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Outbreak of Influenza A(H3N2) Variant Virus Infections Among Persons Attending Agricultural Fairs Housing Infected Swine — Michigan and Ohio, July–August 2016

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On August 3, 2016, the Ohio Department of Health Laboratory reported to CDC that a respiratory specimen collected on July 28 from a male aged 13 years who attended an agricultural fair in Ohio during July 22–29, 2016, and subsequently developed a respiratory illness, tested positive by real-time reverse transcription–polymerase chain reaction (rRT-PCR) for influenza A(H3N2) variant* (H3N2v). The respiratory specimen was collected as part of routine influenza surveillance activities. The next day, CDC was notified of a child aged 9 years who was a swine exhibitor at an agricultural fair in Michigan who became ill on July 29, 2016, and tested positive for H3N2v virus at the Michigan Department of Health and Human Services Laboratory. Investigations by Michigan and Ohio health authorities identified 18 human infections linked to swine exhibits at agricultural fairs. To minimize transmission of influenza viruses from infected swine to visitors, agricultural fair organizers should consider prevention measures such as shortening the time swine are on the fairgrounds, isolating ill swine, maintaining a veterinarian on call, providing handwashing stations, and prohibiting food and beverages in animal barns. Persons at high risk for influenza-associated complications should be discouraged from entering swine barns.

*Influenza viruses that normally circulate in swine are referred to as "variant" when they infect humans. Seasonal influenza A(H3N2) viruses that circulate worldwide in the human population have substantial antigenic and genetic differences from influenza A(H3N2) viruses circulating in swine (http://www.who.int/influenza/gisrs_laboratory/terminology_variant/en/).

Epidemiologic Investigation

Novel influenza viruses are different from currently circulating human influenza H1 and H3 viruses and have the potential to cause a pandemic if the virus is efficiently transmitted from person to person. In the United States, human infection with a novel influenza A virus is nationally notifiable, and globally, it is a reportable event under International Health Regulations 2005 (*1*); all such infections identified in the United States are investigated and reported to CDC. In early July 2016, before the identification of H3N2v virus infections described in this report, CDC reminded public health and laboratory

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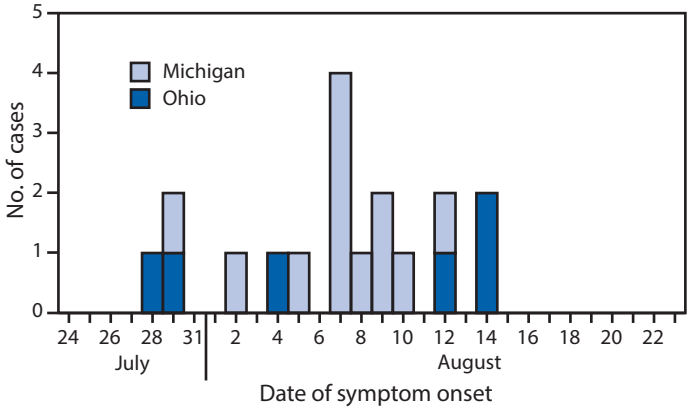
partners nationwide to collect and test respiratory specimens from patients with influenza-like illness and swine exposure.

After the initial identification of the H3N2v virus infections, the Michigan Department of Health and Human Services and the Ohio Department of Health encouraged enhanced surveillance and increased collection and rRT-PCR testing of respiratory specimens from patients with illness and swine exposure or agricultural fair attendance. Specimens from swine at fairs in both states were tested for influenza by The Ohio State University in collaboration with the St. Jude Center of Excellence for Influenza Research and Surveillance and the United States Department of Agriculture-Animal and Plant Health Inspection Service-Veterinary Services, National Veterinary Services Laboratories, Influenza A Virus in Swine Surveillance Program.

During August 3–25, 2016, a total of 18 human infections with H3N2v virus (12 from Michigan and six from Ohio) were confirmed and reported to CDC (Figure). All of the clinical specimens were sent to CDC for verification and further virus characterization. Sixteen of the ill persons were aged <18 years, including seven aged <5 years. All 18 persons reported exposure to swine during attendance at one or more of seven agricultural fairs (three in Michigan and four in Ohio); no ill person reported contact with another known infected person, and no person-to-person transmission was identified. Thirteen persons reported direct contact with swine (touching or handling), including four children aged <18 years who exhibited swine as part of a youth agriculture club. Four of the five persons who did not report direct swine contact reported passing through a swine barn; the fifth person was a fair attendee with unspecified indirect contact with swine. Specimens obtained from swine from all seven fairs tested positive for influenza A(H3N2) virus. Eight of the 18 ill persons were at high risk for influenza-associated complications because of the presence of an underlying medical condition or because of their young age (*2*). One person, who had an underlying condition, was hospitalized for 2 days. All persons fully recovered. Six ill persons were treated with an influenza antiviral medication. Among the 17 persons with known vaccination history, three had received a seasonal influenza vaccination in the preceding 12 months.

FIGURE. Influenza A(H3N2) variant virus infections (N = 18), by date of symptom onset — Michigan and Ohio, July–August 2016



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Laboratory Investigation

CDC performed genomic sequence analysis on all 18 specimens from infected humans; two different H3N2v viruses were identified. Among the 18 variant viruses detected in persons, 16 were reassortants, with a constellation of genes not previously detected in viruses infecting humans. Whereas these viruses contained seven gene segments similar to segments detected in previously reported variant virus outbreaks, one gene segment coding for an influenza A(H3) hemagglutinin (HA) gene was determined to be similar to HA genes found in human seasonal influenza A(H3N2) viruses from 2010 and 2011. This HA gene was likely introduced from humans into swine in 2010 or 2011, and has since circulated and evolved in swine to be genetically and antigenically different from both previous and currently circulating human seasonal influenza A(H3N2) viruses (*3*). The viruses in the remaining two specimens had HA genes similar to those of swine-origin H3N2 influenza viruses circulating in the U.S. swine population since 1998, and previously identified in human H3N2v virus infections in the United States since 2009 (*4*,*5*). Preliminary analysis suggests that the viruses identified in all human specimens were nearly identical to H3N2 viruses detected in swine at agricultural fairs in Michigan and Ohio. With the exception of one virus isolated from a human specimen, H3N2 viruses found in human cases were genetically related to specimens from swine at the same fairs attended by the infected persons.

All fully sequenced viruses from human infections had the matrix (M) gene from the influenza A(H1N1)pdm09 virus, which has been seen in H3N2v outbreaks since 2011 and has been found to enhance transmissibility in several animal models (*6*,*7*) and confer resistance to adamantine antiviral drugs (amantadine and rimantadine). Four H3N2v viruses were tested and were susceptible to neuraminidase inhibitors (oseltamivir, peramivir, and zanamivir).

Discussion

Including the infections described in this report, 372 H3N2v virus infections have been reported in the United States since human infections with novel influenza A viruses became notifiable in 2005 (*8*); this report describes all reported H3N2v virus infections in the United States since January 1, 2016. This outbreak underscores the importance of implementing measures to minimize influenza transmission between swine and persons at agricultural fairs. Young persons who exhibit or have other direct contact with swine should know how to protect themselves from infection, as most infections in this and previous outbreaks have been in persons aged <18 years who had direct contact with swine (*5*). Transmission is possible, though less common, without direct swine contact. In this outbreak, five of the 18 infections occurred in persons who did not report direct contact with swine. Messaging about variant influenza virus transmission risk and prevention, particularly among young persons and persons at increased risk for influenza-associated complications (children aged <5 years, persons aged ≥65 years, pregnant women, and persons with certain health conditions) (*2*), should be provided to all agricultural fair organizers and officials, fair attendees, and animal exhibitors. When planning for subsequent fair seasons, fair organizers should consider prevention measures such as shortening the time swine are on the fairgrounds to ≤72 hours (*9*), establishing a protocol to immediately isolate ill swine, maintaining a veterinarian on call for the duration of the swine exhibition, providing prominent handwashing stations in or near animal barns for exhibitors and attendees, and displaying signage that discourages or prohibits food and beverages in animal barns (*9*,*10*) and discourages persons at high risk for influenza-associated complications from entering swine barns.

Treatment with a neuraminidase inhibitor is recommended for persons with suspected variant virus infection who are hospitalized, who have severe or progressive illness, or who are in a group at high risk for influenza-associated complications. Treatment with these influenza antiviral drugs also can be considered for any previously healthy outpatient with confirmed or suspected H3N2v virus infection based on clinical judgment. Human seasonal influenza vaccine is not known to protect against commonly circulating swine-origin influenza viruses, but it can protect against seasonal influenza, which can circulate even during summer months when most fairs occur. An annual seasonal influenza vaccine, which is recommended for all persons aged ≥6 months, might help prevent future reassortment of H3N2v viruses with human seasonal influenza viruses.

