



Norovirus Outbreak Prevention and Control in Long-term Care Settings

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Noroviruses are the most common cause of gastroenteritis outbreaks, occurring throughout the year but predominately in the winter months. Norovirus is the official genus name for the group of viruses provisionally described as “Norwalk-like viruses.” Long-term care settings are commonly reported settings of outbreaks in the United States. In these settings, outbreaks can be particularly troublesome among the vulnerable elderly population with high person-to-person contact for both patients and staff. Norovirus spreads rapidly through these confined populations because it is easily transmitted with a low infectious dose, has a short incubation period, is environmentally stable, and lacks long-term immunity after infection.

The virus can be introduced into the long-term care setting by the staff, visitors and/or patients who are incubating or infected with the virus. An outbreak in these settings can last for months and can incur significant costs. Implementing isolation precautions, providing personal protective equipment (PPE), increasing environmental cleaning, staff cohorting or replacement, and sick time all factor in to the increase in operational costs.

The average incubation period of noroviruses is 12–48 hours (median period is approximately 33 hours), and is characterized by an acute onset of vomiting, non-bloody diarrhea, nausea, and abdominal cramps. A low-grade fever, nausea, and headache are also commonly reported. Some people may only experience vomiting or diarrhea. Symptoms typically resolve within 1–3 days in healthy persons, but illness in the elderly, young children, and those who are immunocompromised may last longer. Dehydration is the most common complication, which is treated by fluid replacement. Asymptomatic infections may also occur in up to 30% of the population, making outbreak control all the more difficult.

Noroviruses are extremely contagious with an infectious dose estimated as small as 18 viral particles. The virus is primarily shed in the stool but also can be found in the vomit of infected persons. Viral shedding is at its highest 2–5 days after infection, but the virus can be detected for an average of four weeks following infection. Humans are the only known reservoir for noroviruses. Transmission may occur person to person directly through the fecal-oral route, by ingesting aerosolized vomitus, or indirectly by materials, fomites or environmental surfaces contaminated with either feces or vomitus. Food borne transmission may occur when infected food handlers contaminate food or beverages during preparation and service. The viruses are relatively stable in the environment and can survive freezing and heating to 140°F. Norovirus can also survive on surfaces for prolonged periods of time.

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Detection of a Norovirus Outbreak

Recognizing cases early is an important first step in control of an outbreak. The Centers for Disease Control and Prevention (CDC) defines a Norovirus case as an acute onset of vomiting or diarrhea with three or more loose stools within any 24-hour period. A Norovirus outbreak may be occurring when three or more residents or staff members in the facility are experiencing symptoms within a 48-hour period. Key infection control activities include rapid identification and isolation of suspected cases, notifying Infection Control staff, and promoting increased hand washing and enhanced environmental cleaning and disinfection. Investigation of cases to determine and confirm causes of the illness should also begin promptly.

Norovirus infection can be diagnosed by detecting viral RNA in the stool of the infected person by use of reverse transcription-polymerase chain reaction (RT-PCR) assays. This test is available at the Indiana State Department of Health Laboratory and should be considered during gastrointestinal outbreaks in long term care settings. Stool specimens obtained within 48 to 72 hours after the onset of symptoms provide best diagnostic results. When laboratory results are delayed or not available, the Kaplan's clinical and epidemiologic criteria are sometimes used to identify a Norovirus outbreak by the following:

- Vomiting in more than half of the symptomatic cases, and
- Mean incubation period of 24 to 48 hours, and
- Mean duration of illness 12 to 60 hours, and
- No bacteria isolated in the stool culture

Outbreak Prevention Steps

Staff will be better prepared to respond to Norovirus outbreaks when protocols are in place before a problem arises. Staff should be aware of the risk factors and know their roles in an outbreak situation. Interventions to limit the transmission of Norovirus in long-term care settings include good hand hygiene, patient cohorting, isolation precautions and environmental cleaning and disinfection.

Hand Hygiene

Good hand hygiene practice is likely the single most important method to control Norovirus infection and transmission. Facilities should actively promote hand hygiene among patients, staff and visitors. Using soap with running water for at least 20 seconds is the best washing method to remove Norovirus from the hands after caring for an ill patient or handling soiled materials. Using an ethanol-based hand sanitizer should not be used as a substitute for hand washing but used in addition to soap and running water. According to CDC, the effectiveness of hand sanitizers against Norovirus is still unclear.

