FALL
2012
VOL 26
Number 02

GEORGIA EPIDEMIOLOGY REPORT

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Violent Deaths in Georgia, 2006-2009: Results from the Georgia Violent Death Reporting System (GVDRS)

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Background

The Georgia Violent Death Reporting System (GVDRS) is funded by the Centers for Disease Control and Prevention's National Violent Death Reporting System (NVDRS)[1]. NVDRS was established in 2002 to collect violence-related death data and currently funds 18 states, including: Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, Michigan, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia, and Wisconsin[3]. NVDRS, as well as GVDRS, is a population-based surveillance system designed to collect information on homicide, suicide, unintentional firearm, legal intervention, and undetermined intent deaths, for both multi-victim incidents as well as individual persons (victims and suspects)[1].

Introduction

Violence is an increasing public health problem. Violence-related injuries are responsible for the loss of more than one million lives each year and are among the leading causes of death for 15-44 year olds[2]. According to NVDRS, a total of 64,334 persons died from violence-related injuries from 2006 to 2009, averaging 16,084 deaths each year[3]. Additionally, in 2009, homicide was the second leading cause of violence-related injury death among 15-24 year olds and the third leading cause of injury death among 10-14 year olds; suicide was the second and third leading cause of violence-related injury death among 10-14 year olds and those 35 years and older, respectively[4]. The following descriptive analysis aims to report the burden of violent deaths in Georgia for the period from 2006 to 2009.

Methods

NVDRS defines violent death as one that results from the intentional use of physical force or power, threatened or actual, against oneself, another person, or a group or community[1]. Violent death incidents can consist of: 1) a single isolated violent death; or, 2) companion cases, which include two or more related violent deaths when the fatal injuries were inflicted less than 24 hours apart[1]. The NVDRS defines each manner of death as follows:

- Suicides: deaths resulting from the intentional use of force against oneself
- Homicides: deaths resulting from the intentional use of force or power against another person, group, or community

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State Epi Corner

Being prepared to detect, respond to, and rapidly recover from public health threats (such as bioterrorism, emerging infectious diseases, pandemic influenza, natural disasters, or foodborne outbreaks) is critical for protecting and securing Georgia's public health. The foundation of public health preparedness is disease surveillance.

In July 2011, the Centers for Disease Control and Prevention (CDC) released a watershed document entitled "Public Health Preparedness Capabilities: National Standards for State and Local Planning" (http://www.cdc.gov/phpr/capabilities/DSLR_capabilities_July.pdf). This document details 15 capabilities that represent a national standard for and a "road map" to public health preparedness.

As part of these capabilities, CDC recommends that state and local health departments have surveillance systems in place that can collect, review, and respond to reports of potential health threats on 24/7 basis. To accomplish this in Georgia, we use our 1-866-PUB-HLTH reporting hotline (in collaboration with our partners at the Georgia Poison Center).

1-866-PUB-HLTH is intended for use by healthcare providers, health departments, emergency response personnel, laboratories, and others who need to report an immediately notifiable disease or to contact Public Health during an emergency. During the summer of 2012, we received reports through this system of myriad disease conditions requiring immediate notification and follow up, including a suspect measles case, a suspect case of viral hemorrhagic fever, an outbreak of ciguatera poisoning, a cluster of persons with suspected organophosphate poisoning, and a naturally-occurring *Burkholderia pseudomallei* infection.

We thank you for these and other reports, and continue to rely on you for on-the-ground situational awareness in Georgia!

Cherie L. Drenzek, DVM, MS, State Epidemiologist

Violent Deaths in Georgia, 2006-2009: Results from the GVDRS (continued from page 1)

- Legal intervention: deaths where the victim was killed by a police officer or other officers (i.e., persons with specified legal authority to use deadly force), including military police, acting in the line of duty

- Unintentional firearm: deaths resulting from a penetrating injury or gunshot wound from a weapon that uses a powder charge to fire a projectile when there was enough evidence that the shooting was not intentionally directed at the victim

- Undetermined intent: deaths resulting from the use of force or power against oneself or another person for which the evidence indicating one manner of death is no more compelling than the evidence indicating another manner of death[1]

