

Outbreaks of enteric illness were the most common type of outbreak in 2010, accounting for 36.5% of all outbreaks.

A total of 35 enteric outbreaks were reported by 16 (29%) counties. One enteric illness outbreak was reported in West Virginia as part of a multi-state outbreak. The Centers for Disease Control and Prevention (CDC) and other states were the lead investigators in this outbreak. The highest number (22) of enteric disease outbreaks were reported from healthcare facilities (Table3).

**Table 3. Outbreaks of Enteric Disease by Transmission Settings, West Virginia, 2010**

Transmission Settings	Number of Outbreaks	Percent
Healthcare Facilities	22	62.8%
Schools	4	11.4%
Communities	3	8.6%
Households	2	5.6%
Banquet	1	2.9%
Basketball tournament	1	2.9%
Restaurant	1	2.9%
Schools / Community	1	2.9%
<b>Total</b>	<b>35</b>	<b>100%</b>

Norovirus and acute gastroenteritis outbreaks were the most common types of enteric disease outbreaks, accounting for 28 (80%) enteric outbreaks (Table 4). Acute gastroenteritis outbreaks were defined as outbreaks of illness with short duration (2-3 or fewer days) characterized by acute onset of vomiting and /or diarrhea and no laboratory confirmation.

**Table 4. Outbreaks of Enteric Disease by Etiologic Agent, West Virginia, 2010**

Etiologic Agent	Number of Outbreaks	Percent
Norovirus	16	45.7%
Acute Gastroenteritis (undetermined etiology)	12	34.3%
<i>Salmonella</i> Species	3	8.6%
Hepatitis A	2	5.7%
<i>Bacillus Cereus</i>	1	2.9%
<i>Shigella Sonnei</i>	1	5.7%
<b>Total</b>	<b>35</b>	<b>100%</b>

Among the 12 outbreaks characterized as acute gastroenteritis, laboratory tests were negative or non contributory in 5 outbreaks and not done in 7 outbreaks. All norovirus outbreaks were confirmed by PCR; 11 were norovirus genotype II, 3 were norovirus genotype I, 1 was combined norovirus genotype I and II, and 1 was norovirus with undetermined genotype.

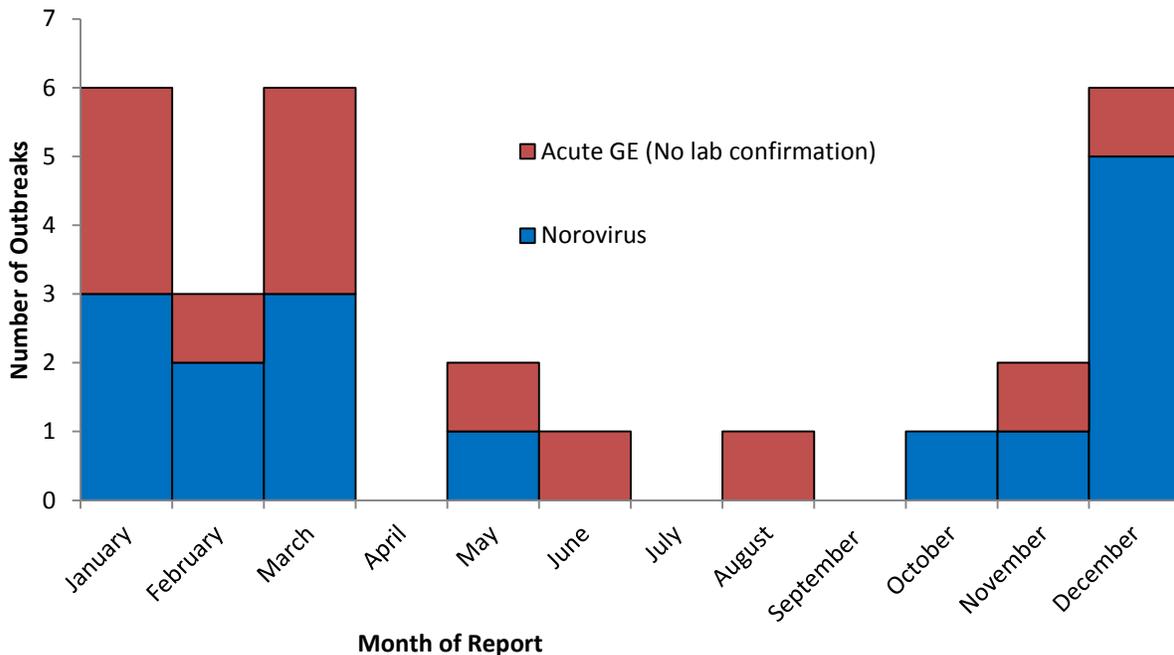
Most enteric outbreaks 26 (74.3%) were due to person to person transmission (Table 5).