Rapid detection and reporting of human infections with novel influenza A viruses are important to facilitate prompt identification and characterization of influenza A viruses with pandemic potential and to accelerate the implementation of an effective public health response. Most persons in this outbreak were infected with an influenza virus genotype not previously detected in humans. Although person-to-person spread was not identified, ongoing investigations to monitor for genetic changes in the virus and to detect person-to-person transmission continue to be necessary. Health care providers should consider novel influenza virus infections in ill persons with swine exposure or agricultural fair attendance and consult with their state public health department about further testing, regardless of the results of rapid influenza diagnostic tests (which can have poor sensitivity for variant viruses), based on CDC's interim guidance for clinicians.[†] All clinical specimens that are suspected to contain novel influenza A viruses should be sent by state public health laboratories to CDC for additional characterization and verification of results. Additional information about variant influenza viruses is available at http://www.cdc.gov/flu/swineflu/h3n2v-cases.htm.

[†] http://www.cdc.gov/flu/swineflu/interim-guidance-variant-flu.htm.

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Summary

What is already known about this topic?

Sporadic human infections and outbreaks with influenza viruses that normally circulate in swine have occurred in the past. The largest known outbreak of H3N2v virus infections occurred in 2012.

What is added by this report?

In August 2016, 18 laboratory-confirmed infections with H3N2v virus were reported among persons who had attended agricultural fairs in Michigan and Ohio. Sixteen of the 18 cases occurred in persons who were infected with a reassortant H3N2v virus that contained a hemagglutinin (HA) gene previously not detected in variant viruses. The HA gene was likely introduced from humans into swine in 2010 or 2011, and viruses with this gene have circulated and evolved in swine to be genetically and antigenically different from both previous and currently circulating human seasonal influenza A(H3N2) viruses.

What are the implications for public health practice?

To minimize transmission of influenza viruses from swine to humans and from humans to swine, agricultural fair organizers should consider measures such as shortening the time swine are on the fairgrounds to ≤72 hours, immediately isolating ill swine, maintaining a veterinarian on call for the duration of the swine exhibition, providing prominent handwashing stations, and prohibiting food and beverages in animal barns. Persons at high risk for influenza-associated complications should be discouraged from entering swine barns.

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Preparedness for Zika Virus Disease — New York City, 2016

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The rapid spread of Zika virus across the World Health Organization's Region of the Americas has had a direct effect on the U.S. health care delivery system. Hospitals in New York City (NYC) have been implementing prevention and response efforts consistent with CDC guidance. As of September 21, 2016, a total of 715 cases of laboratory-confirmed Zika virus disease had been diagnosed in New York state among travelers who returned from affected areas, their sexual contacts, or infants infected in utero. This represents the highest number of reported cases in any state to date, and underscores the importance of health care systems preparing to care for patients with possible Zika virus disease (*1*). Building upon a framework that was established in 2014 to screen patients for possible exposure to Ebola virus disease (Ebola), NYC Health + Hospitals,* the largest municipal health care delivery system in the United States, implemented a Zika Preparedness and Response Action Plan† (Zika Action Plan) to address the threat from Zika and ensure appropriate patient care. The plan developed by NYC Health + Hospitals includes universal travel screening, signage depicting areas with active Zika virus transmission, clinical and epidemiologic evaluation for possible Zika virus exposure, diagnostic testing for Zika virus infection and linking of infected patients to appropriate specialists, and education on Zika virus disease and preventive measures (e.g., avoiding travel to areas with active Zika virus transmission).

NYC Health + Hospitals operates an integrated health care system that includes 11 acute care hospitals, six of which are regional trauma centers, six long-term care centers, numerous community-based health centers, a correctional health services unit, and a home care agency. The 42,000 staff members of NYC Health + Hospitals serve a population of approximately 1.2 million; the obstetrical units perform >18,000 deliveries each year.§ To prepare for and manage the Zika virus threat, NYC Health + Hospitals built its Zika Action Plan from a framework established during the 2014 Ebola outbreak. The Zika Action Plan is closely coordinated internally with its integrated system of hospitals and externally with the New York City Department of Health and Mental Hygiene (DOHMH) and the New York State Department of Health. Existing general protocols, such as universal screening for recent travel and exposure to communicable diseases, were augmented to include surveillance information about areas with local transmission of Zika virus to enhance early recognition and management of persons with Zika virus infection. The Zika Action Plan, which details the criteria for testing and reporting of Zika virus disease, includes Zika virus screening algorithms for pregnant and nonpregnant females, adult males, children, and newborns, and is based on guidance from CDC and DOHMH practices. Objectives of the Zika Action Plan include rapidly identifying patients at risk for Zika virus infection, offering testing, and providing all necessary care and counseling to persons with confirmed or probable Zika virus infection (*2*–*4*). The Zika Action Plan has been distributed across the NYC Health + Hospitals system of hospitals and ambulatory care centers and placed on the system's internal intranet site for easy access.

Initial screening for possible Zika virus infection at all points of entry into NYC Health + Hospitals emergency departments, ambulatory units, and obstetrical settings includes signage that depicts areas with active Zika virus transmission. The signage is continually updated based on CDC guidance, and as new countries are added to the list of those with active transmission. A Zika-specific job aid (Figure 1) prompts personnel at the point of entry with a set of initial screening questions regarding travel history of the patient and the patient's sexual contacts and any signs or symptoms compatible with Zika virus disease. Although local mosquito-borne transmission of Zika virus has not been documented, NYC Health + Hospitals personnel are encouraged to be vigilant for patients with Zika-compatible symptoms even in the absence of travel or sexual exposure risk (*5*). The Zika-specific job aid also references the NYC Health + Hospitals Zika Virus Pregnancy Screening Protocol (Figure 2). If a patient is pregnant, the greeter is prompted to refer her to the pregnancy screening protocol immediately for next steps.

The Zika Action Plan instructs clinicians to test for Zika virus disease after identifying a patient meeting the CDC case definition for suspected Zika virus disease¶ (*6*). Information is solicited about travel to an area with ongoing Zika virus transmission or sexual contact with a person who traveled from such an area; receipt of blood, blood products, or an organ transplant within 30 days of symptom onset; and other potential epidemiologic links to a confirmed or probable case of Zika virus disease, including suspected mosquito-borne transmission and

* http://www.nychealthandhospitals.org/hhc/html/home/home.shtml.

† The Zika Action Plan is based on guidance from CDC, the New York City Department of Health and Mental Hygiene, and the New York State Department of Health.

§ New York City Health + Hospitals. 2015. Internal Systems Report.

¶ A person with one or more signs/symptoms of fever, maculopapular rash, arthralgia, conjunctivitis, complication of pregnancy, or Guillain-Barré syndrome not known to be associated with another diagnosed etiology.

FIGURE 1. Zika-specific job aid that prompts health care providers with a set of initial screening questions — NYC Health + Hospitals, 2016

