012	Multi-state	2 VA 27 US	<i>Salmonella</i> ser. Braenderup	Live Poultry	Private Home

* Nationally, an additional 168 cases of *Salmonella* associated with five other turtle-associated outbreaks were identified, but the Virginia cases did not match into these outbreaks.

** Nationally, the outbreak also included cases caused by *Salmonella* ser. Infantis and *Salmonella* ser. Lille.

Other Outbreaks

In addition to the norovirus, influenza, foodborne, healthcare-associated, vaccine-preventable, waterborne, and zoonotic disease outbreaks discussed above, 56 other outbreaks were reported in Virginia in 2012, which was a 14% increase compared to the 49 reported in 2011. The average

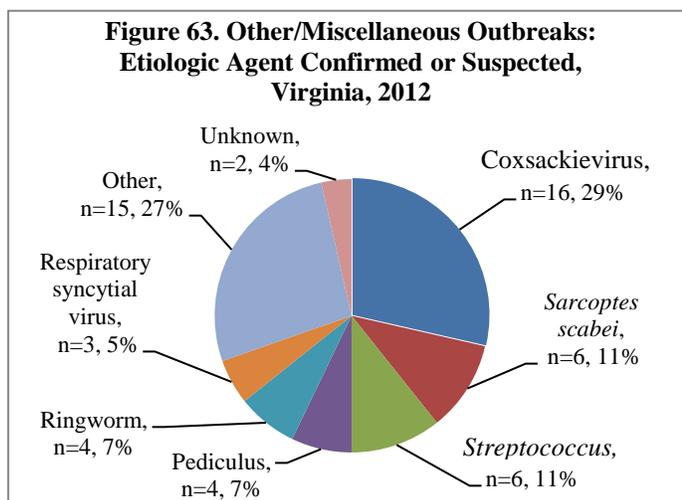
number of ill persons per outbreak was 12, and ranged from one to 58 (one multi-state outbreak involved one Virginia resident). As in previous years, the majority of these outbreaks (50, 89%) were attributed to person-to-person transmission and the remaining outbreaks (6, 11%) were attributed to other or undetermined factors.

Outbreak spotlight: Hand, food, and mouth disease

Nearly one-third of the other outbreaks (17, 30%) were outbreaks of hand, foot, and mouth (HFMD) disease, a viral illness that can cause fever, blister-like sores in the mouth, and a skin rash. HFMD disease usually affects infants and children younger than 5 years of age, but can sometimes occur in adults. HFMD disease is caused by the Enterovirus group of viruses, which includes polioviruses, coxsackieviruses, echoviruses, and enteroviruses. The HFMD disease outbreaks in Virginia in 2012 were suspected to be caused by viruses in the Enterovirus group; two were confirmed to be caused by coxsackievirus. The majority of HFMD disease outbreaks occurred in daycare facilities (13, 76%), and the remaining outbreaks occurred in school (3, 18%) or college (1, 6%) settings. Coxsackievirus was also suspected in a rash outbreak at a daycare facility.

The remaining 38 outbreaks not related to coxsackievirus or enterovirus were suspected or confirmed to be caused by a variety of etiologic agents (Figure 63). Six were caused by

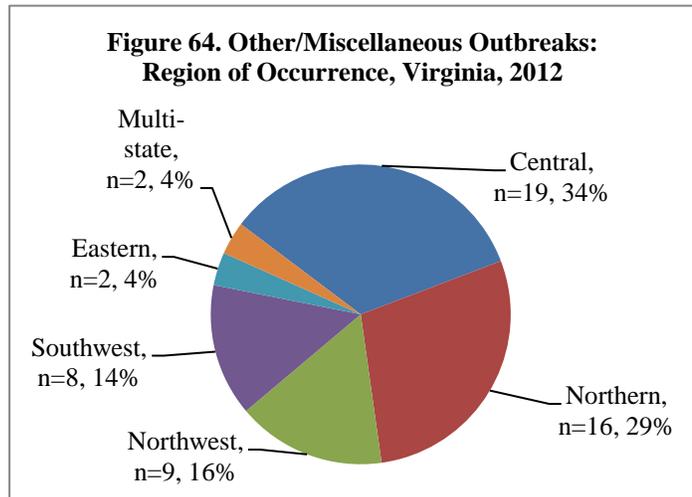
Sarcoptes scabiei (confirmed in two and suspected in four), six were caused by *Streptococcus* (confirmed in two and suspected in four), four were suspected to be caused by pediculus (head lice), four were caused by *Tinea corporis* (ringworm) (one confirmed and three suspected), three were caused by respiratory syncytial virus (one confirmed and two suspected), and two were confirmed to be caused by hepatitis B virus. One of the six *Streptococcus* outbreaks caused invasive and non-invasive *Streptococcus pyogenes* (group



A) illness among residents in an assisted living facility in the central health planning region. In addition, *Cryptosporidium* (confirmed), *Escherichia coli* (confirmed), human herpesvirus (suspected), human parainfluenza virus (confirmed), human parvovirus B19 (suspected), lead (confirmed), *Mycoplasma pneumoniae* (suspected), metapneumovirus (confirmed), rotavirus (confirmed), *Salmonella infantis* (confirmed), and *Staphylococcus aureus* (suspected) were each responsible for one outbreak. The etiologic agent was unknown in two outbreaks of gastrointestinal illnesses.

Overall, the most common settings for these 56 outbreaks caused by other etiologic agents were daycare/pre-K facilities (22, 39%) and schools (K-12) (18, 32%). In addition, multiple outbreaks occurred in assisted living facilities (7, 13%) and colleges/universities (2, 4%). Outbreaks were also reported from a business/workplace, a restaurant, and three other settings. Two outbreaks were clusters of genetically related enteric bacteria identified by the state public health laboratory that had an undetermined route of transmission (i.e., not foodborne, waterborne, or zoonotic).

Although these outbreaks occurred throughout the year, illness onset occurred most frequently in May or June, each with eight outbreaks (14%). These outbreaks occurred throughout the state, with the largest proportions in the central (19, 34%) and northern (16, 29%) health planning regions, followed by the northwest (9, 16%), southwest (8, 14%), and eastern (2, 4%) regions (Figure 64). Two multi-state outbreaks (4%) affected residents of the northern region.



Outbreak spotlight: hepatitis B virus

A community-wide hepatitis B outbreak associated with injection drug use in the southwest region resulted in a clustering of 37 cases. Extensive outreach was made to the affected community, including providing targeted health education to at-risk populations, increasing awareness of risk factors for hepatitis B and C with local providers, and conducting a site visit to a local jail to discuss infection prevention practices.

One additional outbreak of acute hepatitis B was identified in a northwest region assisted living facility. At least three residents contracted hepatitis B viral infection; disease transmission was associated with improper blood glucose monitoring practices.