Based on NVDRS requirements, GVDRS collects information on all violent deaths in Georgia. Data is obtained from death certificates, coroner/medical examiner reports, police reports, supplemental homicide reports, and crime laboratory records, and linked into a single incident for each violent death as well as for multiple deaths associated to each other[1]. Source documents are sent to the Georgia Department of Public Health, and data are abstracted and entered into a secure electronic database. Primacy rules are applied to variables to resolve data inconsistencies and to create a final analytical data set; each variable has a primacy rule based on a hierarchy of assumed reliability of the particular data source[1]. For example, for the race variable, the primacy is given to the death certificate; if race is not available, then the race is taken from the coroner/medical examiner report; if not available there, it is then taken from the police report[1]. Information collected on the deceased includes: demographics, military service status, cause of death, circumstances, toxicology, weapons, and injury place and date. Circumstance information about the violent death incident is captured from the narratives available on the coroner/medical examiner reports and police reports. Information about suspects, as well as details about the relationship between the victims and suspects, are also collected when available[1]. Information about weapons used to produce fatal injuries is also collected and includes: firearms, sharp instruments, blunt instruments, hanging/strangulation/suffocation, poisoning, personal weapons (e.g., fists), fall, drowning, fire or burns, shaking (e.g., shaken baby syndrome), motor or transport vehicle, intentional neglect (e.g., starving a baby), and other[1].

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Prolonged Outbreak of Invasive Group A Streptococcus Infections in a Skilled Nursing Facility

Lauren Lorentzson, MPH and Matthew Crist, MD, MPH

Between June and August of 2009, three cases of invasive Group A *Streptococcus* (iGAS) infection among residents of a skilled nursing facility (SNF-A) in Clayton County were reported to the Georgia Department of Public Health (DPH). At that time, DPH performed on-site medical chart reviews, recommended additional iGAS surveillance, and provided education about infection prevention. No additional cases of iGAS were identified during the site visit, and for 16 months no further iGAS cases were reported from the facility. However, between December 2010 and October 2011, eight incidents of iGAS resulting in hospitalization were reported among six residents of SNF-A. Of these eleven total invasive cases among eight individuals, all were hospitalized and four died. All iGAS isolates were characterized as type emm11, reported to be found in only 1.5-3% of all GAS pharyngeal isolates,[1] and had the same unusual pattern of antimicrobial resistance to erythromycin and tetracycline, indicating that the outbreak was due to continued circulation of one strain of GAS.

In November 2011, DPH requested an Epi-Aid from the Centers for Disease Control and Prevention (CDC) to assist with the outbreak investigation. Goals of the investigation included: 1) identification of additional invasive and non-invasive cases; 2) assessment of GAS carriage by performing throat and wound cultures on residents and staff; 3) identification of risk factors for GAS infection through a case-control study; and 4) identification of breaches in infection control practices.

During this investigation, we retrospectively identified seven additional non-invasive GAS infections among five residents of SNF-A through review of GAS-positive cultures from the two major referral hospitals serving SNF-A. Most of these cases occurred between October 2009 and September 2010, indicating continuous circulation of GAS in the facility (Figure 1). By the conclusion of the investigation, a total of 18 GAS cases had been identified between June 2009 and October 2011 among 13 residents of SNF-A; 7 were non-invasive, 11 were invasive, and 5 were recurrent infections.

To assess GAS carriage in SNF-A, 189/221 (86%) residents had oro-pharyngeal (OP) swabs performed for culture and 15/16 residents with wounds had their wounds swabbed. Among SNF-A staff, 164/204 (80%) had OP swabs. One staff member was GAS-positive, though not type emm11, and three residents (1 wound, 2 OP) cultured GAS positive, all emm11. These four carriers were treated with oral clindamycin simultaneously.

To assess risk factors for GAS infection among residents, a case-control study was performed which matched each invasive and non-invasive GAS case to three resident controls for chart abstraction. Controls were matched on residence at the facility within 30 days prior to a case's positive culture date. Conditional logistic regression showed GAS infection was associated with having a non-surgical wound (Odds Ratio [OR] 9.6, 95% Confidence Interval [CI] 2.8-35.3), being bedbound (OR 13.5, 95% CI 2.9-62.5), living on the east wing (OR 3.9, 95% CI 1.2-12.4), and having an indwelling central line or urinary catheter (OR 5.9, 95% CI 1.6-22.2). Sex, race, body mass index, surgery in previous month, physical therapy, diabetes, hypertension, and dialysis were not significantly associated with GAS infection (Table 1).

