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Consumption of Alcohol Beverages and Binge Drinking Among Pregnant Women Aged 18–44 Years — United States, 2015–2017

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Drinking alcohol during pregnancy can cause fetal alcohol spectrum disorders (FASDs), including birth defects that involve central nervous system impairment, behavioral disorders, and impaired intellectual development, which can lead to difficulties with school and employment. A recent study in four U.S. communities found a 1.1%–5.0% prevalence of FASDs among first-grade students (*1*). Drinking during pregnancy might also be a risk factor for other adverse pregnancy and birth outcomes, including miscarriage and stillbirth (*2*). CDC estimated the prevalence of self-reported current drinking (at least one alcohol drink in the past 30 days) and binge drinking (consuming four or more drinks on at least one occasion in the past 30 days) among pregnant women aged 18–44 years, using 2015–2017 data from the Behavioral Risk Factor Surveillance System (BRFSS). Current drinking and binge drinking in the past 30 days were reported by 11.5% and 3.9% of pregnant women, respectively. Among pregnant women who binge drink, the average frequency of binge drinking in the past 30 days was 4.5 episodes, and the average intensity of binge drinking (the average largest number of drinks reported consumed on any occasion among binge drinkers) was 6.0 drinks. Increased implementation of evidence-based community-level and clinic-level interventions, such as universal alcohol screening and brief counseling in primary and prenatal care, could decrease the prevalence of drinking during pregnancy, which might ultimately reduce the prevalence of FASDs and other adverse pregnancy and birth outcomes.

BRFSS is a random-digit–dialed landline and cellphone telephone survey that measures behavioral risk factors from a representative sample of civilian, noninstitutionalized adults aged ≥18 years, conducted by all U.S. states and participating U.S. territories, in collaboration with CDC (https://www.cdc.gov/brfss/index.html). For this report, CDC analyzed 2015–2017 BRFSS data from 6,814 pregnant women aged 18–44 years from all 50 states and the District of Columbia. Women reported if they were currently pregnant at the time of the interview, although information about the gestational week of pregnancy was not collected. The annual median response rate* for the combined landline and cellphone sample ranged from 45.8% to 47.0%.

This report focuses on current drinking and binge drinking among pregnant women, two measures of excessive drinking† in the 2015–2020 Dietary Guidelines for Americans.§ Respondents were asked "During the past 30 days, how many days per week or per month did you have at least one drink of any alcoholic beverage such as beer, wine, a malt beverage, or liquor?" Response choices were as follows: number of days per week, number of days in past 30 days, no drinks in past 30 days, don't know/not sure, and refused. In addition, women respondents were asked "Considering all types of alcoholic

* Calculated using the American Association for Public Opinion Research guidelines. The response rate is the number of respondents who completed the survey as a proportion of all eligible and likely eligible persons.

† Excessive drinking by women includes binge drinking (four or more drinks per occasion for women), heavy drinking (more than one drink per day on average for women), any drinking by pregnant women, and drinking by women aged <21 years. https://www.cdc.gov/alcohol/fact-sheets/prevention.htm.

§ https://health.gov/dietaryguidelines/2015/.

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beverages, how many times during the past 30 days did you have four or more drinks on an occasion?" Response options were as follows: number of times, none, don't know/not sure, and refused. Finally, the intensity of binge drinking was based on the question "During the past 30 days, what is the largest number of drinks you had on any occasion?" Response choices were as follows: number of drinks, don't know/not sure, and refused.¶

Prevalences and 95% confidence intervals (CIs) for current drinking and binge drinking by pregnant women were estimated overall and by sociodemographic characteristics (age group, race/ethnicity, education, employment status, and marital status). Adjusted prevalence ratios (aPRs) and CIs were calculated to examine the associations between sociodemographic characteristics and current and binge drinking, while controlling for other characteristics. Finally, frequency and intensity of binge drinking were estimated for all pregnant women who reported binge drinking. Data were weighted to represent state-level population estimates and aggregated to represent a nationwide estimate. Analyses were conducted using SAS (version 9.4; SAS Institute) with SUDAAN (version 11.0; RTI International) to account for the complex sampling method used in BRFSS.

Among pregnant women, the prevalences of reported current drinking and binge drinking in the past 30 days were 11.5% and 3.9%, respectively (Table). The prevalence of current drinking among pregnant women who were not married (15.2%) was nearly double that among those who were married (8.6%; aPR = 2.2). The prevalence of binge drinking among pregnant women who were not married (6.1%) was nearly triple the prevalence among those who were married (2.2%; aPR = 2.7). Women categorized as "other, non-Hispanic," which included American Indian/Alaska Native, Asian/Pacific Islander, and multiracial respondents, reported a significantly higher prevalence of current drinking (18.5%) than did Hispanics, who had the lowest prevalence (8.9%; aPR = 2.0). Among pregnant women who reported binge drinking in the past 30 days, the average frequency was 4.5 (CI = 3.1–5.9) episodes, and the average largest intensity was 6.0 (CI = 5.0–7.0) drinks.

¶ https://www.cdc.gov/brfss/questionnaires/pdf-ques/2017_BRFSS_Pub_Ques_508_tagged.pdf.

Discussion

During 2015–2017, approximately one in nine pregnant women reported drinking alcohol in the past 30 days, and among those, about one third reported binge drinking. High blood alcohol concentrations among pregnant women might be particularly harmful to the brain of a developing fetus (*3*) and could occur even before pregnancy is recognized (*4*). A study using data from the Pregnancy Risk Assessment Monitoring System (https://www.cdc.gov/prams/index.htm) found that women who binge drink before pregnancy are more likely to drink and binge drink during pregnancy than are women who do not binge drink before pregnancy (*4*).

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TABLE. Estimated prevalences* and adjusted prevalence ratios (aPRs) of current drinking† and binge drinking§ reported by pregnant women aged 18–44 years (N = 6,814), by selected characteristics — Behavioral Risk Factor Surveillance System, United States, 2015–2017

Characteristic	Current drinking		Binge drinking	
	% (95% CI)	aPR¶ (95% CI)	% (95% CI)	aPR¶ (95% CI)
Overall	11.5 (10.1–13.0)	––	3.9 (3.1–4.8)	––
Age group (yrs)				
18–24	11.4 (9.1–14.3)	0.7 (0.5–1.0)	5.8 (4.2–7.9)	1.6 (0.8–3.1)**
25–29	9.6 (7.4–12.4)	0.7 (0.5–0.9)	3.7 (2.3–6.0)**	1.1 (0.5–2.4)**
30–34	11.6 (8.8–15.2)	0.8 (0.6–1.2)	2.6 (1.7–4.0)**	0.8 (0.4–1.6)**
35–44	14.1 (11.1–17.7)	Referent	3.1 (1.9–5.2)**	Referent
Race/Ethnicity				
White, non–Hispanic	10.7 (9.2–12.3)	1.3 (0.9–1.8)	3.4 (2.6–4.5)	1.1 (0.6–2.0)
Black, non–Hispanic	14.0 (10.1–19.1)	1.3 (0.8–2.1)	NA††	NA††
Hispanic	8.9 (6.3–12.3)	Referent	3.5 (2.2–5.6)**	Referent
Other, non–Hispanic	18.5 (12.6–26.3)	2.0 (1.2–3.5)	5.1 (3.1–8.6)**	1.7 (0.8–3.5)**
Education				
High school diploma or less	10.4 (8.0–13.2)	Referent	4.1 (2.9–5.7)	Referent
Some college	11.6 (9.2–14.6)	1.2 (0.8–1.6)	3.9 (2.5–6.1)**	1.0 (0.6–1.9)**
College degree	12.7 (10.9–14.9)	1.4 (1.0–2.0)	3.6 (2.7–4.9)	1.5 (0.8–2.8)
Employment status				
Employed	12.6 (10.9–14.4)	1.2 (0.9–1.5)	4.3 (3.4–5.5)	1.3 (0.8–2.3)**
Not employed	10.0 (7.8–12.7)	Referent	3.3 (2.2–4.9)**	Referent
Marital status				
Married	8.6 (7.1–10.3)	Referent	2.2 (1.5–3.4)**	Referent
Not married	15.2 (12.8–18.0)	2.2 (1.6–3.0)	6.1 (4.8–7.7)	2.7 (1.4–5.3)**

