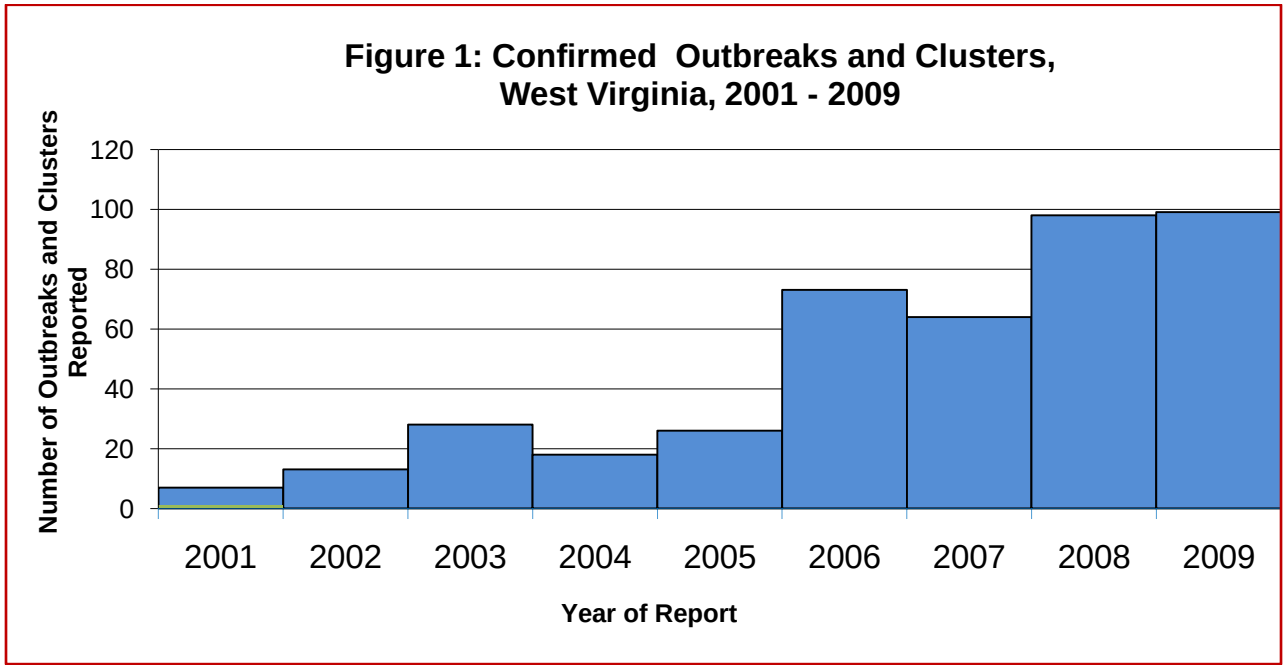
2009 Final Outbreak Report
State of West Virginia

In 2009, a total of 123 outbreaks were identified and reported to local health departments. Of these reports, 99 (80.4%) were confirmed as outbreaks or clusters of disease (Appendix). Local health departments investigate and report outbreaks with assistance from their regional epidemiologist and the Bureau for Public Health. Results of the investigation are compiled by the Bureau for Public Health and summarized in this report.

The total number of outbreaks reported in West Virginia continued to rise during 2009. In 2001, 7 outbreaks were reported. In 2009, 99 confirmed outbreaks were reported, representing a 13-fold increase in recognized outbreaks (Figure 1).



In 2009, 92 (93%) of reported outbreaks were limited to West Virginia residents, and 7 (7%) outbreaks involved residents of other states. The most common type of outbreak involved respiratory illness, followed by outbreaks of enteric illness (Table 1)

Table 1 Types of Outbreaks Reported in West Virginia, 2009

Type of Outbreaks	Number of Outbreaks	Percent
Respiratory	53	53.5%
Enteric	29	29.3%
Rash	10	10.1%
Other	7	7.1%
Total	99	100.0%

In 2009 40 (73%) counties reported outbreaks, including multi-county outbreaks (Table 2).

Table 2 Counties Reporting Outbreak-Related Cases (Includes Multi-County Outbreaks) West Virginia, 2009

Counties with Cases	Number of Outbreaks
Berkeley	3
Boone	2
Cabell	3
Fayette	5
Gilmer	2
Greenbrier	2
Hampshire	1
Hancock	1
Hardy	1
Harrison	1
Jackson	2
Jefferson	1
Kanawha	17
Lewis	2
Lincoln	1
Logan	5
Marion	2
Marshall	4
Mason	3
Mercer	6
Monongalia	4
Monroe	2
Morgan	1
Nicholas	1
Ohio	4
Pendleton	1
Pleasants	3
Preston	4
Putnam	6
Raleigh	5
Randolph	3
Ritchie	1
Roane	3
Summers	1
Taylor	1
Tucker	1
Tyler	1
Upshur	1
Wayne	2
Wetzel	1
Wood	13
Wyoming	1

Outbreaks of respiratory illness were the most common type of disease outbreak in 2009, accounting for 53 (53.5%) of all confirmed outbreaks. Respiratory illness outbreaks were reported by 31(56%) counties. In 2008, outbreaks of respiratory illness represented the second most common type of outbreak after outbreaks of enteric origin. This marked increase in the outbreaks of respiratory origin in 2009 is attributed to the emergence of (2009) influenza A (H1N1) virus.

Table 3 Etiology of Respiratory Outbreaks, West Virginia, 2009

Etiologic Agent or Clinical Syndrome	Number of Outbreaks	Percent
2009 influenza A (H1N1)	23	43.4%
Influenza-like illness	10	18.8%
Influenza A	6	11.3%
Influenza B	2	3.8%
Upper respiratory illness	6	11.3%
Bacterial pneumonia	3	5.7%
Other	3	5.7%
Total	53	100.0%

2009 influenza A (H1N1) accounted for 23 (43.4%) of all respiratory disease outbreaks. All 2009 Influenza A (H1N1) outbreaks were confirmed by PCR at the State Office of Laboratory Services. The majority of the 2009 influenza A (H1N1) outbreaks occurred in schools 11(48%), and summer camps 7 (30%) (Table 4).