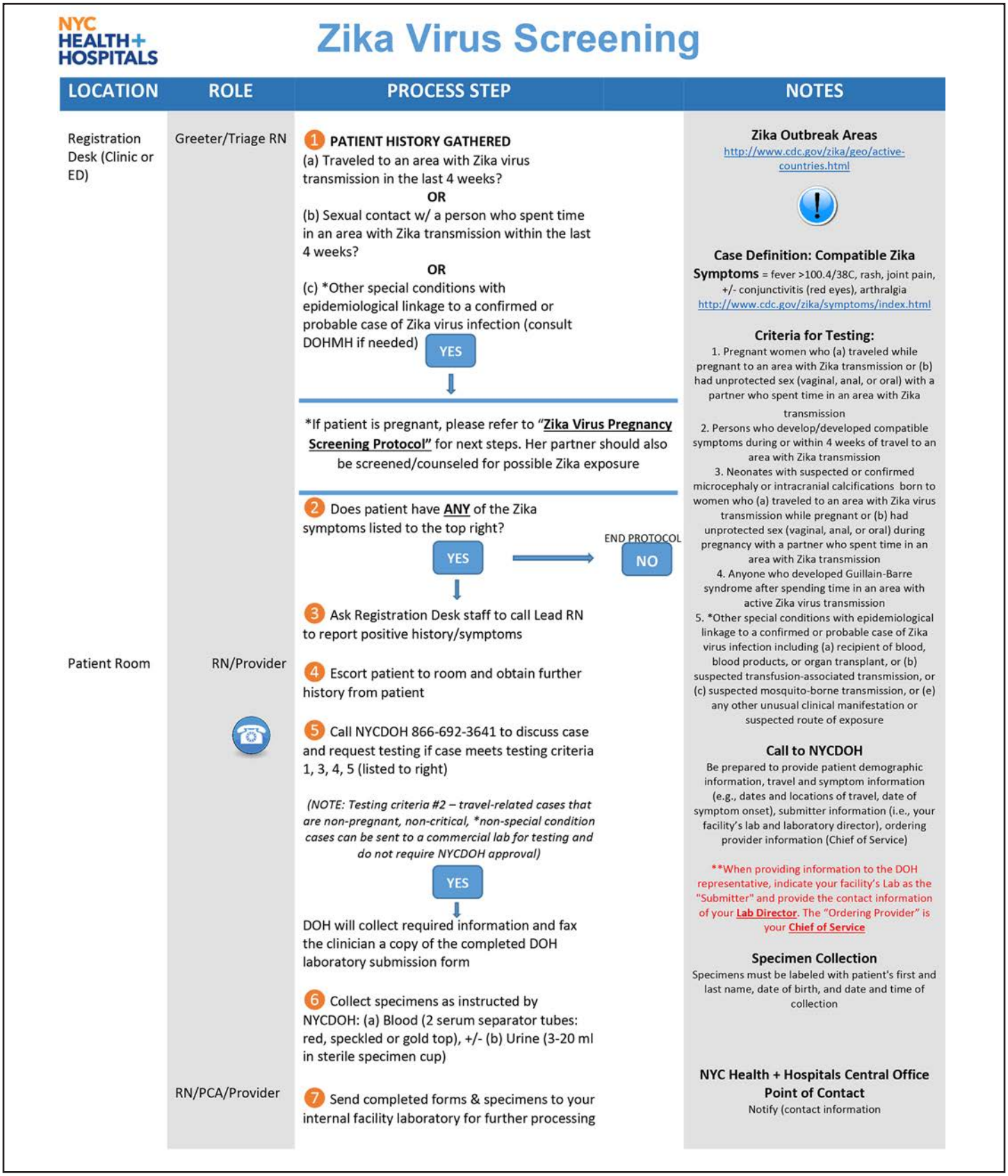
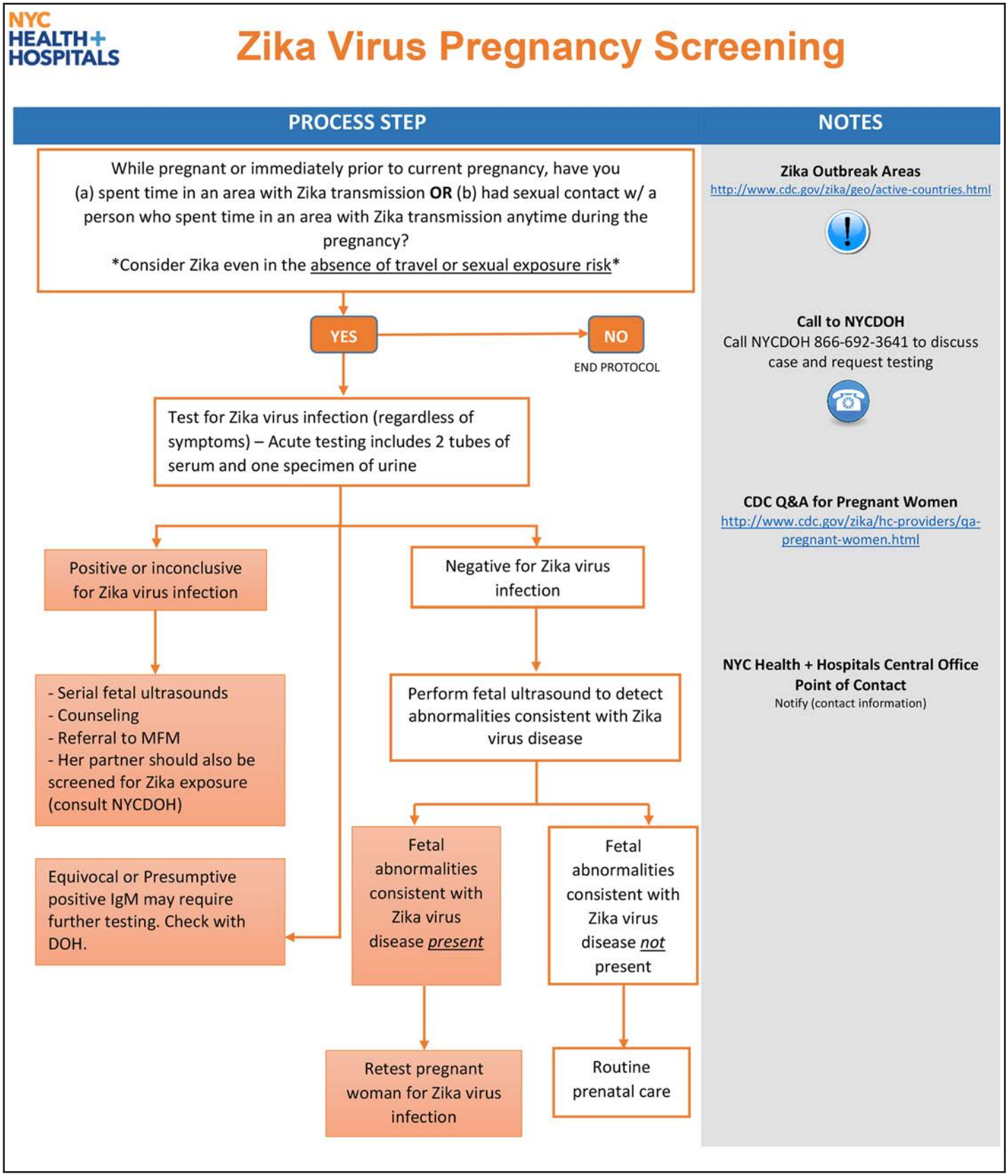


FIGURE 2. Zika-specific job aid that references Zika virus pregnancy screening protocol — NYC Health + Hospitals, 2016



Summary

What is already known about this topic?

The state of New York has reported the highest number of Zika virus disease cases in the continental United States, with 715 cases reported as of September 21, 2016, underscoring the importance of the health care system to be prepared to care for patients with possible Zika virus disease.

What is added by this report?

NYC Health + Hospitals created a Zika Preparedness and Response Action Plan by building upon the framework established in 2014 to screen patients for possible exposure to Ebola virus disease. The Zika plan includes universal screening for travel-associated Zika virus exposure, signage and maps depicting areas with active Zika virus transmission, laboratory services, and timely linking of infected patients to appropriate care.

What are the implications for public health practice?

A robust emergency preparedness and response program can help health care systems limit the effects of Zika virus and ensure appropriate screening, diagnosis, and care. Potentially effective strategies include modification of established and tested protocols, offering ongoing health care provider education, and close collaboration with state and local health departments for Zika guidance and support.

any other unusual clinical manifestation or suspected route of exposure (*6*,*7*). Laboratory testing, if indicated, can be performed at DOHMH or at a specified commercial laboratory. Patient specimens from travel-associated cases of suspected Zika virus infection are sent to the commercial laboratory for testing and do not require the clinician to call DOHMH. Clinicians are instructed to call DOHMH for testing in all nontravel-associated cases of suspected Zika virus disease.

The NYC Health + Hospitals electronic health system also has built-in algorithms to prompt for Zika virus testing if relevant travel history and pregnancy status is entered. The laboratory management section of NYC Health + Hospitals Zika Action Plan discusses consideration of obtaining laboratory studies for alternative diagnoses, including chikungunya and dengue virus infection, when appropriate and consistent with current guidance (*8*). Nonpregnant patients with possible Zika virus exposure who do not meet clinical criteria for Zika virus testing (i.e., lack symptoms of Zika virus infection) are offered counseling to limit potential spread of Zika virus.

Zika preparedness and response efforts of NYC Health + Hospitals include hosting a series of internal, system-wide electronic town hall meetings. These events are open to all 42,000 staff members of NYC Health + Hospitals. A Zika-specific e-mail address also has been created for staff members to submit ongoing Zika-related questions or concerns. This Zika-specific e-mail address is monitored continually by NYC Health + Hospitals, Emergency Management, and questions are answered within 24 hours by clinical leaders. To assess staff competency and appropriate screening and identification of suspected cases of Zika virus infection, NYC Health + Hospitals, Simulation Center and Emergency Management is conducting a series of no-notice simulation exercises at each of the system's prenatal clinics. Scenarios include a pregnant woman and accompanying partner with Zika-compatible risk factors. The goal of these exercises is to assess each clinic's ability to screen for, identify, offer testing for, and provide education on Zika virus infection, including modes of transmission and ways to prevent the spread of Zika virus, and then provide corrective actions as necessary when deficiencies are identified (e.g., directing the prenatal clinic leadership to the NYC Health + Hospitals Zika intranet page for the most up-to-date Zika guidance and information).