Abbreviations: CI = confidence interval; NA = not available.
* Percentages weighted to represent nationwide estimates of the U.S. population.
† Defined as having consumed at least one alcohol drink in the past 30 days.
§ Defined as having consumed four or more alcohol drinks on one occasion at least once in the past 30 days.
¶ Model includes age, race/ethnicity, education, employment status, and marital status.
** Estimate might be unstable because the relative standard error is 0.2–0.3.
†† Estimate suppressed because the relative standard error is >0.3.

The overall estimates of current drinking and binge drinking among pregnant women were slightly higher during 2015–2017 (11.5% and 3.9%, respectively) than were the estimates during 2011–2013 (10.2% and 3.1%, respectively) (*5*). Although the frequency of binge drinking among pregnant women during 2015–2017 (4.5 episodes) was similar to that in the 2011–2013 BRFSS report (4.6 episodes), the intensity estimate for the 2015–2017 report (6.0 drinks) was lower than that in the earlier report (7.5 drinks) (*5*). The higher prevalences of current drinking and binge drinking among pregnant women who are not married compared with the prevalences among married women might be related to the financial stress associated with being the sole provider as well as lack of social support (*6*).

The findings in this report are subject to at least five limitations. First, data are self-reported and therefore subject to recall and social desirability biases, likely leading to underreporting of alcohol consumption during pregnancy (*7*). Second, the estimates might be affected by selection bias because the median response rates were less than 50% for all 3 years of the survey. Third, some prevalence and prevalence ratio estimates were suppressed, or flagged as possibly being unstable, because of relatively large standard errors. Fourth, pregnancy status might be inaccurate or underestimated because some pregnancies might not have been recognized at the time of interview (*8*). The percentage of currently pregnant women who reported drinking in the past 30 days and before they were pregnant likely is small because the mean gestational age of pregnancy awareness is 5.5 weeks (*8*). Finally, information on trimester of pregnancy was not available. The prevalence of drinking in pregnancy varies by trimester and is higher in the first trimester than in the second and third trimesters (*9*).

The Community Preventive Services Task Force** recommends several community-level interventions to reduce excessive drinking, such as regulating alcohol outlet density (the number of physical locations where alcohol is sold within a geographic area) through zoning and business licensing or state alcohol control agencies, implementing commercial host liability laws, and maintaining limits on hours and days of sale. The U.S. Preventive Services Task Force recommends screening and brief behavioral counseling in primary care settings for all adults aged ≥18 years, including pregnant women, to reduce unhealthy alcohol use, which includes any alcohol use by pregnant women (*10*). An American College of Obstetricians

** https://www.thecommunityguide.org/topic/excessive-alcohol-consumption.

Summary

What is already known about this topic?

Drinking alcohol while pregnant can cause miscarriage, stillbirth, and fetal alcohol spectrum disorders. There is no known safe level of alcohol use during pregnancy.

What is added by this report?

Analysis of 2015–2017 Behavioral Risk Factor Surveillance System data found that 11.5% of pregnant women reported current drinking, and 3.9% reported binge drinking during the past 30 days. Women who were not married were more likely to drink alcohol and binge drink during pregnancy than were married women.

What are the implications for public health practice?

Efforts to expand implementation of community-level interventions and universal alcohol screening and brief counseling might decrease the prevalence of drinking during pregnancy.

and Gynecologists Committee Opinion[††] recommends alcohol use screening for all women seeking obstetric-gynecologic care, including counseling patients that there is no known safe level of alcohol use during pregnancy, and recommends that women who are pregnant or who might be pregnant be advised to avoid alcohol use. The combination of evidence-based community-level interventions and alcohol screening and brief counseling might decrease alcohol consumption during pregnancy, and ultimately the prevalence of FASDs, as well as other adverse pregnancy and birth outcomes.

[††] https://www.acog.org/Clinical-Guidance-and-Publications/Committee-Opinions/Committee-on-Gynecologic-Practice/Prepregnancy-Counseling.

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References

1. May PA, Chambers CD, Kalberg WO, et al. Prevalence of fetal alcohol spectrum disorders in 4 US communities. JAMA 2018;319:474–82. https://doi.org/10.1001/jama.2017.21896
2. Bailey BA, Sokol RJ. Prenatal alcohol exposure and miscarriage, stillbirth, preterm delivery, and sudden infant death syndrome. Alcohol Res Health 2011;34:86–91.
3. Maier SE, West JR. Drinking patterns and alcohol-related birth defects. Alcohol Res Health 2001;25:168–74.
4. Naimi TS, Lipscomb LE, Brewer RD, Gilbert BC. Binge drinking in the preconception period and the risk of unintended pregnancy: implications for women and their children. Pediatrics 2003;111:1136–41.
5. Tan CH, Denny CH, Cheal NE, Sniezek JE, Kanny D. Alcohol use and binge drinking among women of childbearing age—United States, 2011–2013. MMWR Morb Mortal Wkly Rep 2015;64:1042–6. https://doi.org/10.15585/mmwr.mm6437a3
6. Havens JR, Simmons LA, Shannon LM, Hansen WF. Factors associated with substance use during pregnancy: results from a national sample. Drug Alcohol Depend 2009;99:89–95. https://doi.org/10.1016/j.drugalcdep.2008.07.010
7. Nelson DE, Naimi TS, Brewer RD, Roeber J. US state alcohol sales compared to survey data, 1993–2006. Addiction 2010;105:1589–96. https://doi.org/10.1111/j.1360-0443.2010.03007.x
8. Branum AM, Ahrens KA. Trends in timing of pregnancy awareness among US women. Matern Child Health J 2017;21:715–26. https://doi.org/10.1007/s10995-016-2155-1
9. Ethen MK, Ramadhani TA, Scheuerle AE, et al.; National Birth Defects Prevention Study. Alcohol consumption by women before and during pregnancy. Matern Child Health J 2009;13:274–85. https://doi.org/10.1007/s10995-008-0328-2
10. Curry SJ, Krist AH, Owens DK, et al.; US Preventive Services Task Force. Screening and behavioral counseling interventions to reduce unhealthy alcohol use in adolescents and adults: US Preventive Services Task Force recommendation statement. JAMA 2018;320:1899–909. https://doi.org/10.1001/jama.2018.16789