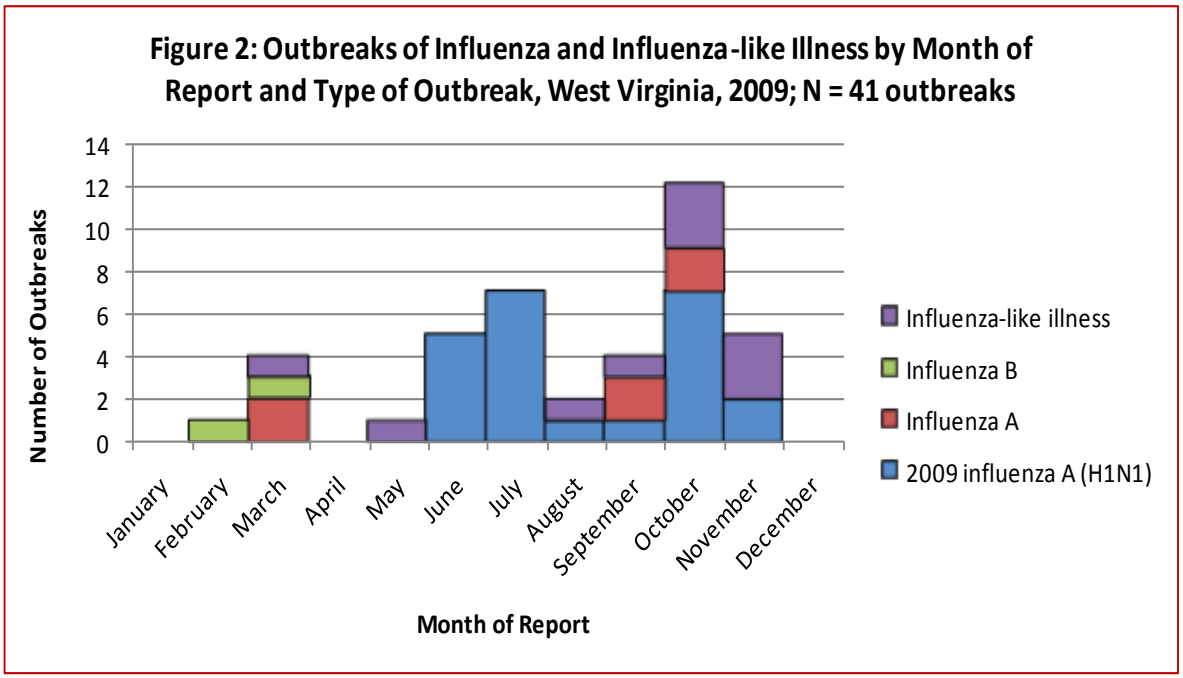
Table 4 Transmission Settings of 2009 Influenza A (H1N1) Outbreaks, West Virginia, 2009

Transmission Settings	Number of outbreaks	Percent
Schools	11	48.0%
Camp	7	30.0%
Workplace	2	9.0%
Other	3	13.0%
Total	23	100.0%

Seven outbreaks of seasonal influenza (influenza A and B) were confirmed only by rapid influenza antigen testing and only 1 outbreak was confirmed by viral culture. All 8 (100%) seasonal influenza outbreaks were reported in schools.

Influenza-like illness outbreaks accounted for 10 (18.8%) respiratory illness outbreaks. Influenza-like illness is defined as fever 100º degrees Fahrenheit or higher, plus cough, and/or sore throat. Seven influenza-like illness outbreaks were reported in schools. The remaining 3 outbreaks were reported as follows: one from a long-term care facility, one from a correctional facility and one from a summer camp.

Outbreaks of influenza and influenza-like illness displayed a familiar seasonal pattern for seasonal influenza A and B. However, the pandemic influenza strain displayed a different pattern. The 2009 influenza A (H1N1) had two peaks one during the summer months and the second during fall months (Figure 2). Since the emergence of 2009 influenza A (H1N1), there has been no laboratory confirmation of seasonal influenza as a cause of any influenza outbreaks.



The 3 (13%) outbreaks categorized as "other" were caused by group A *Streptococcus* (GAS) and presented clinically with fever, pharyngitis and upper respiratory tract symptoms. All three outbreaks were reported from schools. One outbreak was laboratory confirmed with culture and the other 2 were rapid test positive but not culture confirmed.

No outbreaks of seasonal influenza or 2009 influenza A (H1N1) were reported from healthcare facilities. Only one outbreak of influenza-like illness was reported from a healthcare facility during 2009.

There were 3 outbreaks of bacterial pneumonia and 6 outbreaks of upper respiratory illness reported from long-term care facilities. Two outbreaks of bacterial pneumonia were vaccine preventable.

Contrary to 2008, outbreaks of enteric illness were the second most common type of outbreak in 2009, accounting for 29.3% of all outbreaks.

A total of 29 enteric outbreaks were reported by 23 (42%) counties. Five (17%) enteric outbreaks were reported in West Virginia as part of multi-state outbreaks. West Virginia was the lead investigator in one (3%) and the Centers for Disease Control and Prevention (CDC) and other states were the lead investigators in the other 4 (14%).

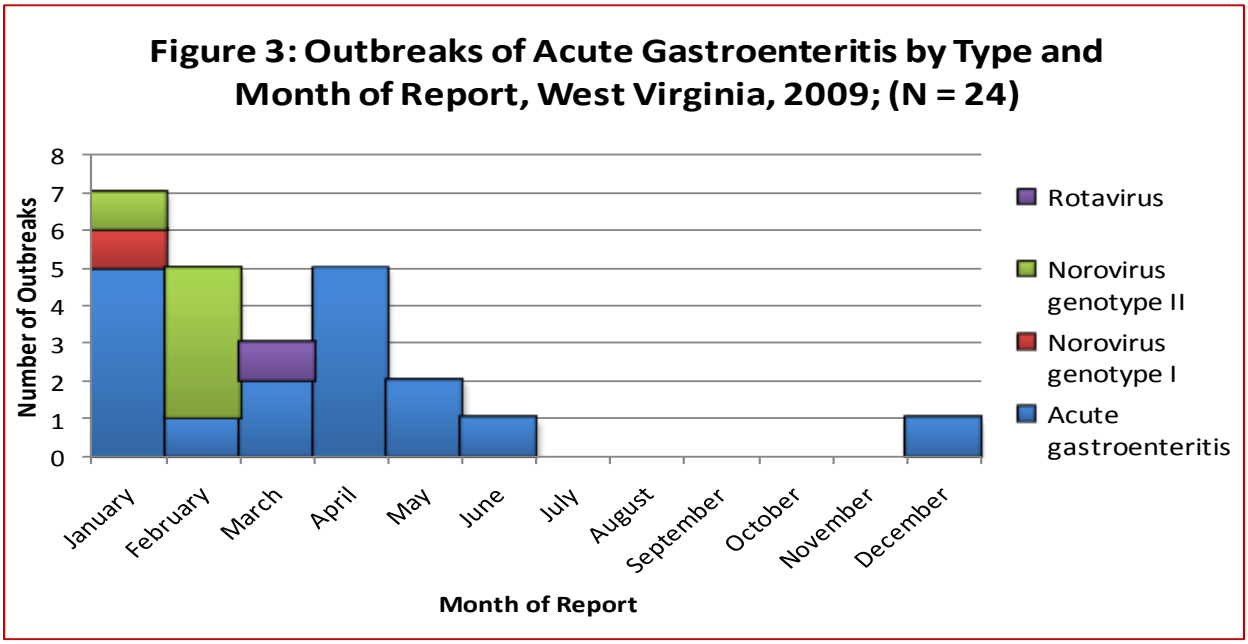
Table 5 Etiology of Enteric Disease Outbreaks, West Virginia, 2009

Etiologic Agent or Clinical Syndrome	Number of Outbreaks	Percent
Acute gastroenteritis	17	58.6%
Norovirus genotype I and *Clostridium difficile*	1	3.4%
Norovirus genotype II	5	17.3%
Rotavirus	1	3.4%
***Salmonella* Species**	5	17.3%
Total	29	100.0%

The most common enteric disease outbreaks were outbreaks of acute gastroenteritis and norovirus, accounting for a total of 23 (79%) of the enteric outbreaks (Table 4). Acute gastroenteritis outbreaks were defined as outbreaks of illness with short duration (2-3 or fewer days) and characterized by acute onset of vomiting or diarrhea or both. In 17 outbreaks characterized as acute gastroenteritis, no laboratory testing was done. All norovirus outbreaks were PCR confirmed, 5 were norovirus genotype II and 1 was norovirus genotype I.