During April–July 2016, a total of 729 patients from NYC Health + Hospitals were tested for possible Zika virus infection.** Testing for Zika virus infection increased substantially over the 4-month period, with 29 tests in April, 69 in May, 314 in June, and 317 in July. Since mid-July, NYC Health + Hospitals has been sending specimens from nonpregnant persons with noncritical, travel-related cases of potential Zika virus infection to a commercial laboratory for testing. All other specimens for Zika virus testing are sent to DOHMH.

As the number of laboratory-confirmed Zika virus disease cases continues to rise, health care systems should be vigilant and prepared to address this public health concern. Close collaboration with state and city health departments will play a critical role. The program implemented by NYC Health + Hospitals can serve as a guide for other health care systems to screen patients and offer Zika virus testing, and to link patients with laboratory-confirmed infection to appropriate care.

** New York City Health + Hospitals. 2016. Internal Zika weekly statistic report.

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Prevalence of Inflammatory Bowel Disease Among Adults Aged ≥18 Years — United States, 2015

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Crohn's disease and ulcerative colitis, collectively known as inflammatory bowel disease (IBD), are characterized by chronic inflammation of the gastrointestinal tract (*1*). IBD has been associated with poor quality of life and extensive morbidity and often results in complications requiring hospitalizations and surgical procedures (*2–4*). Most previous studies of IBD have used administrative claims data or data collected from limited geographic areas to demonstrate increases in estimated prevalence of IBD within the United States (*5,6*). Few national prevalence estimates of IBD among adults based on large, nationally representative data sources exist, and those that do tend to be based on older data. For example, the most recent national study used 1999 National Health Interview Survey (NHIS) data and estimated that 1.8 million (0.9%) U.S. adults had IBD (*7*). To examine the prevalence of IBD among the civilian, noninstitutionalized U.S. adult population, data from the 2015 NHIS were analyzed. Overall, an estimated 3.1 million, or 1.3%, of U.S. adults have received a diagnosis of IBD. Within population subgroups, a higher prevalence of IBD was identified among adults aged ≥45 years, Hispanics, non-Hispanic whites, and adults with less than a high school level of education, not currently employed, born in the United States, living in poverty, or living in suburban areas. The use of a nationally representative data source such as the NHIS to estimate the prevalence of IBD overall and by population subgroups is important to understand the burden of IBD on the U.S. health care system.

NHIS is a household survey that provides nationally representative estimates on a broad range of health measures for the civilian, noninstitutionalized population. Data on IBD were collected in the Sample Adult Core component of the survey. In this component, the respondent (i.e., the sample adult) is randomly selected from among all adults aged ≥18 years in the family. A proxy respondent might respond for the sample adult if, because of health reasons, the sample adult is physically or mentally unable to respond themselves.* Respondents were identified as having a diagnosis of IBD if they responded affirmatively to the question, "Have you ever been told by a doctor or other health professional that you had Crohn's disease or ulcerative colitis?" The 2015 NHIS Sample Adult Core consisted of 33,672 adults and had a final response rate of 55.2%. Sociodemographic characteristics were collected in the NHIS Household Module and Family Core components of the survey.

The number of IBD cases and prevalence of IBD (with accompanying 95% confidence intervals) were estimated for the civilian, noninstitutionalized U.S. adult population overall and by various sociodemographic characteristics, including sex, age, race/ethnicity, education level, marital status, current employment status, nativity, health insurance coverage type (reported separately for adults aged <65 years and ≥65 years), poverty status (calculated using NHIS imputed income files), urbanicity, and region of residence. Comparisons among subgroups used age-adjusted estimates of IBD prevalence, which were calculated using the projected 2000 U.S. population as the standard population and four age groups: 18–24 years, 25–44 years, 45–64 years, and ≥65 years. All estimates meet the standards of reliability,† unless otherwise noted. Sampling weights were used for all estimates, and the complex sample design of the NHIS was accounted for by using SUDAAN 11.0 software for the analysis. For comparisons of prevalence between subgroups, statistical significance ($p<0.05$) was determined by two-tailed Z-tests. All reported differences between subgroups were statistically significant.

In 2015, an estimated 1.3% (1.2% age-adjusted) of U.S. adults (3.1 million) had ever received a diagnosis of IBD (Table). A higher percentage of adults aged 45–64 (1.5%) and ≥65 (1.7%) years had IBD compared with adults aged 18–24 (0.5%) and 25–44 (1.0%) years. Hispanics (1.2%) and non-Hispanic whites (1.4%) had a higher prevalence of IBD than did non-Hispanic blacks (0.5%). Adults with less than a high school level of education had a higher prevalence of IBD (1.7%) than did those with a bachelor's degree or higher (1.1%). Among adults not currently employed, 1.6% had ever received a diagnosis of IBD, compared with 1.2% of adults who were currently employed. Adults who were born in the United States had a higher prevalence of IBD (1.4%) than did adults who were not born in the United States (0.8%). Adults living in poverty (from families with incomes <100% of the federal

* 2015 National Health Interview Survey (NHIS) Public Use Data Release: Survey Description Document (ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NHIS/2015/srvydesc.pdf).

† The National Center for Health Statistics' standard for reliability is for an estimate to have a relative standard error <30.0%, where the relative standard error is calculated by dividing the standard error of an estimate by the estimate itself, then multiplying by 100.

TABLE. Prevalence of inflammatory bowel disease* among U.S. adults aged ≥18 years, by sociodemographic characteristics — National Health Interview Survey, 2015

Characteristic	Adults with IBD	
	Estimated no.†	Age-adjusted§ % (95% CI)
Total (crude)	**3,087,000**	**1.3 (1.13–1.44)**
Total (age-adjusted)	**3,087,000**	**1.2 (1.09–1.40)**
Sex		
Men	1,315,000	1.1 (0.91–1.33)
Women	1,772,000	1.4 (1.16–1.59)
Age group (yrs)		
18–24	153,000	0.5¶ (0.28–0.93)
25–44	865,000	1.0 (0.83–1.31)
45–64	1,265,000	1.5 (1.25–1.86)
≥65	805,000	1.7 (1.40–2.15)
Race/ethnicity		
Hispanic	395,000	1.2 (0.82–1.64)
Non-Hispanic white	2,345,000	1.4 (1.23–1.64)
Non-Hispanic black	156,000	0.5 (0.36–0.77)
Non-Hispanic other**	190,000	1.0 (0.59–1.74)
Education level		
Less than high school	516,000	1.7 (1.24–2.41)
High school diploma/GED	773,000	1.3 (0.98–1.60)
Some college	945,000	1.3 (1.03–1.60)
Bachelor's degree or more	850,000	1.1 (0.84–1.33)
Current marital status		
Never married	447,000	1.1 (0.82–1.59)
Married/Cohabitating	1,868,000	1.2 (1.00–1.39)
Divorced/Separated	493,000	1.6 (1.17–2.13)
Widowed	279,000	—¶
Current employment		
Yes	1,528,000	1.2 (0.95–1.42)
No	1,559,000	1.6 (1.33–2.00)
U.S.-born		
Yes	2,719,000	1.4 (1.18–1.53)
No	369,000	0.8 (0.56–1.14)
Health insurance coverage††		
Age <65 years		
Private	1,441,000	1.0 (0.86–1.25)
Medicaid	348,000	1.4 (0.96–2.11)
Other	210,000	1.5 (0.99–2.36)
Uninsured	279,000	1.2 (0.76–1.83)
Age ≥65 years		
Private	425,000	1.9 (1.36–2.57)
Medicare and Medicaid	88,000	2.7 (1.54–4.78)
Medicare only	251,000	1.5 (1.03–2.30)
Other	41,000	1.1¶ (0.44–2.54)
Uninsured§§	NA	NA
Poverty status		
<100% FPL	496,000	1.8 (1.32–2.43)
100% to <200% FPL	552,000	1.2 (0.86–1.63)
200% to <400% FPL	945,000	1.3 (1.03–1.63)
≥400% FPL	1,095,000	1.1 (0.84–1.30)
Urbanicity		
MSA, central city	790,000	1.0 (0.77–1.25)
MSA, noncentral city	1,855,000	1.4 (1.20–1.67)
Not in MSA	442,000	1.2 (0.85–1.61)
Region		
Northeast	597,000	1.4 (1.08–1.90)
Midwest	682,000	1.2 (0.93–1.56)
South	1,183,000	1.3 (1.03–1.55)
West	625,000	1.1 (0.85–1.42)

Abbreviations: CI = confidence interval; FPL = federal poverty level; GED = General Educational Development high school equivalency diploma; IBD = inflammatory bowel disease; MSA = metropolitan statistical area; NA = not applicable.