Preliminary Incidence and Trends of Infections with Pathogens Transmitted Commonly Through Food — Foodborne Diseases Active Surveillance Network, 10 U.S. Sites, 2015–2018

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Foodborne diseases represent a major health problem in the United States. The Foodborne Diseases Active Surveillance Network (FoodNet) of CDC's Emerging Infections Program monitors cases of laboratory-diagnosed infection caused by eight pathogens transmitted commonly through food in 10 U.S. sites.* This report summarizes preliminary 2018 data and changes since 2015. During 2018, FoodNet identified 25,606 infections, 5,893 hospitalizations, and 120 deaths. The incidence of most infections is increasing, including those caused by *Campylobacter* and *Salmonella,* which might be partially attributable to the increased use of culture-independent diagnostic tests (CIDTs). The incidence of *Cyclospora* infections increased markedly compared with 2015–2017, in part related to large outbreaks associated with produce (*1*). More targeted prevention measures are needed on produce farms, food animal farms, and in meat and poultry processing establishments to make food safer and decrease human illness.

FoodNet conducts active, population-based surveillance for laboratory-diagnosed infections caused by *Campylobacter*, *Cyclospora*, *Listeria*, *Salmonella*, Shiga toxin–producing *Escherichia coli* (STEC), *Shigella*, *Vibrio*, and *Yersinia* in 10 sites covering 15% of the U.S. population (approximately 49 million persons in 2017). FoodNet is a collaboration among CDC, 10 state health departments, the U.S. Department of Agriculture's Food Safety and Inspection Service (USDA-FSIS), and the Food and Drug Administration (FDA). Bacterial infections are defined as isolation of the bacterium from a clinical specimen or detection of pathogen antigen, nucleic acid sequences, or, for STEC,† Shiga toxin or Shiga toxin genes. *Listeria* cases are defined as isolation of *L. monocytogenes* or detection of its nucleic acid sequences from a normally sterile site or from placental or fetal tissue in cases of miscarriage or stillbirth. *Cyclospora* infections are defined as detection of the parasite from a clinical specimen by direct fluorescent antibody, polymerase chain reaction, or light microscopy. Hospitalizations occurring within 7 days of specimen collection are attributed to the infection, as is the patient's vital status at hospital discharge, or 7 days after specimen collection if the patient was not hospitalized.

Incidence per 100,000 population was calculated by dividing the number of infections in 2018 by U.S. Census estimates of the surveillance area population for 2017. A negative binomial model with 95% confidence intervals (CIs) was calculated using SAS (version 9.4; SAS Institute) to estimate changes in incidence.

Surveillance for physician-diagnosed postdiarrheal hemolytic uremic syndrome, a complication of STEC infection characterized by renal failure, thrombocytopenia, and microangiopathic anemia, is conducted through a network of nephrologists and infection preventionists and by hospital discharge data review. This report includes pediatric hemolytic uremic syndrome cases (those occurring in persons aged <18 years) identified during 2017, the most recent year for which data are available.

Cases of Infection, Incidence, and Trends

During 2018, FoodNet identified 25,606 cases of infection, 5,893 hospitalizations, and 120 deaths. The incidence of infection (per 100,000 population) was highest for *Campylobacter* (19.5) and *Salmonella* (18.3), followed by STEC (5.9), *Shigella* (4.9), *Vibrio* (1.1), *Yersinia* (0.9), *Cyclospora* (0.7), and *Listeria* (0.3) (Table). Compared with 2015–2017, the incidence significantly increased for *Cyclospora* (399%), *Vibrio* (109%), *Yersinia* (58%), STEC (26%), *Campylobacter* (12%), and *Salmonella* (9%). The number of bacterial infections diagnosed by CIDT (with or without reflex culture§) increased 65% in 2018 compared with the average annual number diagnosed during 2015–2017; the increase ranged from 29% for STEC to 311% for *Vibrio* (Figure 1). In 2018, the percentage of infections diagnosed by DNA-based syndrome panels was highest for *Yersinia* (68%) and *Cyclospora* (67%), followed by STEC (55%), *Vibrio* (53%), *Shigella* (48%), *Campylobacter* (43%), *Salmonella* (33%), and was lowest for *Listeria* (2%). In 2018, a reflex culture was attempted on 75% of specimens with positive CIDT results, ranging from 64% for *Campylobacter* to 100% for *Listeria* (Figure 1). The percentage of specimens with a reflex culture in 2018 was 14% higher than that during

* Connecticut, Georgia, Maryland, Minnesota, New Mexico, Oregon, Tennessee, and selected counties in California, Colorado, and New York (https://www.cdc.gov/foodnet).

† STEC cases are defined as identification of Shiga toxin or its genes by any laboratory; it is not possible to distinguish among serogroups using CIDTs.

§ Culture of a specimen with a positive CIDT result.

TABLE. Number of cases, hospitalizations, and deaths caused by bacterial and parasitic infections, incidence rate, and percentage change compared with 2015–2017 average annual incidence rate, by pathogen — CDC's Foodborne Diseases Active Surveillance Network,* 2018†

	2018				2018 compared with 2015–2017
Pathogen	No. of cases	No. (%) of hospitalizations	No. (%) of deaths	IR§	% (95% CI) Change in IR¶
Bacteria					
Campylobacter	9,723	1,811 (18)	30 (0.3)	19.6	12 (4 to 20)
Salmonella	9,084	2,416 (27)	36 (0.4)	18.3	9 (3 to 16)
Shiga toxin–producing *Escherichia coli***	2,925	648 (22)	13 (0.4)	5.9	26 (7 to 48)
Shigella	2,414	632 (26)	1 (0.04)	4.9	−2 (−24 to 26)
Vibrio	537	151 (28)	9 (2)	1.1	109 (72 to 154)
Yersinia	465	95 (20)	4 (0.9)	0.9	58 (26 to 99)
Listeria	126	121 (96)	26 (21)	0.3	−4 (−23 to 21)
Parasite					
Cyclospora	332	19 (5)	1 (0.3)	0.7	399 (202 to 725)
Total	**25,606**	**5,893 (23)**	**120 (0.5)**	—	—

Abbreviation: CI = confidence interval; IR = incidence rate.
* Connecticut, Georgia, Maryland, Minnesota, New Mexico, Oregon, Tennessee, and selected counties in California, Colorado, and New York.
† Data are preliminary.
§ Per 100,000 population.
¶ Increase or decrease.
** All serogroups were combined because it is not possible to distinguish among them using culture-independent diagnostic tests.

2015–2017, ranging from a 7% decrease for STEC to a 55% increase for *Shigella* (Figure 2). Among specimens with reflex culture in 2018, the percentage that yielded the pathogen was highest for *Listeria* (100%) and *Salmonella* (86%), followed by STEC (64%), *Campylobacter* (59%), *Shigella* (56%), *Yersinia* (50%), and *Vibrio* (37%) (Figure 1) (Figure 2).