Figure 1. Invasive and Non-invasive GAS Infections by Culture Date, SNF-A, Georgia, 2009-2011

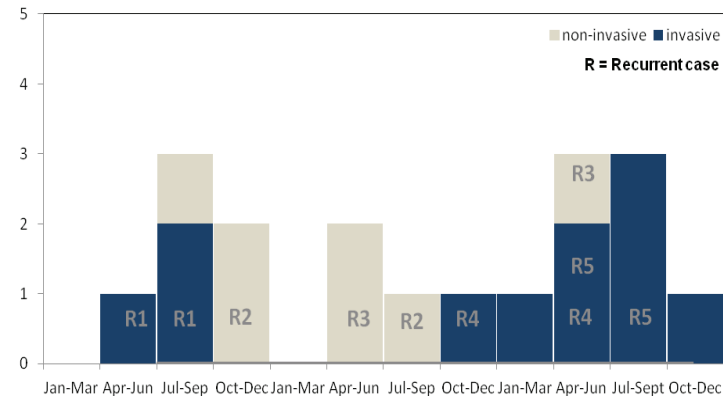

Table 1. Risk Factors for GAS Infection among Residents of SNF-A, Georgia, 2009-2011

Risk Factor	Odds Ratio (OR)	Confidence Interval (CI)
Non-surgical wound	**9.6**	**(2.8-35.3)**
Being bedbound	**13.5**	**(2.9-62.5)**
Indwelling line or catheter	**5.9**	**(1.6-22.2)**
Living on the east wing	**3.9**	**(1.2-12.4)**
Dialysis	3	(0.6- 14.9)
Resident>1 yr	2.6	(0.8- 8.0)
Incontinent	1.2	(0.3- 4.5)

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Violent Deaths in Georgia, 2006-2009: Results from the GVDRS (continued from page 2)

This study includes all violent deaths that occurred in Georgia from 2006 to 2009. Age-adjusted and crude violent death rates, as well as 95% Confidence Intervals (CI) were analyzed by sex, race, state, county of residence, and by rural-urban continuum code using SAS 9.3 software[5]; age-specific violent death rates were analyzed by sex. Race analysis included only black and white; other races and ethnicities were excluded because of insufficient data. Maps were created to illustrate violent death rates by rural-urban continuum codes using ArcGIS Desktop 10.0 [6,7]. Additional analysis was performed to study the frequency of violent deaths by city of injury, manner of death, circumstances, weapons used, and place of injury. Results were compared to the NVDRS database using CDC's WISQARS™ [3].

Results

A total of 8,080 violent deaths were reported to the GVDRS from 2006 to 2009, an average of 2,020 per year. More than half of all violent deaths were due to suicide (51%), followed by homicide (36%), undetermined intent (11.5%), unintentional firearm (1%), and legal intervention deaths (0.3%). Georgia's overall age-adjusted violent death rate increased by 5% from 2006 to 2009; the age-adjusted violent death rate for the combined years was 20 per 100,000 population. Males (32/100,000) were three times more likely than females (10/100,000) to die from a violence-related injury. Black males (36/100,000) had the highest age-adjusted violent death rate when compared to white males, white females, and black females. Persons 45-54 years of age had the highest age-specific violent death rate (26/100,000). The age-adjusted homicide rate was higher for Georgia (7/100,000) than for all NVDRS states combined (5/100,000), while the age-adjusted suicide rate was lower for Georgia (10/100,000 vs 12/100,000). Ninety-five percent of violent death victims were residents of Georgia and died in their county of residence, while 47% of violent deaths occurred at the victim's own home. Metro areas with 250,000 to 999,999 population had the highest age-adjusted violent death rate (21.5/100,000 population, Confidence Interval (CI) 20.1-22.9) when compared to other geographic areas in Georgia (Figure 1). In contrast, rural areas had the highest age-adjusted suicide rate (11/100,000 population, CI 10.1-11.3) while Metro areas with 250,000-999,999 population had the highest age-adjusted homicide rate (7.7/100,000 population, CI 6.9-8.6) (Figure 2 and Figure 3).