* Respondents who had ever been told by a doctor or other health professional that they had Crohn's disease or ulcerative colitis.

† Estimated number rounded to 1,000s. Counts for adults of unknown status (i.e., responses coded as "refused," "don't know," or "not ascertained") with respect to IBD status are not shown separately in the table or included in the calculation of percentages (as part of either denominator or the numerator), to provide a more straightforward presentation of the data. In addition, frequencies presented in the table might be underestimated because of item nonresponse and unknowns.

§ Estimates are age-adjusted using the projected 2000 U.S. population as the standard population and four age groups: 18–24, 25–44, 45–64, and ≥65 years.

¶ Estimates are considered unreliable according to the standards of reliability. Estimates with a relative standard error (RSE) >30.0% and ≤50.0% are still shown, but should be used with caution. Estimates not shown have an RSE >50.0%.

** "Non-Hispanic other" includes non-Hispanic American Indian and Alaska Native only; non-Hispanic Asian only; non-Hispanic Native Hawaiian and Pacific Islander only; and non-Hispanic multiple race.

†† Based on a hierarchy of mutually exclusive categories. Adults with more than one type of health insurance were assigned to the first appropriate category in the hierarchy. "Uninsured" includes adults who had no coverage and those who had only Indian Health Service coverage or had only a private plan that paid for one type of service, such as accidents or dental care.

§§ In the survey sample, there were zero adults aged ≥65 years and uninsured who had ever been told by a doctor or other health professional that they had Crohn's disease or ulcerative colitis.

poverty level§) had a higher prevalence of IBD (1.8%) than did adults from families with incomes ≥400% of the federal poverty level (1.1%). Finally, adults living outside the central city of a metropolitan statistical area (MSA¶) had a higher prevalence of IBD (1.4%) than did adults living in the central or principal city of an MSA (1.0%). The prevalence of IBD did not differ by sex, current marital status, health insurance coverage type, or region of residence.

§ Federal poverty levels are updated annually by the U.S. Census Bureau (https://aspe.hhs.gov/2015-poverty-guidelines). Percentage of poverty relative to the federal poverty level is used to define poverty status, and is calculated, using NHIS imputed income files, as total family income divided by the family's corresponding federal poverty level, and multiplied by 100.

¶ A metropolitan statistical area (MSA) is defined as a county or group of contiguous counties that contain at least one urbanized area of 50,000 population or more. Adults were defined as living in the central or principal city of an MSA (MSA, central city), in an MSA but not in the central city (MSA, noncentral city), or not in a MSA. "Not in a MSA" indicates that the adults lives in a nonmetropolitan area, defined as an area that does not include a large urbanized area; these areas are generally thought of as more rural.

Discussion

Approximately 3 million U.S. adults are estimated to have ever received a diagnosis of IBD, a disease that is associated with decreased quality of life, substantial morbidity, and complications requiring hospitalizations and surgical procedures (*2*–*4*). This is almost three times the number of adults previously estimated to have IBD based on administrative data sources and limited geographic coverage (*6*,*8*,*9*).

Differences in IBD prevalence among a number of sociodemographic subgroups reveal that prevalence is not uniform across the U.S. adult population. Consistent with past research that found the prevalence of both Crohn's disease and ulcerative colitis increase with age (*8*), a higher prevalence of IBD was found among adults aged ≥45 years in this nationally representative population. Furthermore, a significantly higher prevalence of IBD among non-Hispanic whites was found, consistent with racial/ethnic differences previously reported using 1999 NHIS data (*7*). However, other results differed from previous reports. For example, although the current study found no significant differences in the prevalence of IBD by health insurance coverage type among adults aged <65 years or ≥65 years, previous analyses using claims data found that commercially insured persons had a higher prevalence of IBD than did persons insured by Medicaid (*5*). Furthermore, significant regional (*5*,*7*,*8*) and sex (*7*,*8*) differences identified in past research were not found in this study. Finally, significant differences among sociodemographic characteristics such as education level, employment status, nativity, and poverty status were identified in this study, but not elsewhere. Other researchers have speculated that subgroup differences likely exist for many of the same measures, but small sample sizes and less heterogeneous populations have limited their ability to produce stable, reliable estimates (*9*). Inconsistencies in findings might also be attributable to differences in data collection methods (e.g., survey data versus claims data) and geographic coverage (e.g., county level versus national level).

The findings in this report are subject to at least five limitations. First, only diagnosed Crohn's disease and ulcerative colitis cases were included; data for undiagnosed conditions are not collected by the NHIS. Second, because the majority of data from the NHIS Sample Adult Core component are self-reported and not corroborated with medical records, a potential for recall bias might exist. Third, the NHIS sample design does not include adults in long-term care facilities; these persons were excluded from the study. Active duty military personnel and incarcerated persons were also excluded. This limits the generalizability of the results to the civilian, noninstitutionalized population. Fourth, most IBD prevalence estimates met the standards of reliability; however, for widowed adults and adults aged 18–24 years, these standards were not met. Finally, although survey weights were adjusted after data collection to ensure national generalizability, the 2015 NHIS Sample Adult Core's response rate (55.2%) signals the potential for nonresponse bias in the IBD estimates.

Previous research indicates the burden of IBD to be extensive, including decreased health-related quality of life (*2*), high hospitalization rates (8.2–17.1 per 100,000 persons with IBD annually) (*3*), and direct treatment costs estimated to exceed 6.8 billion dollars in 2008 (*10*). Understanding the prevalence of IBD in the United States is important to both identify the health and financial burdens created by this disease and to inform policy and resource allocation (*5*). Examination of 2015 NHIS data indicates that the prevalence of IBD among adults has increased and far exceeds estimates based on non–nationally representative data sources. Using the NHIS to monitor the prevalence of IBD among U.S. adults can enhance understanding of the health and financial burdens IBD places on the U.S. health care system and help identify subgroups with higher prevalence rates who might be most in need of resources to manage and treat this potentially fatal chronic disease (*7*).

Summary

What is already known about this topic?

Crohn's disease and ulcerative colitis, collectively known as inflammatory bowel disease, are characterized by chronic inflammation of the gastrointestinal tract. Inflammatory bowel disease has been associated with decreased quality of life and extensive morbidity and often results in complications requiring hospitalizations and surgical procedures. In 1999, an estimated 1.8 million (0.9%) U.S. adults had inflammatory bowel disease.

What is added by this report?

In 2015, an estimated 3.1 million (1.3%) of U.S. adults had ever received a diagnosis of inflammatory bowel disease, and prevalence differed significantly among a number of sociodemographic characteristics, including age, race/ethnicity, education level, employment status, nativity, poverty status, and urbanicity. This study is one of the few times that inflammatory bowel disease prevalence estimates among U.S. adults have been assessed for a wide range of respondent characteristics using a large, nationally representative data source.

What are the implications for public health practice?

The use of a nationally representative data source such as the National Health Interview Survey to estimate the prevalence of inflammatory bowel disease among U.S. adults is important to understanding the burden this disease currently places on the U.S. health care system. Highlighting population subgroups with higher prevalence rates of inflammatory bowel disease can enable a better understanding of the disease and the populations most affected.

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Gastrointestinal Illness Associated with Rancid Tortilla Chips at a Correctional Facility — Wyoming, 2015

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On October 12, 2015, a county health department notified the Wyoming Department of Health of an outbreak of gastrointestinal illness among residents and staff members at a local correctional facility. The majority of ill persons reported onset of symptoms within 1–3 hours after eating lunch served at the facility cafeteria at noon on October 11. Residents and staff members reported that tortilla chips served at the lunch tasted and smelled like chemicals. The Wyoming Department of Health and county health department personnel conducted case-control studies to identify the outbreak source. Consuming lunch at the facility on October 11 was highly associated with illness; multivariate logistic regression analysis found that tortilla chips were the only food item associated with illness. Hexanal and peroxide, markers for rancidity, were detected in tortilla chips and composite food samples from the lunch. No infectious agent was detected in human stool specimens or food samples. Extensive testing of lunch items did not identify any unusual chemical. Epidemiologic and laboratory evidence implicated rancid tortilla chips as the most likely source of illness. This outbreak serves as a reminder to consider alternative food testing methods during outbreaks of unusual gastrointestinal illness when typical foodborne pathogens are not identified. For interpretation of alternative food testing results, samples of each type of food not suspected to be contaminated are needed to serve as controls.

Wyoming Department of Health investigators were notified that a total of 16 residents and staff members at a local mixed-sex correctional facility were evaluated at the facility's medical office on October 11, 2015, after reporting stomach cramping, gas, bloating, diarrhea, and burping. Active case finding was conducted during October 12–28, using a standardized questionnaire administered by telephone or in-person, or self-completed.