Among 7,013 (87%) serotyped *Salmonella* isolates, the three most common were Enteritidis (2.6 per 100,000 population), Newport (1.6), and Typhimurium (1.5), similar to those during 2015–2017. Among 1,570 STEC isolates tested, 440 (28%) were determined to be O157. Among 662 non-O157 STEC isolates serogrouped, the most common were O103 (31%), O26 (28%), and O111 (24%). The incidence compared with 2015–2017 remained unchanged for both O157 and non-O157 STEC.

FoodNet identified 54 cases of postdiarrheal hemolytic uremic syndrome in children (0.49 cases per 100,000) during 2017; 36 (67%) occurred among children aged <5 years (1.22 cases per 100,000). Incidence was not significantly different compared with that during 2014–2016.

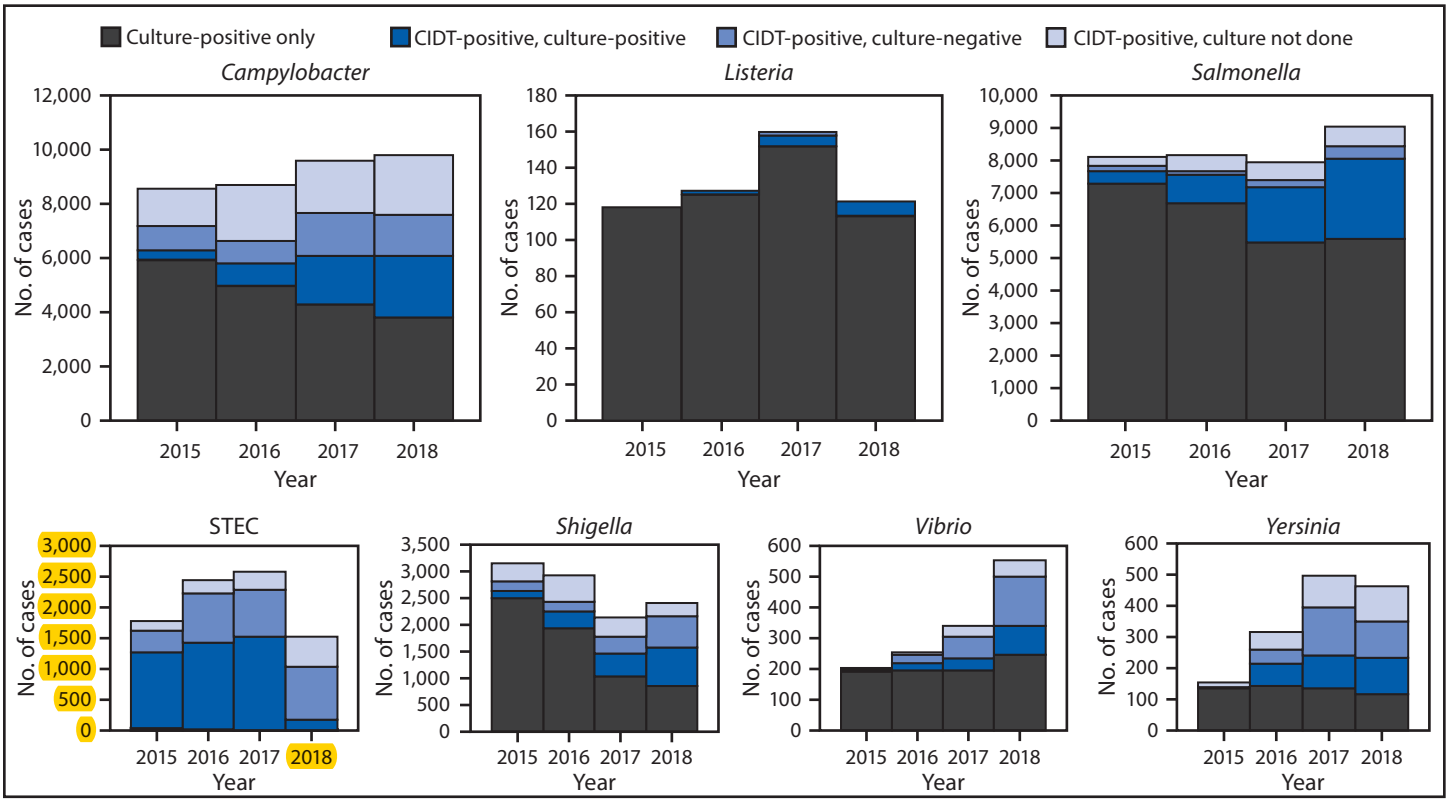
Discussion

Campylobacter has been the most commonly identified infection in FoodNet since 2013. It causes diarrhea, sometimes bloody, and 18% of persons are hospitalized. A rare outcome of *Campylobacter* infection is Guillain-Barré syndrome, a type of autoimmune-mediated paralysis. Poultry is a major source of *Campylobacter* (*2*). In August 2018, FSIS began using a new testing method; in a study of that method, *Campylobacter* was isolated from 18% of chicken carcasses and 16% of chicken parts sampled (*3*). FSIS currently makes aggregated test results available and intends to update performance standards for *Campylobacter* contamination.

The incidence of infections with Enteritidis, the most common *Salmonella* serotype, has not declined in over 10 years. Enteritidis is adapted to live in poultry, and eggs are an important source of infection (*4*). By 2012, FDA had implemented the Egg Safety Rule,¶ which requires preventive measures during the production of eggs in poultry houses and requires subsequent refrigeration during storage and transportation, for all farms with ≥3,000 hens. In 2018, a multistate outbreak of Enteritidis infections was traced to eggs from a farm that had not implemented the required egg safety measures after its size reached ≥3,000 hens (*5*). Chicken meat is also an important source of Enteritidis infections (*4*). In December 2018, FSIS reported that 22% of establishments that produce chicken parts failed to meet the *Salmonella* performance standard (USDA-FSIS *Salmonella* verification testing program**). The percentage of samples of chicken meat and intestinal contents that yielded Enteritidis were similar in 2018 to those during 2015–2017 (USDA-FSIS, unpublished data). In contrast, a decline in serotype Typhimurium isolated from the same sources was observed during the same period. This trend coincides with declines in Typhimurium human illnesses. Changes in poultry production practices, including vaccination against Typhimurium, might have resulted in these declines (*6*). In the United Kingdom, vaccination of both broiler and layer chickens against Enteritidis, along with improved hygiene,