Eleven outbreaks of acute gastroenteritis and 4 outbreaks of norovirus were due to person to person transmission.

Seasonality of outbreaks of acute gastroenteritis and norovirus was similar and follows a familiar pattern of norovirus transmission in the winter months (Figure 3).



There were 5 enteric outbreaks caused by *Salmonella* species. In the first one, four West Virginia residents developed salmonellosis and were linked to a multi-state outbreak of *Salmonella* serotype Typhimurium. The source of illness in this outbreak could not be determined. In April, 2009 the second outbreak occurred when 2 West Virginia residents were diagnosed with salmonellosis as a part of multi-state outbreak of *Salmonella* serotype Saintpaul. The outbreak affected 228 US residents and was traced to contaminated alfalfa sprouts. The third outbreak occurred in June, 2009 when one resident of West Virginia developed salmonellosis as a part of multi-state outbreak of *salmonella* serotype Enteritidis. The outbreak affected 19 U.S. residents and the source of contamination could not be identified. In the fourth outbreak, one resident of West Virginia was diagnosed with salmonellosis after attending an out-of-state music festival. An additional 56 US residents were diagnosed with *Salmonella* serotype Oranienburg as part of this multi-state outbreak. The cause of the outbreak could not be traced. The fifth outbreak occurred also in June, 2009, when 21 West Virginia residents were diagnosed with *salmonella* serotype Enteritidis. Since *Salmonella* serotype Enteriditis is very common serotype, standard PFGE (Pulse Field Gel Electrophoresis) testing was not sufficient to associate the outbreak cases. A total of 16 isolates were sent to the CDC laboratory for MLVA (multi-locus variable-number tandem repeat analysis) testing. The test confirmed that 15 cases were linked to the outbreak. According to CDC laboratory database, this strain of *Salmonella* serotype Enteriditis is unique and rare.

Epidemiologic investigation including a case control study indicated that the source of the outbreak may have been contaminated sausage in multiple locations of a single chain restaurant.

Healthcare facilities reported 18 (62%) of 2009 enteric disease outbreaks; 16 (88.9%) of these occurred in long-term care facilities, one (5.6%) was reported from a hospital unit and the last one (5.6%) was reported from a rehabilitation center (Table 5).

Table 6 Enteric Outbreaks Reported by Healthcare Facilities, West Virginia, 2009

Healthcare Facility	Number of Outbreaks	Percent
Long-Term Care Facilities	16	88.9%
Hospital	1	5.6%
Rehabilitation Center	1	5.6%
Total	18	100.0%

The third most common type of outbreak was rash illness 10 (10.1%). The most common type of rash illness reported was human parvovirus B19 (fifth disease) followed by scabies (3) and varicella (2) (Table 6). All human parvovirus B19 (fifth disease) outbreaks (4) and varicella outbreaks (2) were reported from schools.
Three outbreaks of scabies were reported as follows: one from a long-term care facility, one from a detention center, and one from a homeless shelter.

In 2009, a case of measles was diagnosed. There had been no measles cases in West Virginia since 1994. The case was a preschool child who did not receive the recommended vaccination. The diagnosis was confirmed by RT-PCR and the virus was identified as genotype D at the CDC laboratory. One case of measles is considered an outbreak. There were no additional cases identified as a part of this outbreak.

Table 7 Outbreaks of Rash Illness by Etiologic Agent, West Virginia, 2009

Etiologic Agent	Number of Outbreaks	Percent
Human parvovirus B19 (fifth disease)	4	40.o%
Scabies	3	30.o%
Varicella	2	20.0%
Measles	1	10.0%
Total	10	100.0%

There were 7 (7.1%) recognized outbreaks in 2009 that were categorized as “other” (Table 7).
Two outbreaks were conjunctivitis, one was reported from a long-term care facility and the other was reported from an elementary school. Two (28.6%) outbreaks of methicillin-resistant *Staphylococcus aureus* (MRSA) were reported in 2009. One was reported from a long-term care facility and the other was reported among a sports team.

Table 8 Other Reported Outbreaks by Etiologic Agent or Clinical Syndrome, West Virginia, 2009

Etiologic Agent or Clinical Syndrome	Number of Outbreaks	Percent
Conjunctivitis	2	28.6%
Methicillin-resistant *Staphylococcus aureus* (MRSA)	2	28.6%
Hepatitis B	1	14.3%
Methicillin-sensitive *Staphylococcus aureus* (MSSA)	1	14.3%
Skin infection	1	14.3%
Total	7	100.0%

There was one outbreak of methicillin-sensitive *Staphylococcus aureus* that was reported from an outpatient medical clinic. There was also one outbreak of acute hepatitis B virus infection that was reported from an outpatient dental clinic. The investigation of these two outbreaks is still ongoing to date.

In 2009, 38 (38.3%) outbreaks were vaccine preventable. This marked increase in the vaccine preventable outbreaks from 2008 (25%) can be attributed to the emergence of the 2009 influenza A (H1N1). Twenty three outbreaks (60.5%) were due to the 2009 influenza A (H1N1). Eight (21.1%) outbreaks were due to seasonal influenza. Two (5.3%) outbreaks were due to *Streptococcus pneumoniae* and two (5.7%) outbreaks were due to varicella. One outbreak (2.6%) was due to hepatitis B virus, one (2.9%) was due to rotavirus, and the last one (2.6%) was due to measles (Table 8).

Table 9 Vaccine Preventable Disease Outbreaks by Etiologic Agent or Clinical Syndrome, West Virginia, 2009

Etiologic Agent or Clinical Syndrome	Number of Outbreaks	Percent
2009 influenza A (H1N1)	23	60.5%
Influenza A	6	15.8%
Influenza B	2	5.3%
Streptococcus pneumoniae	2	5.3%
Varicella	2	5.3%
Hepatitis B	1	2.6%
Measles	1	2.6%
Rotavirus	1	2.6%
Total	38	100.0%

In 2009, 33 (33.3%) outbreaks were reported from healthcare facilities (Table 9). The majority of these outbreaks 29 (88%) were reported from long-term care facilities, and 4 (12%) were reported as follows: one from a rehabilitation center, one from a hospital, one from an outpatient dental clinic, and one from an outpatient medical clinic.