Because facility residents were continually being admitted and released, investigators could not assess exposures in the entire population at the time of the outbreak; therefore, an initial case-control study was used to identify specific meals and food items associated with illness. A case was defined as the onset of nausea, vomiting, stomach cramps, diarrhea, gas, or bloating in any facility resident or staff member during October 9–12. Controls were defined as residents or staff members who consumed food from the facility cafeteria during October 8–11 and did not report any of these symptoms. To substantiate the link between consumption of one food item and illness, investigators performed a nested case-control study focusing on persons who became ill with more severe symptoms on or after October 11. A case of severe illness was defined as the occurrence of vomiting or diarrhea in any facility resident or staff member during October 11–12. Controls were defined as residents or staff members who consumed meals from the facility cafeteria during October 10–11 and did not experience any illness. The age and resident status of case-patients and controls were compared using the Mann-Whitney U test and Fisher's exact test, respectively.

Meals served at the correctional facility during October 8–11 were included in univariate analyses. Meals significantly associated with illness in univariate analyses were included in multivariate logistic regression models. Stool specimens were collected from four case-patients and tested by the Wyoming Public Health Laboratory for enteric pathogens. Because samples of food items served at every meal were frozen and stored by the correctional facility for an extended period of time, investigators were able to obtain frozen samples of all food items served at the October 11 lunch meal for testing. The Wyoming National Guard's 84th Civil Support Team examined frozen food samples using gas chromatography–mass spectrometry to assess for possible chemical contamination or unusual added substances. A private food testing laboratory tested a frozen mixture of beef and beans, nacho cheese sauce, tortilla chips, and Spanish rice (composite sample) for bacterial toxins and peroxide levels.

At the time of investigation, there were an estimated 254 residents and 75 staff members at the facility. The questionnaire response rate among residents was 62% (157 of 254) and among staff members was 84% (63 of 75). Overall, 220 (67%) of the 329 facility residents and staff members completed the questionnaire; 109 (33%) were unavailable or did not participate. During in-person interviews, residents reported that tortilla chips served at lunch on October 11 tasted and smelled like chemicals. Although the tortilla chips reportedly smelled and tasted foul, many persons consumed them.

Among 220 persons interviewed, 133 (60%) met eligibility for the initial case-control study with 79 case-patients and 64 controls identified. The median age of the case-patients (30 years; range = 20–77 years) was slightly less than that of the controls (36 years; range = 19–63 years) ($p = 0.02$). The percentage of residents among case-patients (76 of 79, 96%) was similar to

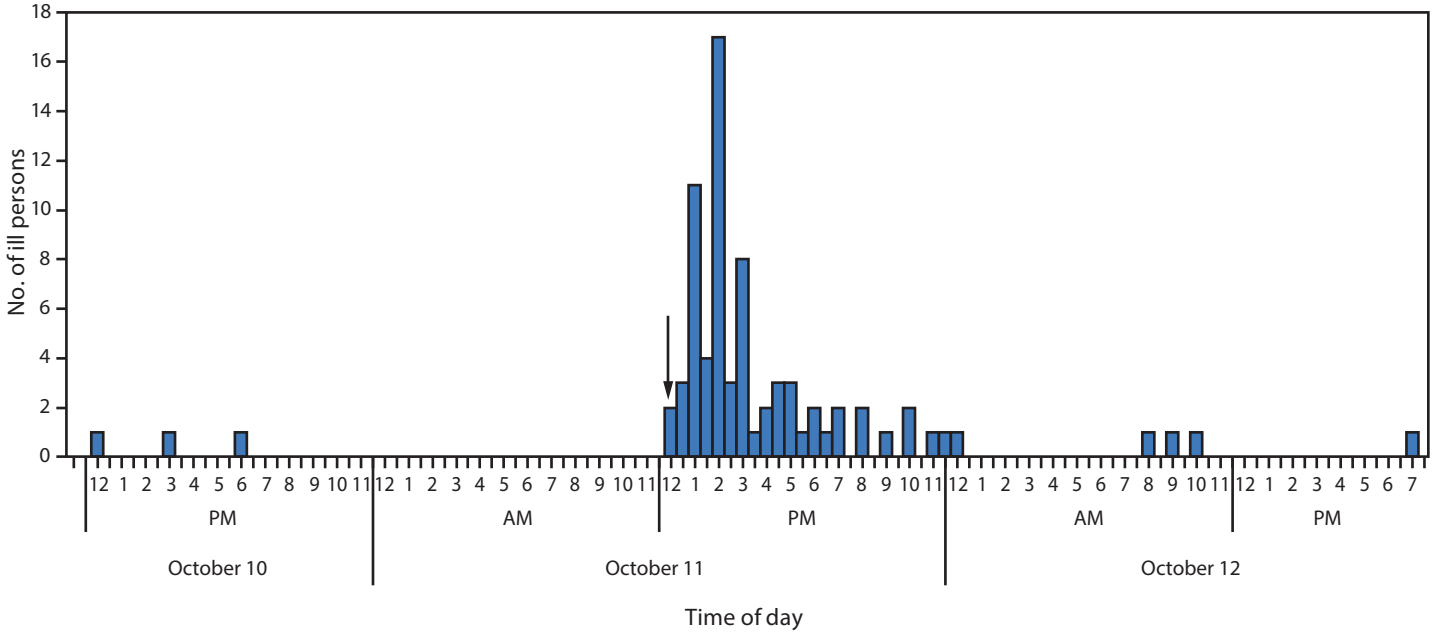
the percentage among controls (59 of 64, 92%) (p = 0.47). Among case-patients, the predominant symptoms reported were nausea (65 of 79, 82%), gas/bloating (61 of 79, 77%), stomach cramps (59 of 79, 75%), and diarrhea (57 of 79, 72%); a smaller number reported vomiting (17 of 79, 21%). Most case-patients experienced short-lived illness and recovered fully with a median illness duration of 24.5 hours (range = 2 hours–14 days). More than half of the case-patients with known illness onset times (48 of 78, 62%) became ill within 1–3 hours after eating lunch on October 11, indicating that the outbreak likely was caused by a point source exposure (Figure).

Lunch on October 11 was the only meal significantly associated with illness in multivariate analysis (adjusted odds ratio = 22.8) (Table 1). Food items served included nacho cheese sauce, tortilla chips, beef and beans, Spanish rice, salad, ranch dressing, a cookie, and multiple drink options. Certain food items served at the meal were often consumed together (e.g., tortilla chips and nacho cheese sauce) and associated with illness in univariate analysis; these items were included in multivariate modeling. Tortilla chips were the only food item associated with illness in multivariate analysis (adjusted odds ratio = 9.7) (Table 2).

A total of 55 case-patients and 57 controls were identified for the nested case-control study. The median age among case-patients (30.5 years; range = 20–77 years) was similar to that of controls (median = 35.5 years; range = 19–63 years) (p = 0.07). No difference in the percentage of residents among case-patients (52 of 55; 95%) and controls (56 of 57; 98%) was observed (p = 0.36). Multivariate modeling identified the lunch on October 11 (adjusted odds ratio = 10.5; 95% confidence interval [CI] = 1.2–90.1) and tortilla chips (adjusted odds ratio = 7.9; CI = 1.4–45.3) as exposures associated with illness.

No enteric pathogens were identified in stool specimens tested by the Wyoming Public Health Laboratory, and no bacterial toxins were detected in a composite sample of food items served at the October 11 lunch meal. Because no infectious source was identified and epidemiologic association of tortilla chips with illness existed, investigators tested the tortilla chips for chemicals to identify potential contamination. On October 30, testing of frozen samples of tortilla chips, nacho cheese sauce, and a composite food mixture (beef, beans, nacho cheese sauce, tortilla chips, and Spanish rice) by the Wyoming National Guard's 84th Civil Support Team for possible chemical contamination did not yield any unusual chemicals; however, hexanal, which is used as a measure of rancidity (*1*,*2*), was detected in the tortilla chip sample. On December 10, 2015, the private food testing laboratory measured the peroxide value, another marker for rancidity, in the composite sample of frozen lunch items. The peroxide value of the composite food sample was 377 meq/kg. Laboratory staff members reported that the peroxide value of the composite food sample was markedly high, but they could not provide any reference ranges because of a lack of food not suspected to be contaminated

FIGURE. Number of residents and staff members (N = 79*) at a correctional facility reporting gas, bloating, abdominal cramps, diarrhea, nausea, or vomiting, by time of onset of first symptom† — Wyoming, October 10–12, 2015



* Onset time was unavailable for one patient.
† Lunch was served at noon on October 11.