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Figure 1. Age-Adjusted Violent Death Rates by Rural-Urban Status*, Georgia, 2006-2009

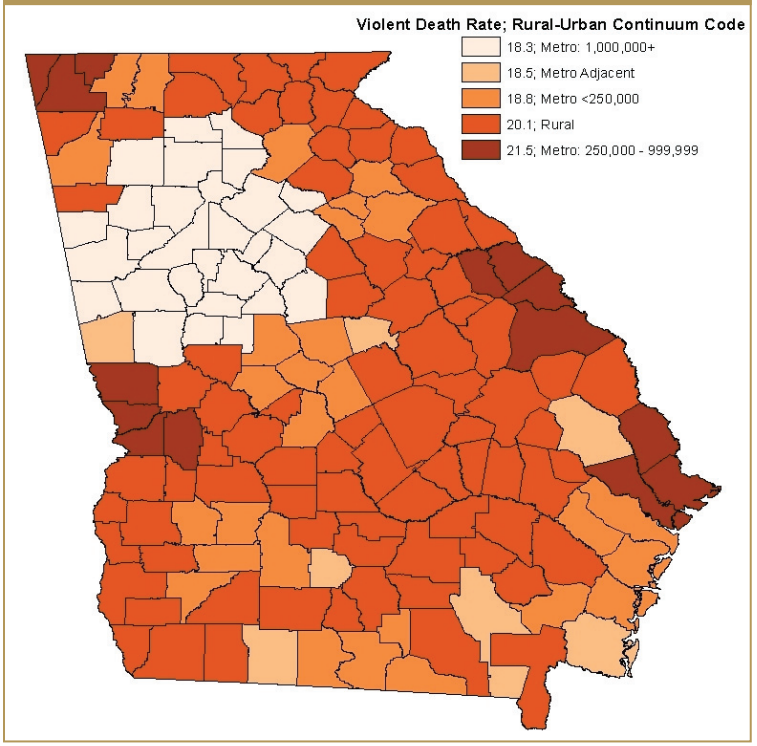


Figure 2. Age-Adjusted Suicide Rates by Rural-Urban Status*, Georgia, 2006-2009

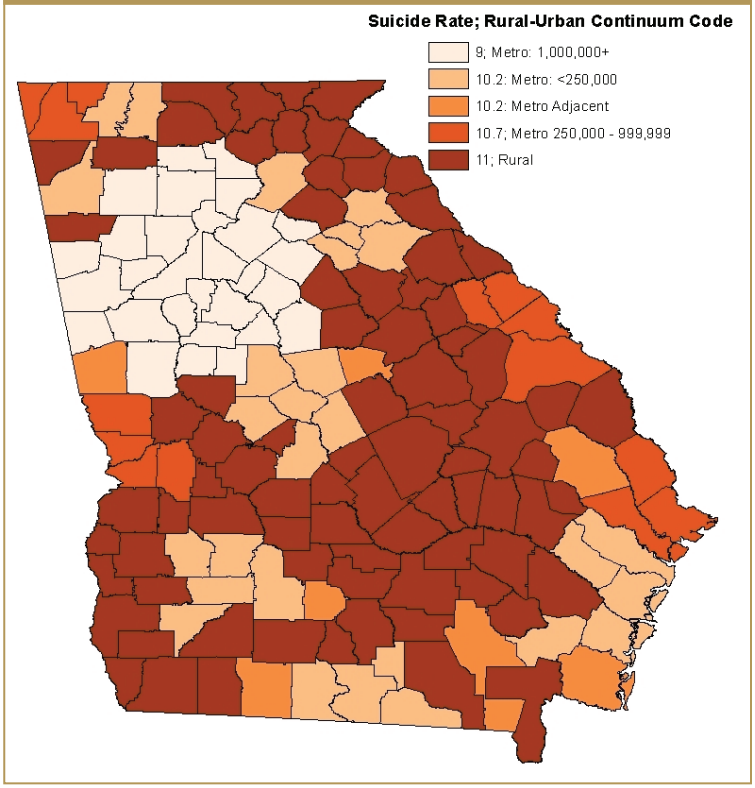
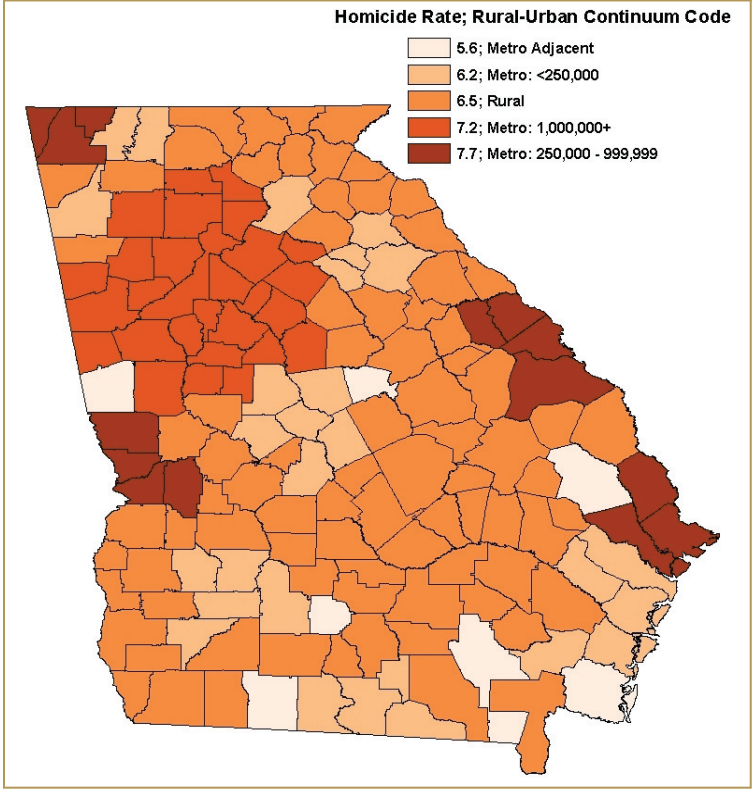