**Table 5. Outbreaks of Enteric Disease by Mode of Transmission, West Virginia, 2010**

Modes of Transmission or Source of Illness	Number of Outbreaks	Percent
Person to Person	26	74.3%
Foodborne	4	11.4%
Point source and secondary Person to Person transmission	3	8.6%
Likely Point Source	2	5.7%
<b>Total</b>	<b>35</b>	<b>100%</b>

Outbreaks of acute gastroenteritis and norovirus exhibit similar seasonality and follow a familiar pattern of norovirus transmission in the winter months (Figure 2).

**Figure 2. Outbreaks of Acute Gastroenteritis by Type, and Month of Report, West Virginia, 2010 (N=28)**



There were 3 enteric outbreaks caused by *Salmonella* species. The first of these outbreaks was reported in January, 2010 when 6 members of a family of 10 from 3 households developed symptoms of salmonellosis after a dinner party. Three family members tested positive for *Salmonella* serotype Enteritidis. A foodborne source was postulated in this outbreak. However, an exact source could not be determined.

The second outbreak was also reported in January, 2010 when a West Virginia resident was diagnosed with salmonellosis as part of a multi-state outbreak of *Salmonella* serotype Montevideo. The outbreak affected 272 US residents and was traced to salami products containing contaminated imported black and red pepper.

The third outbreak occurred in March, 2010 when 7 laboratory confirmed cases of *Salmonella* serotype Enteritidis were identified. Further investigation identified additional cases for a total of 18 laboratory confirmed and 4 probable cases. A probable case was defined as a symptomatic person with an epidemiologic link to a laboratory confirmed case. Since *Salmonella* serotype Enteritidis is a very common serotype, standard pulse field gel electrophoresis (PFGE) testing was not sufficient to associate the outbreak cases. A total of 11 isolates were sent to the CDC laboratory for multi-locus variable-number tandem repeat analysis (MLVA) testing. The analysis, conducted by the WV Office of Laboratory Services (OLS) and CDC, confirmed that the isolates of *Salmonella* serotype Enteritidis obtained from the 11 cases were identical. This indicated that the cases were likely exposed to the same source of infection. Epidemiologic analysis associated illness with eating at multiple locations of a single chain restaurant.

Laboratory studies also concluded that the *Salmonella* serotype Enteritidis that was the cause of this outbreak was identical to the *Salmonella* serotype Enteritidis isolated during the investigation of a multi-county outbreak in June 2009, which was found to be associated with multiple locations of the same chain restaurant. Since epidemiologic and laboratory investigation linked the two outbreaks to several locations of the same chain restaurant, the BPH and LHD discussed the findings of this investigation and the recommendations with this restaurant corporation. The corporation planned to adopt the recommended changes in their food purchasing and handling practices to prevent similar outbreaks in the future.

Another foodborne outbreak was reported in August, 2010 when 10 family members were diagnosed with acute gastroenteritis after consuming pizza from a local restaurant. Laboratory testing of the patients was negative. Testing of the remaining pizza at OLS revealed contamination with *Bacillus cereus*. The LHD communicated the findings of the investigation and the recommendations to the restaurant.

There were two outbreaks of hepatitis A reported in 2010. The first one was reported in October when two family members were diagnosed with hepatitis A. An investigation determined that these cases were epidemiologically linked to an outbreak of hepatitis A in a daycare in the state of Kentucky. An asymptomatic infant in the household attended the daycare and likely transmitted the infection to other family members. Hepatitis A infection is asymptomatic among children younger than 6 years of age in 70% of cases.

The second outbreak was also reported in October among members of a community. The epidemiologic investigation identified 11 cases of hepatitis A with disease onset dates ranging from 9/5/2010 to 12/15/2010. Although West Virginia's reportable disease rule mandates reporting of hepatitis A cases within 24 hours of identification, the 2 cases with the earliest onset dates in September were retrospectively identified in October after the outbreak report. The mode of transmission in this outbreak appeared to be person-to-person with the infection transmitted among friends/associates and with secondary spread to family members. In an effort to control the outbreak, the local health department issued press releases, provided education and outreach to community physicians, and conducted community wide vaccination clinics and education in the targeted areas.

An outbreak of *Shigella sonnei* was reported among children in multiple schools with secondary spread to the community. A total of 105 cases were identified (33 confirmed and 72 probable cases). However, since shigellosis is asymptomatic in 95% of cases the actual number of cases in this outbreak was probably several times higher than that reported. *Shigella* is mainly transmitted from person-to-person via fecal-oral route. Occasionally *Shigella* may be spread by physical contact or ingestion of contaminated food and/or water. Because few bacteria are required to cause disease, shigellosis can propagate and persist in settings with insufficient hygiene practices. This makes

controlling shigellosis outbreaks among certain populations a significant challenge. This outbreak continued for almost 11 weeks. The LHD in collaboration with BPH and CDC implemented strict measures to control this outbreak.