Table 10 Healthcare-Associated Outbreaks by Healthcare Facilities, West Virginia, 2009

Healthcare Facilities	Number of outbreaks	Percent
Long-Term Care Facilities	**29**	**88.0%**
Rehabilitation centers or short-term care facilities	**1**	**3.0%**
Hospitals	**1**	**3.0%**
Outpatient Dental Clinics	**1**	**3.0%**
Outpatient Medical Clinics	**1**	**3.0%**
Total	**33**	**100.0%**

Of the outbreaks reported by long-term-care facilities, 16 (55.3%) were enteric disease outbreaks, 10 (34.5%) were respiratory disease outbreaks and 3 (10.2%) outbreaks had other causes as listed in Table 10.

Table 11 Types of Outbreaks Reported by Long-Term Care Facilities, West Virginia, 2009

Outbreak Type	Number of Outbreaks	Percent
Enteric	16	55.3%
Respiratory	10	34.5%
Scabies	1	3.4%
MRSA	1	3.4%
Conjunctivitis	1	3.4%
Total	29	100.0%

Among the 16 enteric outbreaks reported by long-term care facilities, 11 (68.8%) were acute gastroenteritis, 4 (25%) were due to norovirus genotype II and 1 (6.2%) was due to both norovirus genotype I and *Clostridium difficile* (Table 11). The mode of transmission was person-to-person in 11 (69%).

Table 12 Enteric Outbreaks Reported by Long-Term Care Facilities by Etiologic Agents or Clinical Syndrome, West Virginia, 2009

Etiologic Agent or Clinical Syndrome	Number of Outbreaks	Percent
Acute gastroenteritis	11	68.8%
Norovirus Genotype II	4	25.0%
Norovirus Genotype I and *Clostridium difficile*	1	6.2%
Total	16	100.0%

Long-term care facilities reported 10 respiratory outbreaks (Table 12). Six were outbreaks of upper respiratory illness. Among the upper respiratory illness outbreaks, one was culture confirmed as parainfluenza virus and the other 5 laboratory testing was either negative or noncontributory or not performed. One was an outbreak of influenza-like illness. However, there were no reported outbreaks of either seasonal influenza or 2009 influenza A (H1N1).

Table 13 Respiratory Outbreaks Reported by Long-Term Care Facilities by Etiologic Agents or Clinical Syndrome, West Virginia, 2009

Etiologic Agent or Clinical Syndrome	Number of Outbreaks	Percent
Upper respiratory Illness	**6**	**60.0%**
Bacterial pneumonia	**3**	**30.0%**
Influenza like illness	**1**	**10.0%**
Total	**10**	**100.0%**

There were 3 outbreaks of bacterial pneumonia. The first one was caused by invasive *Streptococcus pneumoniae*. In this outbreak, 26 cases of x-ray confirmed pneumonia were identified. The attack rate was 52.4% and the mortality rate in this outbreak was high because of late reporting and the delay in implementing the preventive measures. There was also routine use of empiric antibiotics for residents with respiratory symptoms before appropriate laboratory tests, including cultures, were performed. This resulted in a delay in collecting laboratory specimens and in determining the etiology of the outbreak. Respiratory syncitial virus was isolated from a few patients, which indicates that this virus might have been the triggering factor of this outbreak. In the second outbreak *Streptococcus pneumoniae* was suspected to be the cause. A total of five cases of x-ray confirmed pneumonia were identified indicating an attack rate of 23%. Routine use of empiric antibiotics was also noticed in this outbreak which may have contributed to a delay in diagnosis. The third outbreak was caused by *Haemophilus influenzae* serotype F, biotype III. A total of 7 residents were diagnosed with pneumonia.

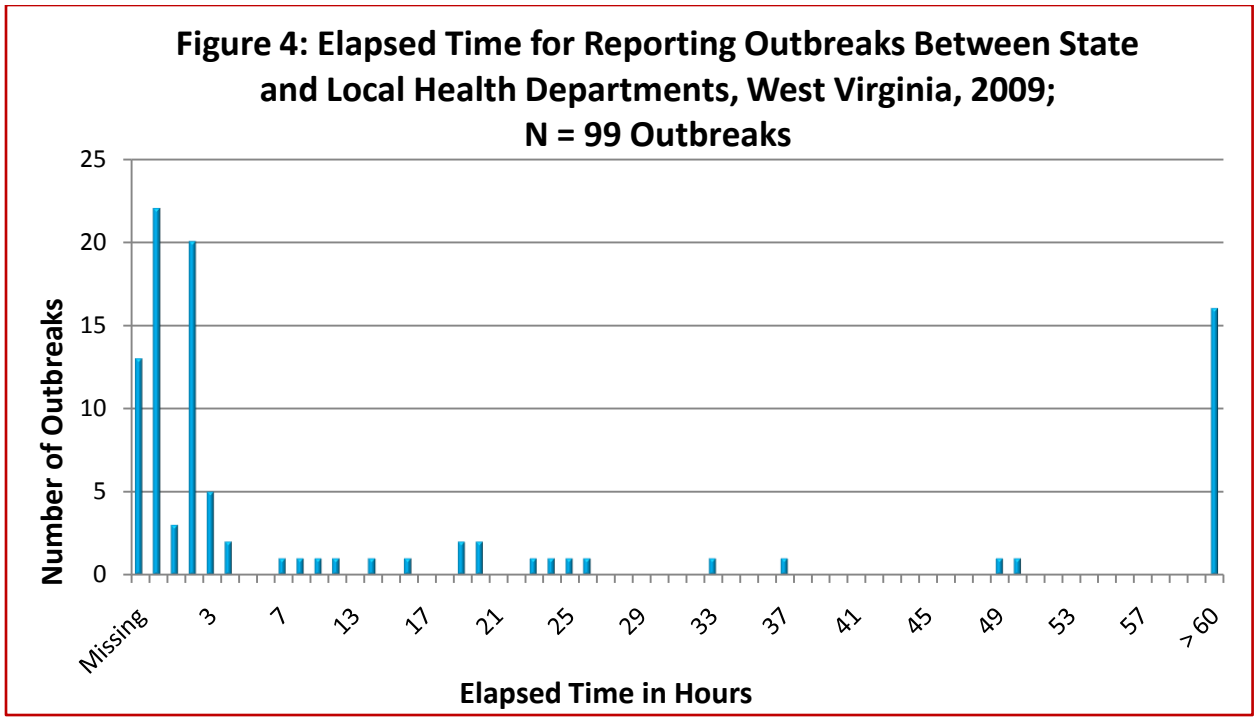
Long-term care facilities also reported one outbreak of MRSA that was laboratory confirmed. Two additional outbreaks were reported from LTCF. One was caused by scabies and the other was due to conjunctivitis.