TABLE 1. Univariate and multivariate logistic regression analysis of meal exposures among 79 case-patients and 64 controls in an outbreak of gastrointestinal illness at a correctional facility — Wyoming, October 2015

Meal	Date	No. exposed	No. of case-patients reporting exposure* (%)	No. of controls reporting exposure* (%)	OR (95% CI)	p-value†	Adjusted OR (95% CI)	p-value§
Breakfast	10/8/15	137	52/75 (69)	38/62 (61)	1.4 (0.7–2.9)	0.37	—	—
Lunch	10/8/15	136	59/74 (80)	40/62 (64)	2.2 (1.0–4.7)	0.05	0.9 (0.3–3.5)	0.96
Dinner	10/8/15	132	66/74 (89)	41/58 (71)	3.4 (1.3–8.6)	0.01	0.9 (0.2–4.6)	0.92
Breakfast	10/9/15	136	52/76 (68)	41/60 (68)	1.0 (0.5–2.1)	1.00	—	—
Lunch	10/9/15	135	65/75 (87)	43/60 (72)	2.6 (1.1–6.1)	0.05	0.5 (0.1–2.3)	0.43
Dinner	10/9/15	137	65/76 (85)	39/61 (64)	3.3 (1.5–7.6)	<0.001	2.5 (0.6–10.8)	0.21
Breakfast	10/10/15	138	41/78 (52)	30/60 (50)	1.1 (0.6–2.2)	0.86	—	—
Lunch	10/10/15	136	64/75 (85)	42/61(69)	2.6 (1.1–6.1)	0.02	1.2 (0.3–4.5)	0.83
Dinner	10/10/15	140	66/78 (85)	47/62 (76)	1.7 (0.7–4.1)	0.20	—	—
Breakfast	10/11/15	140	36/77 (47)	33/63 (52)	0.8 (0.4–1.5)	0.61	—	—
Lunch	10/11/15	141	78/79 (99)	46/62 (74)	27.1 (3.4–211.3)	<0.001	22.8 (2.5–209.5)	0.01

Abbreviations: CI = confidence interval; OR = odds ratio.
* Not all of those interviewed answered each question.
† Fisher's exact test two-sided statistic.
§ Chi-square statistic.

but produced at approximately the same time to serve as control samples. The tortilla chips were purchased from a food distribution center, and the production and expiration dates were unknown. All remaining bags of tortilla chips were discarded before investigators could obtain them for testing.

TABLE 2. Results of univariate and multivariate logistic regression analyses of October 11, 2015, lunch food item exposure among 79 case-patients and 64 controls in an outbreak of gastrointestinal illness at a correctional facility — Wyoming, October 2015

Food item	No. of case-patients reporting exposure* (%)	No. of controls reporting exposure* (%)	OR (95% CI)	p-value†	Adjusted OR (95% CI)	p-value§
Tortilla chips	75/78 (96)	36/62 (58)	18.1 (5.1–63.6)	<0.001	9.7 (2.2–42.7)	<0.001
Beef and bean mix	72/77 (93)	40/63 (63)	8.3 (2.9–23.5)	<0.001	1.9 (0.4–9.6)	0.42
Nacho cheese sauce	74/79 (94)	41/63 (65)	7.9 (2.8–22.5)	<0.001	1.9 (0.3–10.0)	0.46
Spanish rice	64/76 (84)	38/63 (60)	3.5 (1.6–7.8)	<0.001	0.9 (0.2–3.8)	0.90
Salad	61/77 (79)	36/61 (59)	2.6 (1.2–5.6)	0.01	1.1 (0.3–4.7)	0.85
Cookie	53/71 (75)	33/60 (55)	2.4 (1.2–5.0)	0.03	0.9 (0.3–2.5)	0.90
Ranch dressing	56/76 (74)	34/59 (58)	2.1 (0.9–4.2)	0.06	—	—
Fruit drink	27/75 (36)	15/60 (25)	1.7 (0.8–3.6)	0.19	—	—

Abbreviations: CI = confidence interval; OR = odds ratio.
* Not all of those interviewed answered each question.
† Fisher's exact test two-sided statistic.
§ Chi-square statistic.

Discussion

This report describes a point source outbreak of gastrointestinal illness at a correctional facility where no infectious etiology was identified, but epidemiologic evidence implicated a single food item, tortilla chips, as the source of illness. Hexanal is a compound common in food additives, dyes, and insecticides. However, both hexanal and peroxide are markers of rancidity (*1*,*2*). The high peroxide value in the composite food sample and detection of hexanal in the tortilla chips indicate the chips might have been rancid. Rancidity results from degradation of oils and fats, a process that can occur through exposure to heat and light, and can affect the taste and quality of food. The foul taste and odor of the tortilla chips reported by facility residents and staff members further support this hypothesis. However, because approximately 3–8 weeks had elapsed between the date of food service and testing, the rancidity of the chips at the time of service could not be confirmed. Interpretation of food testing results from this outbreak was difficult because no food control samples for each food item tested were available for comparing results. For example, comparing the peroxide and hexanal levels from the suspect food that was served with those of tortilla chips not suspected to be contaminated and produced by the same manufacturer on approximately the same date would have allowed investigators to better determine what levels would be expected from exposure to heat and light over time and what levels might be associated with adverse health events.

Outbreaks caused by intentional and unintentional chemical contamination of food (e.g., with pesticides and ammonia) have been described (*3*–*7*) and are characterized by a rapid onset of illness. Food testing in this outbreak, however, did not detect evidence of adulteration or added chemicals that could explain the increase in gastrointestinal illness after consumption of tortilla chips. Further, in outbreaks caused by chemical contamination, persons with illness typically experience nausea, vomiting, and neurologic symptoms (*3*–*7*); case-patients in this outbreak did not report neurologic symptoms, and only 21% reported vomiting. Instead, >70% of case-patients reported nausea, burping, gas, or diarrhea.

Summary

What is already known about this topic?

Although consumption of rancid food can cause gastrointestinal illness, few outbreaks have been documented.

What is added by this report?

In October 2015, an outbreak of gastrointestinal illness occurred at a Wyoming correctional facility. Epidemiologic and laboratory evidence implicated rancid tortilla chips as the likely source of illness.

What are the implications for public health practice?

The likelihood of rancid tortilla chips as the source of illness in this outbreak serves as a reminder to consider alternative sources of illness other than foodborne pathogens during outbreaks of unknown gastrointestinal illness. When rancidity is suspected as the source of illness, specific food testing methods are needed that might not be readily available at state public health laboratories.

Few outbreaks of gastrointestinal illness associated with consumption of rancid food have been documented (*8*). Rancidity was identified as the source of an outbreak in India in which 80 persons became ill with abdominal cramping, vomiting, and diarrhea within 1.5–2 hours after consuming rancid biscuits (*8*). The biscuits were deemed rancid through peroxide testing. The Wyoming correctional facility outbreak illustrates the importance of considering noninfectious etiologies of illness and collecting all suspected foods, as well as samples not suspected to be contaminated to serve as controls, to ensure that food testing can be fully interpreted. When considering rancidity as a source of illness, specific testing methods not routinely available or performed at public health laboratories are needed.

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Notes from the Field

Evaluation of the Sensitivity and Specificity of a Commercially Available Rapid Syphilis Test — Escambia County, Florida, 2016

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In December 2014, the Food and Drug Administration granted the first-ever Clinical Laboratory Improvement Amendments waiver for a rapid treponemal syphilis screening test, Syphilis Health Check (SHC) (*1*). SHC is a new tool for public health programs to combat increasing syphilis rates, specifically among persons without a prior syphilis infection. SHC can be performed by nonlaboratorian health care personnel and results are available in 10 minutes. In 2015, a total of 7,094 noncongenital cases of syphilis (35.8 case per 100,000) were reported to the Florida Department of Health (*2*). The Florida Department of Health evaluated the performance of SHC in comparison with treponemal and nontreponemal tests routinely used in its sexually transmitted disease (STD) clinic in Escambia County.

For this evaluation, patients seeking STD testing at the Florida Department of Health STD clinic in Escambia County during March 11–April 21, 2016, were tested for syphilis using the SHC on blood specimens obtained by fingerstick; a venous blood specimen was drawn concurrently and submitted for treponemal (Trep-Sure), and nontreponemal (Arlington Scientific, Inc. [ASI] rapid plasma reagin [RPR] card test for syphilis) testing at the state public health laboratory. The state public health laboratory in Florida uses the CDC-recommended algorithm for syphilis testing (i.e., nontreponemal testing followed by treponemal testing for persons with a reactive nontreponemal test); however, for the purpose of this study, all collected specimens underwent treponemal testing regardless of the nontreponemal test result. The SHC result was compared with results of routine syphilis testing using the traditional testing algorithm at the state laboratory. Sensitivity, specificity, and overall laboratory test agreement were determined using the Trep-Sure qualitative enzyme immunoassay (EIA) reference treponemal test as the standard for "true" positive or negative treponemal test results.