Exclusion and Isolation

During Norovirus outbreaks, isolation and exclusion of infected individuals are important to reduce further transmission. These steps limit contact with persons while they are most infectious, the acute phase of the illness and during the 24 – 72 hours recovery period, as well as excluding exposed and potentially incubating persons. Long-term care settings may benefit from isolation of both exposed and unexposed well persons to interrupt the transmission and prevent additional cases.

Ill residents may be cohorted together in an area with designated staff that only cares for those who are ill. In some cases, this may be staff that has already recovered from the illness. Transferring symptomatic residents to unaffected areas or facilities is not recommended unless medically necessary. Incubating or asymptomatic

patients and staff should not be transferred to or work in unaffected areas of the facility for at least 48 hours after exposure. Facilities should exclude ill staff members and food service workers for 48 – 72 hours after symptoms resolve. Suspension of group dining and other activities may also be necessary to control transmission. Visitors should be advised about the risk of exposure and excluded if symptomatic.

Environmental Cleaning

Another important measure to interrupt Norovirus spread is proper environmental cleaning. Staff should increase the frequency and disinfection of patient care areas and frequently touched surfaces during outbreaks. Surfaces should always be cleaned first before application of the disinfectant. A chlorine bleach solution has proven to be effective disinfectant and should only be applied to hard, nonporous surfaces at a concentration of 1,000-5,000 ppm and mixed fresh daily to avoid evaporative dilution. Other EPA-approved products for healthcare settings with a label claim for Norovirus disinfection are also effective. It is important to follow the manufacturer's recommendations for methods of application, amount, dilution and contact time for all disinfectant products used.

During outbreaks, the frequency of cleaning and disinfection should increase, focusing on high touch surfaces such as toilets, faucets, door knobs, telephones, computer equipment and hand rails. Soiled linens should be handled carefully to avoid dispersal of the virus into the air. Mop heads should be changed with each new solution and after cleaning large spills of vomitus or feces. Staff should use personal protective equipment such as gloves and gowns to avoid cross contamination. Upholstered furniture that cannot be cleaned with bleach may be steamed cleaned. Consider changing privacy curtains routinely and upon patient discharge or transfer.

Policies and Education

Long-term care settings that have established norovirus outbreak policies and guidelines are better equipped to respond quickly when an outbreak occurs. It is important to include key stakeholders such as clinical staff, environmental services, administration and the state and/or local health department in developing these policies. Providing education and having resources available to staff, residents and visitors on Norovirus symptoms, transmission, basic outbreak control measures and their roles in an outbreak are vital in preventing further transmission. As always, notify your state and local health department when an outbreak is suspected.

Helpful Resources

[Poster: What Healthcare Providers Should Know](#)  [1 page]

[Factsheet: Norovirus in Healthcare Facilities](#)  [2 pages]

[Key Infection Control Recommendations](#)  [1.1 MB, 3 pages]

[Slide Set: Norovirus Gastroenteritis Management of Outbreaks in Healthcare Settings](#)  [2.8 MB, 25 pages]

References

1. Centers for Disease Control and Prevention (CDC). Updated Norovirus Outbreak Management and disease Prevention Guidelines. MMWR. March 4, 2011/60(RR03);1-15.
2. Pyrek, K. M. (2013, February). Norovirus Control and Prevention Strategies. Infection Control Today .
3. Pennsylvania Patient Safety Advisory, (Vol. 7, No 4 - December 2010). Controlling the Annual Threat of Norovirus Gastroenteritis Outbreaks.

Indiana Smoking-Attributable Mortality, Morbidity, and Economic Costs

Results using 2011 Indiana BRFSS and Mortality

Cigarette smoking is the leading cause of preventable death in the United States and produces significant health-related economic costs to society. Using the Adult Smoking-Attributable Mortality, Morbidity and Economic Costs (SAMMEC) software provided by the Centers for Disease Control and Prevention (CDC) with 2011 Indiana mortality and Behavioral Risk Factor Surveillance System (BRFSS) data, information on annual health and economic costs are provided below.