Two major healthcare associated outbreaks were reported in 2009. The investigation of these two outbreaks is still ongoing. The first outbreak was reported from an outpatient pain clinic. Invasive procedures, such as epidural injections, joint injections, and nerve blocks. are performed routinely for pain management in this clinic. Eight patients (provisional number) presented clinically with meningitis, epidural abscess or

bacteremia. Invasive methicillin-sensitive *Staphylococcus aureus* (MSSA) was isolated from these patients. The outbreak was likely caused by multiple infection control breaches, including unsafe injection practices. Other identified infection control breaches included inconsistent use of barrier precautions, such as masks, inadequate sterile preparation of the injection sites, and lack of adequate sterile techniques while performing various procedures. Transmission of blood borne pathogens to patients has not been ruled out completely at this time.

The second outbreak was reported from a mass dental clinic. More than 1100 patients were treated in this clinic. In addition, there were more than 700 general and professional volunteers. A cluster of five cases of acute hepatitis B virus infection were identified among patients and volunteers (provisional number). The investigation of this outbreak is ongoing. Several breaches in infection control practices might have contributed to this outbreak. The provisional findings indicate that there were no written policies and procedures for infection control in this clinic. There was also no staff training in infection control. The last two outbreaks are being investigated by local health departments in collaboration with the Bureau for Public Health, Division of Infectious Disease Epidemiology (DIDE) and the CDC.

In West Virginia, outbreaks are immediately reportable to the local health department. According to infectious disease rules and regulations and as a condition of receiving threat preparedness funding local health departments are required to report immediately reportable conditions to the Bureau for Public Health within 60 minutes.
To measure adherence to this requirement, date and time of report to the local health department and date and time of report to the Division of Infectious Disease Epidemiology are recorded on a standard intake form so that elapsed reporting time can be calculated. For 2009, 31 (31.3%) outbreaks were missing date or time of report to the local health department or the state health department or both (Figure 4). Of the remaining 68 (68.7%) outbreaks, a mean (median) of 17.5 (2) hours elapsed between the time the outbreak was reported to the local health department and the time the outbreak was reported to the state health department. The range of hours elapsed between the time the outbreak was reported to the local health department and the time the outbreak was reported to the state health department was 0 to 241 hours. Of the 86 (87%) outbreaks where date of notification was known for the state and local health department, same-day notification occurred for 60 (70%) outbreaks



Conclusions and Recommendations

Although outbreaks always represent challenges in investigation and implementation of appropriate control measures in a timely manner, they also provide several opportunities for improvement. There has been a marked improvement in outbreak recognition and reporting in West Virginia over the last few years. However, improvements should continue in the following areas:

1. Outbreaks are immediately notifiable in West Virginia and should be reported to the Bureau for Public Health within 60 minutes. Immediate reporting improves the outbreak response by facilitating laboratory testing, diagnosis and implementing of the control measures in a timely manner, and preventing further illnesses or deaths. It also facilitates the communication with the CDC on critical health issues.
2. Continued improvements in laboratory testing are important. Timely collection of specimens facilitates diagnosis and institution of control measures.
3. The use of standard outbreak protocols has tremendous impact in improving outbreak investigation and control. The Division of Infectious Disease Epidemiology (DIDE) has developed several outbreak toolkits for influenza,

norovirus and varicella and will continue to develop new toolkits and protocols to assist partners in outbreak investigation. DIDE is committed to maintain its website to provide up-to-date information to our partners not only in outbreak investigation but also in infectious disease reporting and investigation. The web site is www.wvidep.org

4. DIDE will improve feedback of information on outbreaks and outbreak investigation during 2010 and beyond. Training of new state, local and regional public health personnel continues to be a priority now and into the future.
5. DIDE is participating in electronic reporting of all enteric outbreaks in the National Outbreak Reporting System (NORS).
6. The current influenza surveillance system has proven efficient and effective in responding to the 2009 pandemic influenza A (H1N1).
7. During an influenza pandemic, investigation and laboratory confirmation of each outbreak is neither feasible nor beneficial. However, immediate reporting is extremely important in implementing control measures in a timely manner.
8. This report indicates that outbreaks in long-term care facilities are frequent and sometimes severe and even fatal. This underscores the need for an infection control and prevention program as well as an outbreak response plan in these facilities. This report recommends the following strategies:
   a) Establish and maintain an ongoing standardized infection surveillance system that involves systematic collection and analysis of data on healthcare associated infections.
   b) Standard outbreak response plan should include early detection, notifying the local health department, and implementing infection control measures.
   c) There is a great need for a trained designated infection control practitioner in each long-term care facility.
   d) Long-term care facilities are encouraged to develop antibiotic stewardship programs to avoid the unnecessary use of antibiotics and development of antimicrobial resistance.
   e) These outbreaks highlight the need for regular training in infection control and prevention.
   f) Developing and updating infection control policies and procedures according to SHEA-APIC recommendations.
9. Outbreaks in ambulatory care, outpatient medical and outpatient dental clinics represent new challenges. With the development and implementation of the West Virginia Healthcare Associated Infections (HAIs) plan, DIDE will be focusing on the following strategies now and in the future:
   a) Improving surveillance of healthcare associated infections.
   b) Hiring a coordinator for HAIs.
   c) Maintaining multidisciplinary group to guide, plan and implement the state HAIs plan.
   d) The findings from this report will be presented to the multidisciplinary group as a part of a needs assessment of healthcare facilities.
   e) Encourage routine training of healthcare professionals in infection control and prevention and safe injection practices.

Appendix Summary Outbreak Tables for 2009, West Virginia

Number	Date and Time Reported to LHD	Date and Time Reported to State	Elapsed Time in Minutes	Jurisdiction	Counties with Cases	Final Case Count	Etiologic Agent or Clinical Syndrome	Laboratory results	Transmission Settings	Mode of Transmission
1	1/3/2009	1/3/2009 13:34	814	West Virginia	Gilmer	14	Norovirus genotype II	Confirmed	Long-term care facility	likely person-to-person, potential point source
2	1/9/2009 9:30	1/9/2009 10:30	60	West Virginia	Raleigh	56	Norovirus genotype I &*Clostridium difficile*	Confirmed	Long-term care facility	person-to-person
3	Missing	1/22/2009 13:00	Missing	West Virginia	Wood	60	Human parvovirus B19	Test not done	Elementary school	person-to-person
4	1/23/2009 16:15	1/23/2009 16:35	20	West Virginia	Kanawha	22	Acute gastroenteritis	Test not done	Long-term care facility	Undetermined
5	1/27/2009 14:45	1/28/2009 8:40	1075	West Virginia	Raleigh	28	Acute gastroenteritis	Lab test negative or noncontributory	Long-term care facility	point source with secondary person-to-person transmission
6	1/23/2009 15:30	1/23/2009 16:30	60	West Virginia	Kanawha	76	Acute gastroenteritis	Test not done	Long-term care facility	person-to-person
7	1/28/2009 10:00	1/28/2009 12:15	135	West Virginia	Kanawha	22	Acute gastroenteritis	Test not done	Long-term care facility	likely person-to-person
8	1/28/2009 14:15	1/28/2009 14:20	5	West Virginia	Roane	30	Acute gastroenteritis	Lab test negative or noncontributory	Long-term care facility	person-to-person
9	2/2/2009 15:40	2/2/2009 15:55	15	West Virginia	Wood	77	Human parvovirus B19	Test not done	Elementary School	person-to-person