The SHC was used to screen 202 patients for syphilis. Among these patients, 171 (85%) were nonreactive on all syphilis tests (SHC, EIA, and RPR), 26 (13%) had a reactive SHC, and five (2%) had a nonreactive SHC but had one or more reactive tests at the state laboratory. Among the 26 reactive SHCs, 10 (38%) had a reactive EIA (six had a reactive RPR), and 16 (62%) were not confirmed by EIA or RPR at the state laboratory. For the six reactive SHC patients with reactive EIA and reactive RPR, three were staged as secondary syphilis, one as primary syphilis, one as early latent syphilis, and one was a previously treated positive with no increase in titer since last testing. Among the five specimens that were reactive on other tests but SHC nonreactive, only one was both RPR (1:8 serum dilution) and EIA reactive. It came from a patient with primary syphilis and a history of herpes simplex virus 2, and a reactive RPR (1:2 serum dilution) that was collected 6 days before the SHC test.

The sensitivity of SHC was 71.4% (95% confidence interval [CI] = 41.9%–95.1%) when compared with the Trep-Sure (EIA) reference treponemal test (Table). The specificity of the SHC compared with the reference treponemal test was 91.5% (95% CI = 87.5%–95.5%).

The findings in this study are subject to at least one limitation. The sample size was 202; however, results indicate a high proportion of reactive SHC tests were not confirmed by reference treponemal testing (16 of 26, 61.5%). This relatively low positive predictive value suggests that reactive SHC results should be interpreted with caution. Furthermore, four of 14 specimens that tested positive on the reference treponemal test tested negative on the SHC, including one from a patient with primary syphilis. Sensitivity and specificity analyses of the SHC using fingerstick specimens at the Florida Department of Health in Escambia County's STD clinic were significantly lower than the >98% reported by the manufacturer of SHC in a 510(k) submission (*3*). Further evaluation of the sensitivity and specificity of the SHC in additional health care settings is needed to determine whether SHC might be beneficial in identifying patients who might have syphilis, especially in settings where phlebotomy is unavailable.

TABLE. Comparative results of Syphilis Health Check testing of specimens (N = 202) at the Florida Department of Health in Escambia County STD clinic and Trep-Sure reference treponemal testing at the state health department laboratory — Florida, 2016

	Trep-Sure (EIA) result	
Syphilis Health Check result	**Reactive**	**Nonreactive**
Reactive (26)	10	16
Nonreactive (176)	4	172
Total (202)	**14**	**188**
	Testing agreement% (95% CI)	
Sensitivity*	71.4 (41.9–95.1)	
Specificity*	91.5 (87.5–95.5)	
Overall agreement	**90.1 (86.0–94.2)**	

Abbreviations: CI = confidence interval; EIA = enzyme immunoassay; STD = sexually transmitted disease.

* Sensitivity and specificity were calculated comparing the results of the Syphilis Health Check against the reference treponemal tests used at the state public health laboratory in Florida.

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Announcement

World Stroke Day — October 29, 2016

The theme of World Stroke Day 2016 is "Face the Facts: Stroke is Treatable," highlighting that lives can improve with better awareness, action, and access. Stroke is a leading cause of disability and the second leading cause of death worldwide (*1*,*2*). In the United States, one person dies every 4 minutes from stroke, and up to 30% of stroke survivors are permanently disabled (*3*). High blood pressure is a leading risk factor for stroke (*3*).

This year's World Stroke Day campaign aims to raise awareness that stroke is a medical emergency and should be immediately treated. Stroke is a complex medical condition, but there are ways to reduce its complications. Recognizing the signs of stroke and acting FAST (face drooping, arm weakness, speech difficulty, time to call 9-1-1), promoting awareness of specialized stroke units, and providing rapid access to proven treatments (e.g., thrombolytic drugs) improve the chances for recovery. The campaign encourages everyone, including health care professionals, to push for improved stroke care. Physicians and nurses can encourage more education about stroke among hospital staff members, and emphasize the benefits of specialized stroke units, which increase the chances of a patient having a good outcome after a stroke (*4*).

Approximately 80% of strokes are preventable. Controlling blood pressure and cholesterol levels, and living a healthy lifestyle (e.g., exercising regularly, eating more fruits, vegetables, and foods low in sodium, and avoiding smoking) can reduce a person's chance of having a stroke.

CDC supports several public health measures that address stroke, including the Paul Coverdell National Acute Stroke Program (PCNASP) and the Million Hearts initiative. The PCNASP funds nine state health departments that measure, track, and improve the quality of stroke care. Million Hearts, co-led by CDC and the Centers for Medicare & Medicaid Services, aims to prevent 1 million heart attacks and strokes by 2017.

More information on World Stroke Day is available at http://www.worldstrokecampaign.org/. Information about CDC's programs to prevent stroke is available at https://www.cdc.gov/stroke/cdc_addresses.htm.

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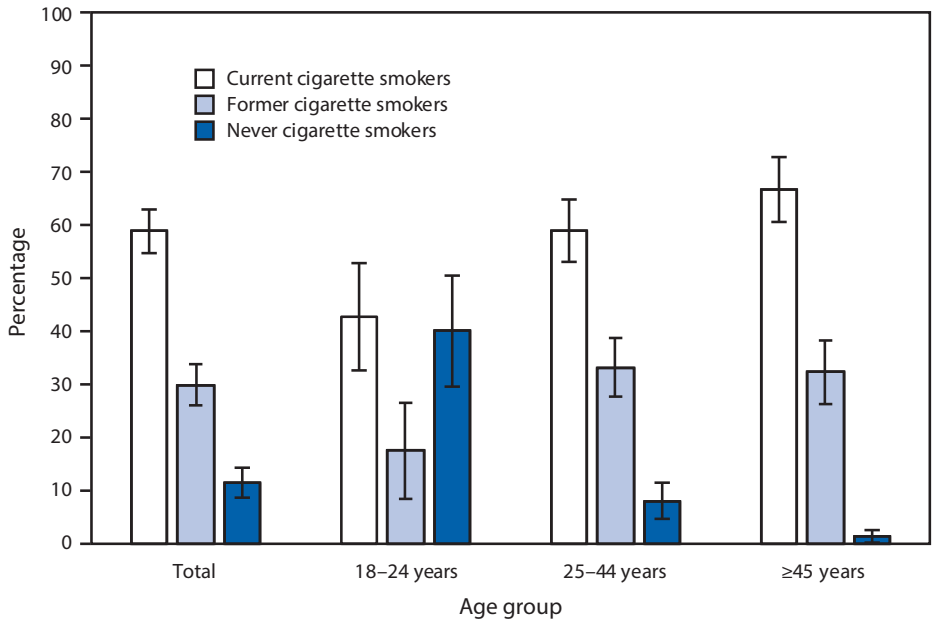
QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Cigarette Smoking Status* Among Current Adult E-cigarette Users,† by Age Group — National Health Interview Survey,§ United States, 2015



* Adults were asked if they had smoked at least 100 cigarettes in their lifetime and, if yes, whether they currently smoked cigarettes every day, some days, or not at all. Those who smoked every day or some days were classified as current cigarette smokers. Adults who had not smoked 100 cigarettes were classified as never cigarette smokers. Adults who had smoked 100 cigarettes but were not smoking at the time of interview were classified as former cigarette smokers. Percentages are shown with 95% confidence intervals.

† Current e-cigarette use was based on responses of "every day" or "some days" to the question, "Do you currently use electronic cigarettes every day, some days, or not at all?" asked of adults who had ever tried an e-cigarette, even one time.

§ Estimates are based on household interviews of a sample of the noninstitutionalized U.S. civilian population aged ≥18 years and are derived from the National Health Interview Survey sample adult component.

In 2015, 3.5% of U.S. adults were current e-cigarette users. Among adult e-cigarette users overall, 58.8% also were current cigarette smokers, 29.8% were former cigarette smokers, and 11.4% had never been cigarette smokers. Among current e-cigarette users aged ≥45 years, 98.7% were either current or former cigarette smokers, and 1.3% had never been cigarette smokers. In contrast, among current e-cigarette users aged 18–24 years, 40.0% had never been cigarette smokers.

Source: National Health Interview Survey, 2015 data. Available at http://www.cdc.gov/nchs/nhis.htm.

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For more information on this topic, CDC recommends the following link: http://www.cdc.gov/tobacco/campaign/tips/diseases/dual-tobacco-use.html.

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