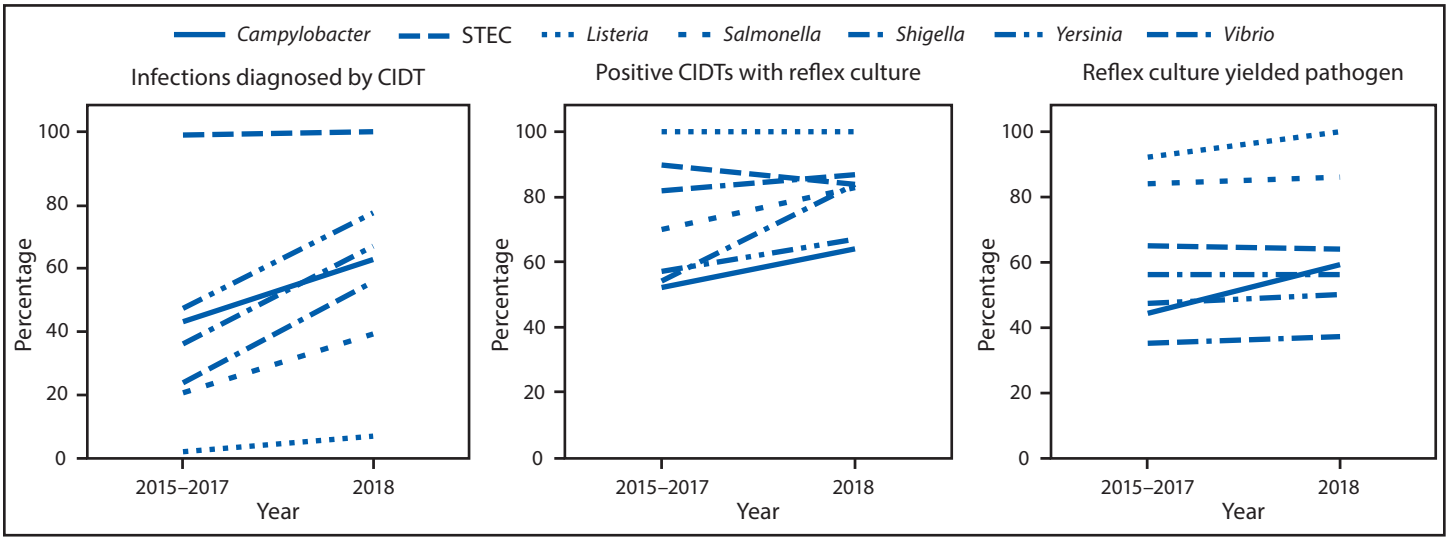
¶ https://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/Eggs/ucm170615.htm.
** https://www.fsis.usda.gov/wps/portal/fsis/topics/data-collection-and-reports/microbiology/salmonella-verification-testing-program.

FIGURE 1. Number of infections diagnosed by culture or culture-independent diagnostic tests (CIDTs), by pathogen, year, and culture status — CDC's Foodborne Diseases Active Surveillance Network,* 2015–2018†



Abbreviation: STEC = Shiga toxin–producing *Escherichia coli*.
* Connecticut, Georgia, Maryland, Minnesota, New Mexico, Oregon, Tennessee, and selected counties in California, Colorado, and New York.
† Data for 2018 are preliminary.

FIGURE 2. Percentage of infections diagnosed by culture-independent diagnostic tests (CIDTs), positive CIDTs with a reflex culture,* and reflex cultures that yielded the pathogen, by pathogen — CDC's Foodborne Diseases Active Surveillance Network,† 2015–2017 and 2018§



Abbreviation: STEC = Shiga toxin–producing *Escherichia coli*.
* Culture of a specimen with a positive CIDT result.
† Connecticut, Georgia, Maryland, Minnesota, New Mexico, Oregon, Tennessee, and selected counties in California, Colorado, and New York.
§ Data for 2018 are preliminary.

Summary

What is already known about this topic?

The incidence of foodborne infections has remained largely unchanged. Clinical laboratories are increasingly using culture-independent diagnostic tests (CIDTs) to detect enteric infections. CIDTs benefit public health surveillance by identifying pathogens not routinely detected by previous methods but complicate data interpretation.

What is added by this report?

The incidence of most infections increased during 2018 compared with 2015–2017; this might be partially attributable to increased CIDT use. The incidence of *Cyclospora* infections increased markedly, in part related to large outbreaks associated with produce. The number of human infections caused by *Campylobacter* and *Salmonella*, especially serotype Enteritidis, remains high.

What are the implications for public health practice?

As use of CIDTs increases, it is important to obtain and subtype isolates and interview ill persons to monitor prevention efforts and develop more targeted prevention and control measures to make food safer and decrease human illness.

was followed by a marked decrease in human Enteritidis infections (*7*).

Produce is a major source of foodborne illnesses (*2*). During 2018, romaine lettuce was linked to two multistate outbreaks of STEC O157 infections (*8*). The marked increase in reported *Cyclospora* infections was likely attributable to several factors including produce outbreaks and continued adoption of DNA-based syndrome panel tests (*1*). Improved agricultural practices are needed to prevent produce-associated infections. FDA provides technical assistance to task forces created by the produce industry, to determine how to prevent contamination of romaine lettuce and facilitate outbreak investigations by improving product labeling and traceability. In 2018, FDA expanded surveillance sampling of foreign and domestically grown produce to assess its safety (*9*). FDA is implementing the Produce Safety Rule,[††] with routine inspections of large produce farms planned this spring. Because produce is a major component of a healthy diet and is often consumed raw, making it safer is important for improving human health (*10*).

The findings in this report are subject to at least three limitations. First, the changing diagnostic landscape makes interpretation of incidence and trends more complex. Increases in reported incidence might be attributable entirely, or in part, to changes in clinician ordering practices, increased use of DNA-based syndrome panels that identify pathogens not routinely captured by traditional methods, and changes in laboratory practices in response to the availability of these panels. Second, some CIDT results might be false positives. Finally, year-to-year variations, attributable in part to large outbreaks, might not indicate sustained trends.

The need to obtain and subtype isolates from ill persons is becoming an increasing burden to state health departments but is critical for maintaining surveillance to detect and investigate outbreaks, evaluating prevention efforts, and developing targeted control measures. Measures that might decrease foodborne illnesses include enhanced efforts targeting *Campylobacter* contamination of chicken; strengthening prevention measures during egg production, especially within small flocks; vaccinating poultry against *Salmonella* serotype Enteritidis; decreasing *Salmonella* contamination of produce, poultry, and meat; and continued implementation of the Food Safety Modernization Act, specifically FDA's Produce Safety Rule. FoodNet continues to collect data and develop analytic tools to adjust for changes in diagnostic testing practices and test characteristics. These actions, along with FoodNet's robust surveillance, provide data to help evaluate the effectiveness of prevention efforts and determine when additional measures are needed.

[††] https://www.fda.gov/Food/GuidanceRegulation/FSMA/ucm334114.htm.