Number	Date and Time Reported to LHD	Date and Time Reported to State	Elapsed Time in Minutes	Jurisdiction	Counties with Cases	Final Case Count	Etiologic Agent or Clinical Syndrome	Laboratory results	Transmission Settings	Mode of Transmission
10	2/5/2009 13:00	2/5/2009 14:00	60	West Virginia	Marshall	7 patients; 8 staff	Norovirus genotype II	Confirmed	Hospital	person-to-person
11	2/8/2009 13:00	2/9/2009 8:30	1170	West Virginia	Mercer	34	Norovirus genotype II	Confirmed	Long-term care facility	Undetermined
12	2/10/2009 13:49	2/10/2009 16:00	131	West Virginia	Wood	Peak absentee rate 24%	Influenza B	Rapid test positive but not culture confirmed	Elementary school	person-to-person
13	2/3/2009	2/17/2009 10:00	20760	West Virginia	Monongalia	20 patients and 6 staff	Acute gastroenteritis	Lab test negative or noncontributory	Rehab center	person-to-person
14	2/18/2009 10:00	2/18/2009 11:00	60	West Virginia	Pleasants	26	Bacterial pneumonia	Confirmed	Long-Term Care Facility	person-to-person
15	Missing	1/18/2009 10:00	Missing	West Virginia	Pleasants	60/279 (AR 22%) (estimate)	Human parvovirus B19	Test not done	Elementary School	person-to-person
16	2/17/2009 13:00	2/24/2009 9:10	9850	West Virginia	Fayette	49/74 residents (AR 64%) and 15 staff	Norovirus genotype II	Confirmed	Long-term care facility	person-to-person
17	2/14/2009 10:00	2/24/2009 10:45	14445	West Virginia	Mercer	15/ 60 residents (AR 25%)	Upper respiratory illness	Lab test negative or noncontributory	Long-term care facility	person-to-person
18	2/25/2009 14:50	2/25/2009 15:00	10	West Virginia	Lewis	8/341 (AR 2%)	Varicella	Test not done	Elementary school	person-to-person
19	2/3/2009	2/4/2009 12:00	2160	West Virginia	Wood	2	Scabies	Test not done	homeless shelter	person-to-person
20	2/27/2009 15:15	2/27/2009 15:32	17	West Virginia	Raleigh	31/98 residents (AR 32%)	Norovirus genotype II	Confirmed	Long-term care facility	person-to-person

Number	Date and Time Reported to LHD	Date and Time Reported to State	Elapsed Time in Minutes	Jurisdiction	Counties with Cases	Final Case Count	Etiologic Agent or Clinical Syndrome	Laboratory results	Transmission Settings	Mode of Transmission
21	3/5/2009 15:25	3/5/2009 14:59	26	West Virginia	Kanawha	Peak Absentees Rate (56%) 9 out of 16	Influenza A	Rapid test positive but not culture confirmed	Elementary school	person-to-person
22	3/6/2009	3/6/2009 11:30	690	West Virginia	Putnam	peak absentee rate 43%	Influenza B	Rapid test positive but not culture confirmed	Multiple schools	person-to-person
23	2/23/2009	3/6/2009 11:38	16538	West Virginia	Ohio	peak absentee at 25%	Influenza A	Confirmed	Multiple schools	person-to-person
24	3/9/2009 13:45	3/9/2009 14:00	15	West Virginia	Marshall	Peak Absentees rate is 26%	Influenza-like illness	Missing	Multiple schools	person-to-person
25	3/6/2009 9:00	3/9/2009 9:30	4350	West Virginia	Randolph	4 of 4	Acute gastroenteritis	Lab test negative or noncontributory	Family/ Household	Undetermined
26	3/9/2009 13:00	3/9/2009 14:30	90	West Virginia	Preston	Missing	Conjunctivitis	Test not done	Elementary school	person-to-person
27	3/9/2009	3/8/2009	1440	Multi-state/ CDC= lead investigator	Berkeley, Hampshire	4	*Salmonella* typhimurium	Confirmed	Restaurant	Foodborne
28	3/10/2009 15:00	3/10/2009 16:30	90	West Virginia	Wood	29	Group A *Streptococcus*	Rapid test positive but not culture confirmed	Middle school	person-to-person
29	3/11/2009 14:25	3/11/2009 14:40	15	West Virginia	Mercer	27/113 (23.9%) residents and 7/145 (4.8%) Staff	Upper respiratory illness (Parainfluenza)	Confirmed	Long-term care facility	person-to-person

Number	Date and Time Reported to LHD	Date and Time Reported to State	Elapsed Time in Minutes	Jurisdiction	Counties with Cases	Final Case Count	Etiologic Agent or Clinical Syndrome	Laboratory results	Transmission Settings	Mode of Transmission
30	3/11/2009 14:30	3/11/2009 14:45	15	West Virginia	Raleigh	10	Rotavirus	Confirmed	Community	person-to-person
31	3/12/2009 14:30	3/13/2009 15:00	1470	West Virginia	Lewis	10/784 (1.3%)	Varicella	Test not done	Middle school	person-to-person
32	3/24/2009 14:30	3/24/2009 15:12	42	West Virginia	Roane	11	Acute gastroenteritis	Lab test negative or noncontributory	Long-term care facility	person-to-person
33	4/2/2009 13:25	4/2/2009 13:30	5	West Virginia	Kanawha	14/55 (25.5%) residents and 5/30 (16.7%) staff	Acute gastroenteritis	Test not done	Long-term care facility	Undetermined
34	4/6/2009 11:25	4/6/2009 11:40	15	West Virginia	Monroe	41 residents (AR 79%) and 15 staff (AR 18%)	Acute gastroenteritis	Lab test not done	Long-term care facility	person-to-person
35	4/9/2009 17:30	4/9/2009 17:00	30	West Virginia	Kanawha	2 residents and 21 employees	Scabies	Lab test negative or noncontributory	Long-term care facility	point source
36	Missing	Missing	Missing	Multi-state/ CDC= lead investigator	Monongalia , Ohio	2 WV residents and 228 US residents	*Salmonella* saintpaul	Lab Confirmed	Multi-State	Foodborne/Alfalfa Sprouts
37	4/22/2009 10:00	4/22/2009 10:26	26	West Virginia	Mercer	2/65 (3%) children and 5 staff	Acute gastroenteritis	Test not done	Daycare	person-to-person
38	4/21/2009	4/22/2009	1440	West Virginia	Hancock	6 Teachers and 6 Students	Human parvovirus B19	Test not done	Elementary school	person-to-person