The Adult SAMMEC program derives smoking-attributable mortality using an attributable-fraction formula. The smoking-attributable fractions of deaths for 19 diseases (malignant neoplasms (cancer), cardiovascular diseases and respiratory diseases) where cigarette smoking is a cause are calculated using sex-specific smoking prevalence from the BRFSS and relative risk of death data for current and former smokers ages 35 years and older. Adult SAMMEC uses unpublished age-adjusted relative risk estimates for persons ages 35 years and older from the American Cancer Society's Cancer Prevention Study (CPS-II). To estimate the smoking-attributable mortality, SAMMEC multiplies the age- and sex-specific smoking attributable fractions by the number of deaths for each smoking-related disease. Indiana 2011 mortality data were used for the number of deaths. The estimated economic impact of smoking is based on smoking-attributable health care expenditures and productivity losses using estimates from 2004. These health care expenditures are the excess personal health care costs of past smokers and current smokers compared with those of never smokers. Adult SAMMEC does not include morbidity-related productivity losses. SAMMEC cannot be used to estimate the cost-effectiveness of public health programs aimed at reducing cigarette use. [CDC]

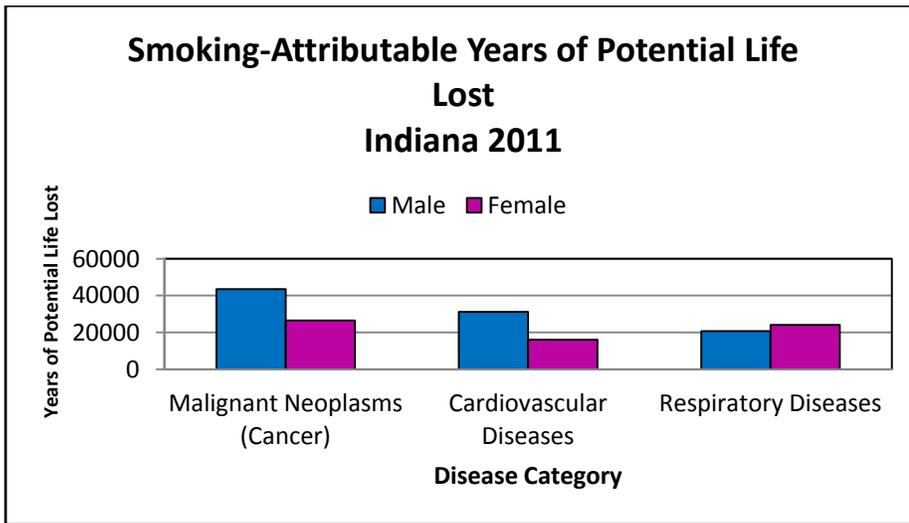
There are limitations to SAMMEC methodology. During periods when smoking prevalence is declining, the attributable-fraction methodology tends to understate the number of deaths caused by smoking. Results do not account for deaths from cigar smoking, pipe smoking, and smokeless tobacco. Productivity loss estimates were based on lifetime future earnings data that were weighted by sex to remove the effects of gender discrimination, and as a result, these losses are likely to be understated because men have higher average earnings than women and are more likely to die from a smoking-attributable disease. Productivity losses are also understated since they do not include the value of work missed because of smoking-related illness, other smoking-related absenteeism, excess work breaks, or the effects of secondhand smoke [CDC]. For additional information on SAMMEC, please visit <https://apps.nccd.cdc.gov/sammec/index.asp>.

An estimated 10,238 smoking-attributable deaths occurred in 2011 among Indiana residents: 4,110 (40.1%) from malignant neoplasms (cancer), 3,354 (34.7%) from respiratory diseases and 2,774 (27.1%) from cardiovascular diseases.

Sixty percent of the deaths (n=6,071) occurred in males. The leading site of smoking-attributable deaths from malignant neoplasms were trachea, lung and bronchus (n=3,156, 76.8%). Ischemic heart disease deaths (n=1,580, 76.8%) were the leading cause of smoking-attributable deaths from cardiovascular disease. Chronic airway obstruction (n=2,940, 87.8%) was the leading cause of smoking-attributable respiratory disease.

An estimated 162,024 years of smoking-attributable years of potential life lost was calculated among adults ages 35 years and older (burn or second-hand smoke deaths are not included), with 95,425 (58.9%) among males and 66,599 (41.1%) among females. Malignant neoplasms were the leading disease category, followed by cardiovascular diseases and respiratory diseases (Figure 1).