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References

1. Casillas SM, Bennett C, Straily A. Notes from the field: multiple cyclosporiasis outbreaks—United States, 2018. MMWR Morb Mortal Wkly Rep 2018;67:1101–2. https://doi.org/10.15585/mmwr.mm6739a6
2. Interagency Food Safety Analytics Collaboration. Foodborne illness source attribution estimates for 2016 for *Salmonella, Escherichia coli* O157, *Listeria monocytogenes,* and *Campylobacter* using multi-year outbreak surveillance data, United States. Atlanta, GA: US Department of Health and Human Services, CDC; 2018. https://www.cdc.gov/foodsafety/ifsac/pdf/P19-2016-report-TriAgency-508.pdf
3. US Department of Agriculture. Constituent update special alert. August 27, 2018. FSIS to implement enrichment method to detect *Campylobacter* in all raw poultry samples. Washington, DC: US Department of Agriculture; 2018. https://www.fsis.usda.gov/wps/portal/fsis/newsroom/meetings/newsletters/constituent-updates/archive/2018/ConstUpdate082718. Accessed 19 February 2019.
4. Gu W, Vieira AR, Hoekstra RM, Griffin PM, Cole D. Use of random forest to estimate population attributable fractions from a case-control study of *Salmonella enterica* serotype Enteritidis infections. Epidemiol Infect 2015;143:2786–94. https://doi.org/10.1017/S095026881500014X
5. Ingram A, Ripley D. Multistate outbreak of *Salmonella* Enteritidis associated with shell eggs. Presented at the 2019 PulseNet/OutbreakNet East Coast Regional Meeting, Tampa, FL; January 15–17, 2019.
6. Dórea FC, Cole DJ, Hofacre C, et al. Effect of *Salmonella* vaccination of breeder chickens on contamination of broiler chicken carcasses in integrated poultry operations. Appl Environ Microbiol 2010;76:7820–5. https://doi.org/10.1128/AEM.01320-10
7. O'Brien SJ. The "decline and fall" of nontyphoidal *Salmonella* in the United Kingdom. Clin Infect Dis 2013;56:705–10. https://doi.org/10.1093/cid/cis967
8. CDC. Reports of *E. coli* outbreak investigations from 2018. Atlanta, GA: US Department of Health and Human Services, CDC; 2018. https://www.cdc.gov/ecoli/2018-outbreaks.html
9. Food and Drug Administration. FDA sampling assignment update identifies *Cyclospora* in herbs. Silver Spring, MD; US Department of Health and Human Services, Food and Drug Administration; 2018. https://www.fda.gov/Food/NewsEvents/ConstituentUpdates/ucm618781.htm
10. Willett W, Rockström J, Loken B, et al. Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. Lancet 2019;393:447–92. https://doi.org/10.1016/S0140-6736(18)31788-4

Hepatitis C Virus Potentially Transmitted by Opioid Drug Diversion from a Nurse — Washington, August 2017–March 2018

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During January 22–March 23, 2018, a local health department in Washington was notified of two patients who received a diagnosis of acute hepatitis C virus (HCV) infection. Neither patient had behavioral risk factors associated with HCV acquisition; however, both had received injectable narcotic (opioid) drugs from the same nurse during separate visits to an emergency department (ED) at a local hospital on December 6 and December 16, 2017. Investigation revealed that the nurse had accessed the automated drug dispensing system at a higher frequency than had other staff members, admitted diverting* patients' injectable narcotic and antihistamine drugs for personal use, and tested positive for HCV antibodies (anti-HCV) on March 19, 2018, but did not have quantifiable HCV RNA. Specimens from both patients were sent to CDC for genetic testing, and HCV viral variants analysis found a significant level of genetically similar HCV variants in both patients, indicating a common source of infection. Further investigation was conducted to confirm the infection source, identify other potentially exposed patients, and treat any new patients who received an HCV diagnosis. Monitoring frequency of access to drug dispensing systems can help identify staff members with abnormal dispensing patterns, including diversion activities (*1*). U.S. health care facilities are required to prevent, identify, and report any loss, diversion, or theft of controlled substances (*2*).

Investigation and Results

The first patient, a man in his 60s, was evaluated at the hospital ED for abdominal pain on December 6, 2017, and received injectable narcotic drugs from two nurses. The patient returned to the same ED on January 12, 2018, with history of jaundice and abdominal discomfort. During this visit, the patient had elevated liver enzymes and tested positive for both anti-HCV and HCV RNA. In December 2016, the patient had tested negative for anti-HCV during routine screening for persons born during 1945–1965 and did not have any behavioral risk factors associated with HCV infection acquisition. The two nurses who treated the patient with injectable narcotic drugs had each withdrawn injectable narcotic drugs from the automated drug dispensing system at a frequency that was >3 standard deviations above the mean for all staff members during February 2018. On March 19, 2018, one of the nurses (nurse A) tested positive for anti-HCV using an immunoassay test and tested negative for HCV RNA using a real time reverse transcription–polymerase chain reaction test; a week later, she tested HCV RNA–positive at a level less than the lower limit of detection of 15 IU/mL, too low for viral sequencing. This nurse, who had tested anti-HCV–negative and HCV RNA–negative with a blood donation in 2013, admitted diverting injectable narcotic and antihistamine drugs from patients for personal use during current employment at the hospital ED, though she did not specify the mechanism. On March 27, 2018, the other nurse (nurse B) tested negative for anti-HCV using an immunoassay test. Both nurses tested negative for human immunodeficiency virus (HIV) and hepatitis B virus (HBV) infections.

On December 16, 2017, in the same ED, a woman in her 50s received injectable narcotic drugs for neck pain from nurse A. This patient, who also did not have behavioral risk factors associated with HCV infection acquisition, returned to the same ED on March 23, 2018, with jaundice and tested positive for both anti-HCV and HCV RNA.

CDC's Division of Viral Hepatitis performed HCV genetic sequencing and phylogenetic analysis on specimens from both ED patients; a high degree of similarity in nucleotide sequences (>96%) between HCV viral variants sampled from two persons indicates a common source of transmission (*3*,*4*). Both patients had HCV genotype 1a that was >96% similar; it was not possible to assess the similarity between the HCV nucleotides in the infected patients and nurse A because HCV RNA titers for nurse A were too low.

Nurse A worked at the ED during August 4, 2017–March 23, 2018. During that period, the hospital identified 2,985 patients who received injectable drugs (i.e., narcotic, sedative, or antihistamine drugs) at the ED while she was on duty, regardless of whether she had been assigned to provide their care. On April 28, 2018, the hospital mailed letters to the 2,762 (93%) living patients who received the injectable drugs when nurse A was on duty, including 208 (7.5%) patients who were treated by nurse A. The letters described potential HCV exposure and offered free testing for HCV, HBV, and HIV infections.

* Drug diversion is the shift of a prescribed substance from the patient for whom it was prescribed to another person for illicit use. https://www.cdc.gov/mmwr/volumes/65/wr/mm6521a4.htm?s_cid=mm6521a4_w.

By November 1, 2018, a total of 1,863 (67%) of 2,762 patients had been tested for HCV, HBV, and HIV infections, including 175 (84%) of the 208 patients treated by nurse A. Among those 175 patients, 20 (11%) tested positive for anti-HCV or HCV RNA, including 13 (65%) who had HCV genotype 1a with >96% similarity between their intrahost nucleotide sequences, three (15%) who tested anti-HCV–positive but HCV RNA–negative, and four (20%) who tested HCV RNA–positive with titers below quantification level. Among the remaining 1,688 patients with no record of treatment by nurse A, 65 (4%) tested positive for anti-HCV or HCV RNA, including 49 (75%) with positive anti-HCV and negative HCV RNA, 15 (25%) who had both positive anti-HCV and HCV RNA, which were not genetically related (10 genotype 1a, one genotype 1b, one genotype 2b, and three genotype 3a), and one (1%) with positive RNA titers below quantification level. No screened patients tested positive for HIV, and no new HBV infections were identified. No other health care providers at the ED were offered HCV testing, and no others had provided treatment to a majority of the 13 patients with genetically similar HCV infection.