Number	Date and Time Reported to LHD	Date and Time Reported to State	Elapsed Time in Minutes	Jurisdiction	Counties with Cases	Final Case Count	Etiologic Agent or Clinical Syndrome	Laboratory results	Transmission Settings	Mode of Transmission
39	Missing	4/24/2009 11:00	Missing	West Virginia	Wood	12/17 (AR 71%)	Acute gastroenteritis	Test not done	International Resort	Food/Water Borne
40	4/28/2009	4/30/2009 13:00	3660	Multi-state/ WV= lead investigator	None	14	Acute gastroenteritis	Test not done	Racetrack	Undetermined
41	5/11/2009 14:45	5/11/2009 15:00	15	West Virginia	Kanawha	15/87 residents (AR 17%)	Acute gastroenteritis	Lab test negative or noncontributory	Long-term care facility	person-to-person
42	5/15/2009 14:00	5/15/2009 14:18	18	West Virginia	Preston	44/600 students (AR 7%)	Group A *Streptococcus*	Confirmed	School	person-to-person
43	5/18/2009 14:30	5/18/2009 14:45	15	West Virginia	Kanawha	10/60 residents (AR 17%)	Influenza-like illness	Lab test negative or noncontributory	Long-term care facility	person-to-person
44	5/20/2009 12:30	5/20/2009 13:20	50	West Virginia	Kanawha	5/60 residents (AR 8%)	Acute gastroenteritis	Test not done	Long-term care facility	person-to-person
45	5/29/2009 15:55	5/29/2009 16:13	18	West Virginia	Kanawha, Raleigh, Boone, Nicholas, Logan, Jackson	8 (provisional)	Methicillin-sensitive *Staphylococcus aureus* (MSSA)	Confirmed	Outpatient Pain Clinic	Nosocomial
46	6/2/2009 16:15	6/1/2009 17:00	1395	West Virginia	wood	22	2009 influenza A (H1N1)	Confirmed	Middle school	person-to-person

Number	Date and Time Reported to LHD	Date and Time Reported to State	Elapsed Time in Minutes	Jurisdiction	Counties with Cases	Final Case Count	Etiologic Agent or Clinical Syndrome	Laboratory results	Transmission Settings	Mode of Transmission
47	5/26/2009 14:48	5/26/2009 14:00	48	Multi-state/ CDC= lead investigator	Randolph	1 WV resident and 19 Virginia residents	*Salmonella* enteritidis	Confirmed	Multi-State	Foodborne/Vehicle Unknown
48	6/1/2009 16:19	6/1/2009 13:09	190	Multi-state / CDC= lead investigator	Berkeley	1 WV resident and 56 US residents	*Salmonella* oranienburg	Confirmed	Jazz Fest	Foodborne/Vehicle Unknown
49	6/12/2009 10:00 AM	6/12/2009 10:30 AM	30	West Virginia	Wood	1	Measles	Lab Confirmed	Household	person-to-person
50	6/15/2009 12:00	6/15/2009 14:15	135	West Virginia	Kanawha	4/96 (AR 4%)	Conjunctivitis	Test not done	Long-term care facility	person-to-person
51	6/15/2009 12:20	6/9/2009 11:30	8690	West Virginia	Logan, Cabell, Boone, Putnam, Wayne, Lincoln, Fayette	21	*Salmonella* enteritidis	Lab Confirmed	Restaurant	Foodborn/Sausage
52	6/16/2009	6/17/2009 8:21	1941	West Virginia	Fayette	7 residents and 13 staff	Acute gastroenteritis	Test not done	Long-term care facility	person-to-person
53	6/21/2009 14:00	6/22/2009 8:00	1080	West Virginia	Kanawha	33	2009 influenza A (H1N1)	Confirmed	Camp	person-to-person
54	6/20/2009 13:00	6/22/2009 13:20	2900	West Virginia	Wood	Peak absentees rate (50%)	2009 influenza A (H1N1)	Confirmed	Daycare	person-to-person

Number	Date and Time Reported to LHD	Date and Time Reported to State	Elapsed Time in Minutes	Jurisdiction	Counties with Cases	Final Case Count	Etiologic Agent or Clinical Syndrome	Laboratory results	Transmission Settings	Mode of Transmission
55	6/20/2009 12:45	6/20/2009 1:30	675	West Virginia	Logan	4	2009 influenza A (H1N1)	Confirmed	Church mission	person-to-person
56	6/29/2009 14:00	6/29/2009 13:00	60	West Virginia	Kanawha, Mason, Marshall, Ohio	9	2009 influenza A (H1N1)	Confirmed	Camp	person-to-person
57	Missing	7/6/2009 13:55	Missing	West Virginia	Kanawha	12	2009 influenza A (H1N1)	Confirmed	Camp	person-to-person
58	7/6/2009 14:45	7/7/2009 9:45	1140	West Virginia	Fayette	3 residents and 2 staff	Upper Respiratory Illness	Test not done	Long-term care facility	person-to-person
59	7/8/2009 13:00	7/8/2009 13:10	10	West Virginia	Kanawha, Putnam	6	2009 influenza A (H1N1)	Confirmed	Workplace	person-to-person
60	7/9/2009	7/9/2009 15:20	920	Multi-state/ WV= lead investigator	Upshur	6	2009 influenza A (H1N1)	Confirmed	Camp	person-to-person
61	7/15/2009 15:15	7/15/2009 15:30	15	West Virginia	Monongalia	4	2009 influenza A (H1N1)	Confirmed	Camp	person-to-person
62	Missing	7/15/2009 16:15	Missing	West Virginia	Summers, Mercer, Fayette, Preston, Randolph, Tucker	7	2009 influenza A (H1N1)	Confirmed	Camp	person-to-person

Number	Date and Time Reported to LHD	Date and Time Reported to State	Elapsed Time in Minutes	Jurisdiction	Counties with Cases	Final Case Count	Etiologic Agent or Clinical Syndrome	Laboratory results	Transmission Settings	Mode of Transmission
63	7/29/2009	7/29/2009 9:55	595	West Virginia	Monongalia	2	Skin infection	Test not done	Daycare	Undetermined
64	7/30/2009 13:15	7/30/2009 13:30	15	West Virginia	Kanawha	6	Methicillin-resistant *Staphylococcus aureus* (MRSA)	Confirmed	Rehab center	person-to-person
65	Missing	7/30/2009 16:15	Missing	WV	Putnam	3	2009 influenza A (H1N1)	Confirmed	Little League	person-to-person
66	8/1/2009 16:00	8/1/2009 15:30	30	Multi-state Including WestVirginia; WV= lead investigator	Greenbrier	3	2009 influenza A (H1N1)	Confirmed	Camp	person-to-person
67	8/3/2009 9:55	8/3/2009 10:00	5	West Virginia	Wood	2	Scabies	Test not done	Correctional facility	person-to-person
68	8/4/2009 15:40	8/4/2009 15:30	10	West Virginia	Greenbrier	5	Influenza-like illness	Test not done	Camp	person-to-person
69	8/2/2009	8/5/2009 15:23	5243	West Virginia	Cabell, Logan, Putnam	5	2009 influenza A (H1N1)	Confirmed	Workplace	person-to-person
70	5/21/2009 8:00	5/21/2009 9:00	60	West Virginia	Preston	25 Students	Group A *Streptococcus*	Rapid test positive but not culture confirmed	School	person-to-person