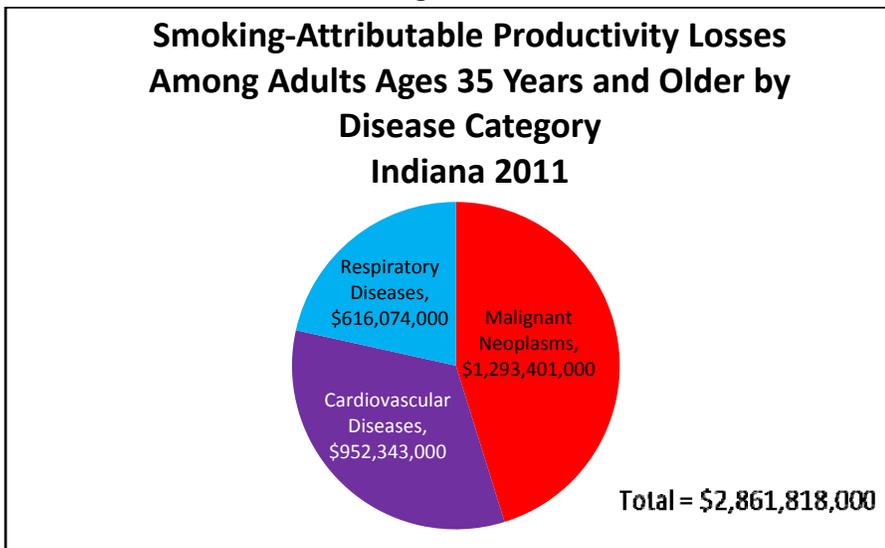
Figure 1.



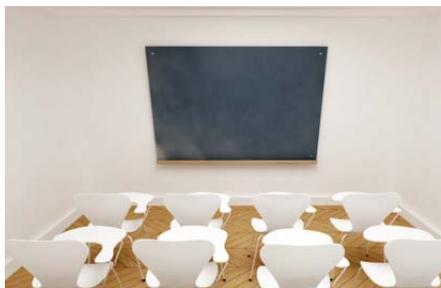
SAMMEC also calculated the excess personal health care costs of smokers and former smokers compared with those of never smokers as \$2,180,000,000 (based on 2004 expenditure data). This is the amount of expenditures that could be avoided if smoking were eliminated from Indiana’s population.

An estimated \$2.8 billion in productivity losses from smoking in Indiana (using year 2000 age-specific present value of foregone future earnings) were calculated, with the largest amount for cancer (Figure 2).

Figure 2.



There are immediate and long-term health benefits when someone stops smoking. The Indiana Tobacco Quitline (1-800-Quit-Now) is a free telephone-based counseling service to help Indiana smokers quit that is provided by the Tobacco Prevention & Cessation Commission at the Indiana State Department of Health. For information, please visit www.IndianaQuitline.net or www.QuitNowIndiana.com.



Training Room

INDIANA STATE DEPARTMENT OF HEALTH IMMUNIZATION PROGRAM PRESENTS: *Immunizations from A to Z*

Immunization Health Educators offer this FREE, one-day educational course that includes:

- Principles of Vaccination
- Childhood and Adolescent Vaccine—Preventable Diseases
- Adult Immunizations—Pandemic Influenza
- General Recommendations on Immunization
 - Timing and Spacing
 - Indiana Immunization Requirements
 - Administration Recommendations
 - Contraindications and Precautions to Vaccination
- Safe and Effective Vaccine Administration
- Vaccine Storage and Handling
- Vaccine Misconceptions
- Reliable Resources

This course is designed for all immunization providers and staff. Training manual, materials and certificate of attendance are provided to all attendees. Please see the Training Calendar for presentations throughout Indiana. Registration is required. To attend, schedule/host a course in your area or for more information, please visit <http://www.in.gov/isdh/17193.htm>.

ISDH Data Reports

The following data reports and the *Indiana Epidemiology Newsletter* are available on the ISDH webpage:

<http://www.IN.gov/isdh/>

HIV/STD/Viral Hepatitis Semi-Annual Report (June 2007 - December 2012)	Indiana Mortality Report (1999–2011)
Indiana Cancer Reports: Incidence; Mortality; Facts & Figures	Indiana Linked Infant Birth/Death Report (1999, 2002, 1990-2003)
Indiana Health Behavior Risk Factors Report (1999–2010)	Indiana Natality Report (1998–2011)
Indiana Health Behavior Risk Factors (BRFSS) Newsletter (2003–2013)	Indiana Induced Termination of Pregnancy Report (1998–2012)
Indiana Hospital Consumer Guide (1996)	Indiana Marriage Report (1995, 1997-2004)
Public Hospital Discharge Data (1999–2012)	Indiana Infectious Disease Report (1997-2011)
Assessment of Statewide Health Needs (2007)	Indiana Maternal & Child Health Outcomes & Performance Measures (1989-1998 through 2001–2010)