Figure 3. Age-Adjusted Homicide Rates by Rural-Urban Status*, Georgia, 2006-2009



Source: Georgia Violent Death Reporting System (2006-2009)

*Rural-Urban Status established using Rural-Urban Continuum Codes[7]

Circumstances were known for 57% of all violent deaths and among these, having a current mental health problem (21%), intimate partner problem (19%), and a crisis in the past two weeks (15%) were among the top circumstances. The most common homicide circumstances included argument, abuse, or conflict (35%), precipitated by another crime (30%), and intimate partner violence-related (17%). The most common suicide circumstances included having a current mental health problem (34%), intimate partner violence (27%), and crisis in the past two weeks (25%). The most frequently used weapons for all violent deaths were firearms (62%), followed by hanging/strangulation/suffocation (12%).

Discussion

Georgia's age-adjusted violent death rate (20/100,000) was similar to that for all NVDRS states combined (19.7/100,000)[3]. However, Georgia's age-adjusted homicide rate was 35% higher, while the age-adjusted suicide rate was 10% lower than for all NVDRS states combined[3]. Similar to the combined NVDRS states, overall, persons 45-54 years of age had the highest age-specific violent death rate; males were more likely than females to be victims of violent deaths. Additionally, black males were more likely to become victims of violent deaths than their white counterparts and black females[3]. The majority of the victims were Georgia residents that died in their counties of residence. The city of Atlanta and Fulton County had the highest frequency of violent deaths. Among counties with more than 50 violent deaths, Glynn County (27.3/100,000, CI 21.2-33.3) and Bibb County (27.1/100,000, CI 23.0-31.3) had the highest age-adjusted violent death rates. Metro areas with 250,000-999,999 population had the highest age-adjusted violent death rates. These areas include Northwest (Dade, Walker, and Catoosa counties), West Central (Chattahoochee, Muscogee, Marion, and Harris counties), East Central (Burke, Richmond, Columbia, and McDuffie counties), and Coastal (Effingham, Chatham, and Bryan counties). Additionally, homicide rates were most prevalent in metro areas with 250,000-999,999 population, which may explain the high age-adjusted violent death rate in these areas (Figure 2); in contrast, suicides rates were most prevalent in rural areas (Figure 3).

Overall, firearms were the weapons most commonly used in all violent deaths. The second most commonly used weapon to commit suicide was hanging/strangulation/suffocation, while sharp instruments were the second most common choice for homicides.