Number	Date and Time Reported to LHD	Date and Time Reported to State	Elapsed Time in Minutes	Jurisdiction	Counties with Cases	Final Case Count	Etiologic Agent or Clinical Syndrome	Laboratory results	Transmission Settings	Mode of Transmission
71	8/12/2009 15:50	8/12/2009 16:15	25	West Virginia	wood	5 (AR 23%)	Bacterial pneumonia	Lab Confirmed	Long-term care facility	likely person-to-person
72	8/26/2009 8:15	8/26/2009 11:45	210	West Virginia	Marion	7 residents	Bacterial pneumonia	Confirmed	Long-term care facility	person-to-person
73	8/28/2009 8:30	8/28/2009 9:15	45	West Virginia	Taylor	8 of 30 residents	Upper respiratory illness	Lab test negative or noncontributory	Long-term care facility	person-to-person
74	Missing	9/4/2009 12:00	Missing	West Virginia	Marion	peak absenteeism 32%	2009 influenza A (H1N1)	Confirmed	Multiple schools	person-to-person
75	9/9/2009 10:00	9/9/2009 11:10	70	West Virginia	Mason	2/42 (AR 4.8%)	Methicillin-resistant *Staphylococcus aureus* (MRSA)	Confirmed	Football Team	person-to-person
76	9/11/2009 16:00	9/11/2009 18:00	120	West Virginia	Wood	9 residents and 2 staff	Upper Respiratory Illness	Lab test negative or noncontributory	Long-term care facility	person-to-person
77	9/14/2009 9:30	9/14/2009 15:35	365	West Virginia	Jackson	peak absenteeism 25%	Influenza A	Rapid test positive but not culture confirmed	Multiple Schools	person-to-person
78	9/21/2009 8:55	9/21/2009 8:58	3	West Virginia	Mercer	11 Residents	Upper Respiratory Illness	Lab test negative or noncontributory	Long-term care facility	person-to-person

Number	Date and Time Reported to LHD	Date and Time Reported to State	Elapsed Time in Minutes	Jurisdiction	Counties with Cases	Final Case Count	Etiologic Agent or Clinical Syndrome	Laboratory results	Transmission Settings	Mode of Transmission
79	Missing	10/24/2009 7:45	Missing	West Virginia	Wayne	peak absenteeism 43%	influenza A	Rapid test positive but not culture confirmed	Multiple schools	person-to-person
80	9/28/2009 11:15	9/28/2009 11:00	15	West Virginia	Putnam	peak absenteeism 13%	Influenza-like illness	Test not done	School	person-to-person
81	10/2/2009	10/5/2009 14:06	5166	West Virginia	Logan	peak absenteeism 43%	2009 influenza A (H1N1)	Confirmed	School	person-to-person
82	10/5/2009 9:00	10/5/2009 9:30	30	West Virginia	Wood	peak absenteeism 50%	2009 influenza A (H1N1)	Confirmed	Multiple schools	person-to-person
83	10/6/2009 8:30	10/6/2009 9:44	74	West Virginia	Cabell	peak absenteeism 38%	2009 influenza A (H1N1)	Confirmed	Multiple schools	person-to-person
84	10/6/2009 9:00	10/6/2009 10:30	90	West Virginia	Kanawha	peak absenteeism 50%	Influenza-like illness	Test not done	School	person-to-person
85	10/5/2009 8:57	10/7/2009 9:54	2937	West Virginia	Mason	peak absenteeism 29%	Influenza A	Rapid test positive but not culture confirmed	School	person-to-person
86	10/13/2009 8:30	10/13/2009 10:00	90	West Virginia	Marshall	peak absenteeism 28%	2009 influenza A (H1N1)	Confirmed	Multiple schools	person-to-person
87	10/14/2009 12:15	10/19/2009 9:00	7005	West Virginia	Monroe	peak absenteeism 11%	2009 influenza A (H1N1)	Confirmed	Multiple schools	person-to-person
88	Missing	10/19/2009 16:48	Missing	West Virginia	Ritchie	peak absenteeism 31%	2009 influenza A (H1N1)	Confirmed	Multiple schools	person-to-person
89	Missing	10/19/2009 16:50	Missing	West Virginia	Roane	Peak absenteeism 30%	Influenza-like illness	Lab test not done	Multiple schools	person-to-person

Number	Date and Time Reported to LHD	Date and Time Reported to State	Elapsed Time in Minutes	Jurisdiction	Counties with Cases	Final Case Count	Etiologic Agent or Clinical Syndrome	Laboratory results	Transmission Settings	Mode of Transmission
90	Missing	10/20/2009 12:15	Missing	West Virginia	Pleasants	peak absenteeism 30%	2009 influenza A (H1N1)	Confirmed	Multiple schools	person-to-person
91	10/21/2009 9:00	10/21/2009 9:30	30	West Virginia	Gilmer	peak absenteeism 57%	Influenza-like illness	Test not done	School	person-to-person
92	10/26/2009	10/28/2009 12:00	3600	West Virginia	Wyoming	peak absenteeism 46%	Influenza A	Rapid test positive but not culture confirmed	Middle school	person-to-person
93	10/26/2009	11/2/2009 9:30	10650	West Virginia	Pendleton	Peak absenteeism 20%	2009 influenza A (H1N1)	Confirmed	Multiple schools	person-to-person
94	10/6/2009	11/2/2009 14:00	39720	West Virginia	Hardy	Peak absenteeism 12%	2009 influenza A (H1N1)	Confirmed	Multiple schools	person-to-person
95	11/3/2009	10/19/2009	21600	West Virginia	Harrison	Peak Absenteeism 28%	Influenza-like illness	Test not done	Multiple schools	person-to-person
96	Missing	11/6/2009	Missing	West Virginia	Berkeley, Morgan	5 (Provisional)	Hepatitis B	Confirmed	Outpatient Dental Clinic	Nosocomial
97	11/2/2009	11/9/2009	10080	West Virginia	Tyler	Peak absenteeism 37%	Influenza-like illness	Lab test negative or noncontributory	Multiple schools	person-to-person
98	11/6/2009 15:00	11/12/2009 9:00	8280	West Virginia	Ohio	9 of 12 inmates (AR 75%)	Influenza-like illness	Test not done	Correctional facility	person-to-person
99	12/12/2009 22:00	12/12/2009 20:00	120	West Virginia	Wetzel	4 out of 20 AR (2%)	Acute gastroenteritis	Test not done	HS basketball team	person-to-person