HIV Disease Summary

Information as of December 31, 2013 based on 2010 population of 6,483,802

HIV - without AIDS:

81	New HIV cases from October 1, 2013 thru December 31, 2013	12-month incidence	1.25 cases/100,000
5,098	Total HIV-positive, alive and without AIDS on December 31, 2013	Point prevalence	78.63 cases/100,000

AIDS cases:

76	New AIDS cases from October 1, 2013 thru December 31, 2013	12-month incidence	1.17 cases/100,000
5,984	Total AIDS cases, alive on December 31, 2013	Point prevalence	92.29 cases/100,000
12,231	Total AIDS cases, cumulative (alive and dead) on December 31, 2013		

Reported cases of selected notifiable diseases				
Disease	Cases Reported in October-December MMWR Weeks 40-52		Cases Reported in January – December MMWR Weeks 1-52	
	2012	2013	2012	2013
Animal Bites	1,485	1,017	6,869	6,116
Brucellosis	0	0	3	1
Campylobacteriosis	96	118	631	553
Chlamydia	7,083	7,225	29,505	28,506
Cryptococcus neoformans	8	5	36	30
Cryptosporidiosis	30	31	127	105
Dengue	0	0	1	1
<i>E. coli</i> , shiga toxin-producing	25	27	132	113
Giardiasis	66	41	229	190
Gonorrhea	1,902	1,803	7,338	7,238
<i>Haemophilus influenzae</i> , invasive	25	32	106	136
Hansen's Diseases (Leprosy)	0	0	0	1
Hemolytic Uremic Syndrome (HUS)	4	4	11	8
Hepatitis A	3	8	11	33
Hepatitis B	16	21	89	98
Hepatitis C (acute)	27	28	113	142
Hepatitis D	0	0	1	2
Hepatitis E	1	1	3	4
Histoplasmosis	56	22	171	86
Influenza Deaths (all ages)	8	4	11	67
Legionellosis	20	15	54	91
Listeriosis	1	1	10	6
Lyme Disease	5	3	65	92
Malaria	3	4	22	19
Measles (rubeola)	0	0	15	2
Meningitis, other	71	1	76	21
Meningococcal, invasive	4	0	9	14
Mumps	0	0	4	3
Pertussis (Whooping Cough)	143	234	442	598
Rabies, Animal	0	1	8	10
Rocky Mountain Spotted Fever	0	0	2	1
Rubella	0	0	1	0
Salmonellosis	121	134	779	670
Shigellosis	23	30	121	108
Severe <i>Staphylococcus aureus</i> Infection in Previously Healthy Person	3	1	21	21

Reported cases of selected notifiable diseases (cont.)				
Diseases	Cases Reported in October - December		Cases Reported in January - December	
	2012	2013*	2012	2013*
Group A Streptococcus, invasive	38	34	184	154
Group B, Streptococcus, Invasive (All ages)	95	87	398	367
Group B, Streptococcus, invasive Newborn	9	7	38	27
<i>Streptococcus pneumoniae</i> (invasive, all ages)	232	168	736	702
<i>Streptococcus pneumoniae</i> (invasive, drug resistant)	1	1	1	1
<i>Streptococcus pneumoniae</i> (invasive, <5 years of age)	14	10	38	35
Syphilis (Primary and Secondary)	57	39	224	227
Toxic Shock Syndrome, streptococcal (STSS)	4	2	18	11
Tuberculosis	31	22	102	96
Tularemia	1	0	4	2
Typhoid Fever	1	1	4	4
Typhus/Rickettsial disease	0	0	0	0
Varicella (Chickenpox, confirmed and probable)	154	11	264	92
Varicella (Hospitalization or Death)	0	1	5	5
Vibriosis (non-cholera Vibro species infections)	0	0	6	7
West Nile Virus neuroinvasive disease	0	0	1	5
Yersiniosis	3	1	10	6
*Provisional				
For information on reporting of communicable diseases in Indiana, call the <i>ERC Surveillance and Investigation Division</i> at 317.233.7125.				



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<http://www.in.gov/isdh/25154.htm>



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Pictured: William VanNess, MD,
State Health Commissioner and Blue