Twelve of 13 patients with genetically similar HCV RNA specimens had newly diagnosed HCV infection and had received injectable narcotic, sedative, or antihistamine drugs from nurse A during November 22–December 26, 2017 (Figure). One patient was known to have chronic HCV infection and received injectable narcotic drugs from nurse A twice in the ED: first on August 17, 2017, and again on November 8, 2017. It is possible that nurse A acquired the virus from the patient with chronic HCV infection during the November 8 visit and was infectious during November 22–December 26, 2017, during which time at least 12 patients that she treated became infected.

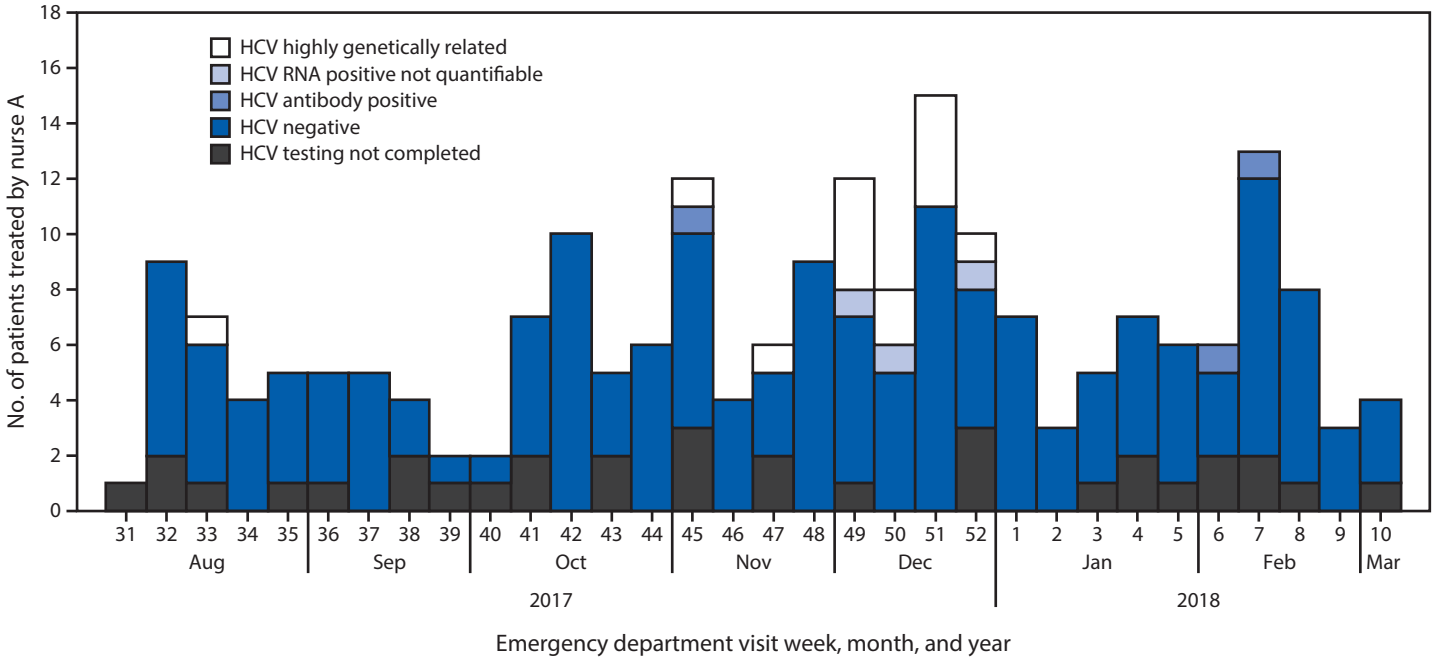
Public Health Action

All screened patients with positive HCV RNA results were referred for care, including hepatitis C treatment for those who developed chronic infection. Because of the high risk for HCV infection among patients who received injections from nurse A, the local health department is conducting additional outreach to the remaining 33 (16%) patients who had not been tested for hepatitis C at the time of this analysis. The Washington State Nursing Commission conducted a separate investigation of nurse A's professional conduct and suspended her practicing license.

Discussion

An HCV outbreak occurred among patients treated in a Washington ED; transmission likely occurred as the result of unsafe injection practices during drug diversion by a health care provider. Drug diversion by health care providers can pose serious infection risks for patients (*1*). Transmission of HCV

FIGURE. Hepatitis C virus (HCV) infection testing among patients (n = 208*) who were treated by nurse A during their visit to the hospital's emergency department during August 2017–March 2018



* Three patients had visited and received treatment from nurse A at the emergency department twice. Two of the patients tested negative for both HCV antibodies and HCV RNA; one previously diagnosed chronically HCV-infected patient with genetically similar HCV had received treatment at the emergency department on August 17, 2017, and November 8, 2017.

from infected health care providers who divert patient drugs has been previously reported, and in some cases those providers have reported unsafe practices including injecting themselves with the patient's drug, refilling the syringe with water, and injecting water into the patient (*5*,*6*). Some investigations have confirmed transmission of HCV infection from health care providers to patients by identifying genetically similar HCV infections in both the health care providers and infected patients (*3*).

Several epidemiologic findings in this investigation strongly indicate that nurse A was the likely source of infection for the 12 patients with acute HCV infection. First, she had accessed the automated drug dispensing system at a higher frequency than had other staff members and admitted to diverting patient injectable narcotic drugs for personal use. Second, she had seroconverted to anti-HCV–positive after a previous negative test and then tested positive for HCV RNA, indicating recent infection. Finally, having administered injectable narcotic, sedative, or antihistamine drugs to each patient, nurse A was the only common epidemiologic link to 13 patients with genetically similar HCV. The patients with HCV infection who were not cared for by nurse A were infected by strains that were genetically distant from each other and from the HCV 1a strains infecting the group of 13 patients.

Because repeat HCV infection after viral clearance might occur with reexposure to the virus (*7*), it is possible that nurse A could have experienced more than one acute HCV infection between the last negative anti-HCV and HCV RNA tests in 2013 and first positive test in 2018. It is also possible that other patients infected by the nurse were missed by limiting the investigation to the period of this outbreak.

Health care facilities need to develop security measures and to actively monitor drug dispensing systems to detect and prevent narcotic and other drug diversion (*2*,*8*). Protocols to respond to identified drug diversion should address testing of patients at risk for contracting illness and measures to prevent further transmission.

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Summary

What is already known about this topic?

U.S. health care facilities are required to prevent, identify, and report any loss, diversion, or theft of controlled substances. Tampering with injectable narcotic drugs can expose patients to infections.

What is added by this report?

Routine surveillance detected acute hepatitis C virus (HCV) infections in two hospital emergency department patients. Investigation identified an outbreak of at least 12 HCV infections in patients who had received opioid injections from a nurse who admitted to diverting injectable narcotic drugs.

What are the implications for public health practice?

Health care facilities and public health partners should recognize the potential for infections and other harms from drug diversion and minimize risks by storing controlled substances securely and routinely scrutinizing drug access logs.

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All authors have completed and submitted the ICMJE form for disclosure of potential conflicts of interest. No potential conflicts of interest were disclosed.