Conclusion

Violent deaths are an increasing public health concern in Georgia. To improve our understanding of violent death, more efforts should be made to collect additional information on circumstances surrounding each case. The quality of the surveillance data can be enhanced by developing new relationships with data providers that may offer complementary data, as well as increasing contact and training of data providers to accurately capture and document crucial information on violent death incidents. Relationships between public health and the research community are essential for understanding the causes of violence and for implementing successful violence prevention programs in Georgia. GVDRS must continue to analyze data and disseminate reports to organizations in Georgia that address violence prevention.

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Prolonged Outbreak of Invasive Group A Streptococcus Infections in a Skilled Nursing Facility (continued from page 3)

An infection control investigation was performed by a certified infection preventionist. Hand hygiene observations noted only four hand hygiene events in twenty opportunities (20%). All opportunities for hand hygiene during wound care (100%) were observed. Alcohol-based hand sanitizer was not available in some halls or patient rooms. There had been frequent turnover in wound care and infection control personnel during 2009-2011. Recommendations included: 1) increasing availability of alcohol-based hand gel; 2) performing hand hygiene observations and education; 3) culturing sore throats and wounds for GAS; 4) instituting a revised leave policy; and 5) use of an inter-facility infection control transfer form when receiving a resident from a hospital so that SNF-A would be made aware of hospitalized residents' diagnoses and treatment needs upon return to the facility. Improved inter-facility communication regarding GAS infections may prevent additional transmission.

In summary, DPH and CDC staff investigated a prolonged Group A *Streptococcus* outbreak in a skilled nursing facility. Eighteen cases (7 non-invasive and 11 invasive infections) were identified; five cases had recurrent infections. The high case fatality and recurrence rate, as well as identical molecular characterization, raised concern about sustained transmission within the facility. Improved hand hygiene, improved communication with referral hospitals, and heightened surveillance with swab cultures were recommended to eradicate circulation of the bacteria.

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Acknowledgements: Kathleen Dooling, CDC; Duc Nguyen, CDC; Chris van Beneden, CDC; Nimalie Stone, CDC; Jennifer Bass, CDC; Karrie-Ann Toews, CDC; Teresa Fox, DPH; Ola Adewale, DPH; Lynett Poventud, GPHL; Mahin Park, GPHL; Bernard Beall, CDC, Cherie Drenzek, DPH

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Information Regarding Influenza A Variant Virus (H3N2v) Infections

Delmar Little, MPH

Influenza A viruses commonly circulate in swine and, when genetic material from avian or human influenza A viruses combine with swine flu viruses, new recombinant influenza viruses can sporadically infect humans. These viruses are called "variant" viruses (which can also be denoted with the letter "v"). In 2011, a new influenza A virus (H3N2v) was detected in both swine and humans; this virus had acquired the M gene from the influenza A pdm09 (2009 H1N1) virus. In addition, during the summer of 2012, outbreaks of human infections with H3N2v have occurred in multiple states. The Georgia Department of Public Health (DPH) is conducting ongoing enhanced surveillance for H3N2v infections.

Nationally, to date, most human infections with H3N2v have occurred among children who were exhibiting or helping to exhibit pigs at fairs this season and had close and prolonged contact with pigs. Cases of human H3N2v infection have been associated with: 1) exposure to swine (e.g., direct contact or close contact, such as walking in a barn with sick pigs); and 2) exposure to individual(s) with swine contact. Although limited human-to-human transmission of the H3N2v virus has occurred, sustained and efficient community transmission of H3N2v virus has not been reported.

To date, most persons infected with H3N2v have experienced mild symptoms similar to seasonal flu, although serious illness resulting in hospitalization and death is possible. People at high risk of serious complications from H3N2v include children younger than 5 years; people with certain chronic conditions like asthma, diabetes, heart disease, and weakened immune systems; pregnant women; and people 65 years and older. These individuals should consider avoiding exposure to pigs and swine barns this season.

As this situation evolves, it will be important to stay informed. For more information regarding the H3N2v virus as well as guidance for clinicians regarding the prevention, diagnosis, treatment and reporting of human infections with H3N2v virus, please visit http://www.cdc.gov/flu/swineflu/h3n2v-outbreak.htm

For information specific to Georgia, or if you suspect H3N2v infection, please contact Delmar Little, Respiratory Disease Surveillance Coordinator for DPH, at delittle@dhr.state.ga.us

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