References

1. Schaefer MK, Perz JF. Outbreaks of infections associated with drug diversion by US health care personnel. Mayo Clin Proc 2014;89:878–87. https://doi.org/10.1016/j.mayocp.2014.04.007
2. Berge KH, Dillon KR, Sikkink KM, Taylor TK, Lanier WL. Diversion of drugs within health care facilities, a multiple-victim crime: patterns of diversion, scope, consequences, detection, and prevention. Mayo Clin Proc 2012;87:674–82. https://doi.org/10.1016/j.mayocp.2012.03.013
3. Cody SH, Nainan OV, Garfein RS, et al. Hepatitis C virus transmission from an anesthesiologist to a patient. Arch Intern Med 2002;162:345–50. https://doi.org/10.1001/archinte.162.3.345
4. Ramachandran S, Thai H, Forbi JC, et al.; Hepatitis C Investigation Team. A large HCV transmission network enabled a fast-growing HIV outbreak in rural Indiana, 2015. EBioMedicine 2018;37:374–81. https://doi.org/10.1016/j.ebiom.2018.10.007
5. Brown J. 30-year term for surgical tech who swapped infected needles. The Denver Post. February 24, 2010. https://www.denverpost.com/2010/02/24/30-year-term-for-surgical-tech-who-swapped-infected-needles
6. Warner AE, Schaefer MK, Patel PR, et al. Outbreak of hepatitis C virus infection associated with narcotics diversion by an hepatitis C virus–infected surgical technician. Am J Infect Control 2015;43:53–8. https://doi.org/10.1016/j.ajic.2014.09.012
7. Osburn WO, Fisher BE, Dowd KA, et al. Spontaneous control of primary hepatitis C virus infection and immunity against persistent reinfection. Gastroenterology 2010;138:315–24. https://doi.org/10.1053/j.gastro.2009.09.017
8. Berge KH, Lanier WL. Bloodstream infection outbreaks related to opioid-diverting health care workers: a cost-benefit analysis of prevention and detection programs. Mayo Clin Proc 2014;89:866–8. https://doi.org/10.1016/j.mayocp.2014.04.010

Erratum

Vol. 67, No. 33

In the report "Assessment of Epidemiology Capacity in State Health Departments — United States, 2017," on page 936, a Table contained errors. The corrected Table is below.

TABLE. Epidemiology full-time equivalents (FTEs), by program area — Council of State and Territorial Epidemiologists Epidemiology Capacity Assessment, 50 states and the District of Columbia, 2017

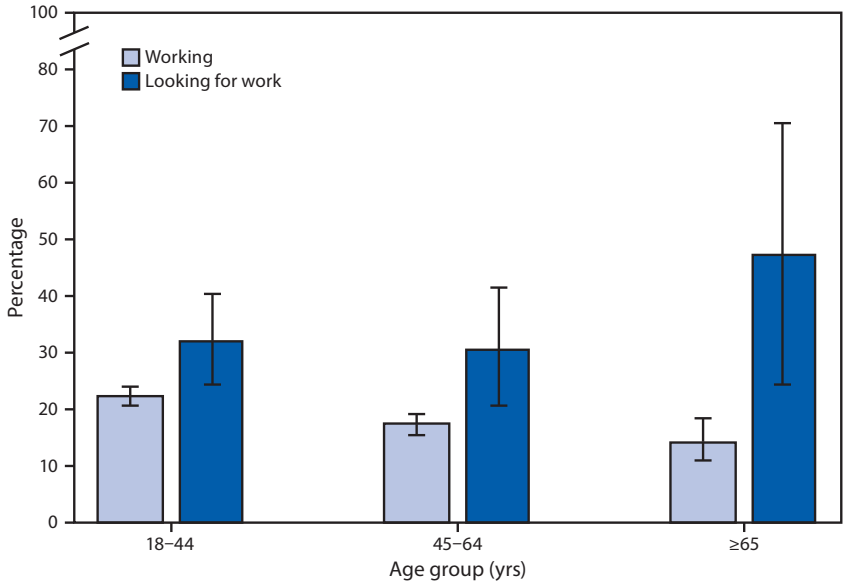
Program area	FTEs currently filled (% of total)	Additional FTEs needed	Optimal* (% of ideal FTEs currently met)†	Vacant positions§	Positions actively being recruited¶
Infectious disease	1,838.2 (54.6)	338.4	2,176.6 (84.4)	158.6	140.6
Maternal and child health	321.2 (9.5)	122.0	443.2 (72.4)	**41.7**	**36.7**
Chronic disease	304.4 (9.0)	136.6	441.0 (69.0)	**44.7**	**37.7**
Environmental health	221.7 (6.6)	121.9	343.6 (64.5)	23.3	18.3
Informatics	95.7 (2.8)	91.2	186.9 (51.2)	**11.2**	**13.2**
Vital statistics	110.7 (3.3)	62.0	172.7 (64.1)	**15.0**	**14.0**
Injury	102.5 (3.0)	56.9	159.4 (64.3)	**9.5**	**10.5**
Preparedness	117.6 (3.5)	35.7	153.3 (76.7)	**13.2**	**13.2**
Substance abuse	58.6 (1.7)	63.7	122.3 (47.9)	8.8	6.3
Occupational health	28.4 (0.8)	38.1	66.5 (42.7)	**3.0**	**2.0**
Mental health	4.0 (0.1)	42.3	46.3 (8.6)	**1.3**	**3.3**
Oral health	18.0 (0.5)	25.0	43.0 (41.9)	**7.5**	**5.5**
Genomics	4.4 (0.1)	20.2	24.6 (17.9)	**6.0**	**6.0**
Other	143.4 (4.3)	45.1	188.5 (76.1)	9.6	6.6
Total	**3,368.8 (100.0)**	**1,199.1**	**4,567.9 (73.7)**	**353.4**	**313.9**

* Currently filled plus additional needed.
† Currently filled/ideal x 100.
§ Positions to be filled at a state health department for which work is available and the job could start within 30 days.
¶ Vacant positions human resources working actively to fill.

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage* of Adults Aged ≥18 Years Who Felt Worried, Nervous, or Anxious Daily or Weekly,† by Age Group and Employment Status§ — National Health Interview Survey,¶ United States, 2017



* With 95% confidence intervals shown by error bars.
† Based on a response of "daily" or "weekly" to the following question: "How often do you feel worried, nervous or anxious? Would you say daily, weekly, monthly, a few times a year, or never?"
§ Employment status in the week before the interview included 1) working for pay at a job or business; or with a job or business, but not at work; or working, but not for pay, at a family-owned job or business and 2) looking for work.
¶ Estimates are based on household interviews of a representative sample of the adult, noninstitutionalized U.S. civilian population and are derived from the National Health Interview Survey Adult Functioning and Disability Supplement.

In 2017, compared with adults currently working, the percentage of adults who reported feeling worried, nervous, or anxious daily or weekly was higher among those looking for work in all three age groups: 18–44 years (22.4% versus 32.1%), 45–64 years (17.3% versus 30.4%), and ≥65 years (14.3% versus 47.2%). The percentage of currently working adults who reported feeling worried, nervous, or anxious declined with age.

Source: National Health Interview Survey, 2017. https://www.cdc.gov/nchs/nhis.htm.

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