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Confidentiality Issues and Use of Sexually Transmitted Disease Services Among Sexually Experienced Persons Aged 15–25 Years — United States, 2013–2015

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National-level data are limited regarding confidentiality-related issues and the use of sexually transmitted disease (STD) services for adolescents and young adults. Changes in the U.S. health care system have permitted dependent children to remain on a parent's health insurance plan until the child's 26th birthday and required coverage of certain preventive services, including some STD services, without cost sharing for most plans (*1*,*2*). Although these provisions likely facilitate access to the health care system, adolescents and young adults might not seek care or might delay seeking care for certain services because of concerns about confidentiality, including fears that their parents might find out (*3*,*4*). Therefore, it is important to examine STD services and confidentiality-related issues among persons aged 15–25 years in the United States. CDC analyzed data from the 2013–2015 National Survey of Family Growth and found that 12.7% of sexually experienced youths (adolescents aged 15–17 years and those young adults aged 18–25 years who were on a parent's insurance plan) would not seek sexual and reproductive health care because of concerns that their parents might find out. Particularly concerned were persons aged 15–17 years (22.6%). Females with confidentiality concerns regarding seeking sexual and reproductive health care reported a lower prevalence of receipt of chlamydia screening (17.1%) than did females who did not cite such concerns (38.7%). More adolescents aged 15–17 years who spent time alone with a health care provider (without a parent in the room) reported receipt of a sexual risk assessment (71.1%) and, among females, chlamydia testing (34.0%), than did those who did not spend time alone (36.6% and 14.9%, respectively). The results indicated that confidentiality-related issues were associated with less reported use of some STD services, especially for younger persons and females. Spending time alone with a provider (i.e., without a parent present) during a health care visit has been associated previously with higher reported delivery of sexual health services (*5*) and has been suggested by the American Academy of Pediatrics and Society for Adolescent Health and Medicine (*6*). Public health efforts related to confidentiality of STD services might be helpful to increase the use of recommended services among some youths.

To effectively prevent and control the spread of STDs, CDC recommends health services that include a sexual risk assessment, chlamydia screening for sexually active women aged ≤25 years, and risk-based testing for other STDs (*7*). Several

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professional medical organizations have endorsed approaches to maintaining confidentiality in insurance plan communications (e.g., explanation of benefits) (*4*). This report uses data for sexually experienced persons aged 15–25 years to provide national estimates of confidentiality-related issues among U.S. adolescents and young adults and examines that association with the receipt of STD services.

The National Survey of Family Growth conducts in-person interviews with females and males aged 15–44 years selected from U.S. households and collects information on marriage, divorce, family life, having and raising children, and medical care.* The survey measures reproductive health status and evaluates the need for and effectiveness of health education programs. The 2013–2015 survey included 10,205 respondents with a 69.3% response rate.

For this report, the data used were primarily collected using audio computer-assisted self-interviewing. STDs are transmitted by sexual contact; therefore, analyses were restricted to respondents aged 15–25 years who were sexually experienced, defined as ever having had any type of sexual contact (vaginal, oral, or anal) with an opposite-sex or same-sex partner. Confidentiality-related issues in the survey included 1) whether all respondents aged 15–17 years and those respondents aged 18–25 years who were on a parent's private health insurance plan would "ever not go for sexual or reproductive health care because their parents might find out"; 2) whether respondents aged 15–17 years had "time alone with a provider in the past 12 months without a parent, relative, or guardian in the room"; and 3) current health insurance status, including being on a parent's insurance plan. STD services included receiving a sexual risk assessment and other clinical services. Receipt of a sexual risk assessment in the past 12 months was defined as reporting that a doctor or other health care provider asked about at least one of the following: 1) sexual orientation or sex of their sexual partners; 2) number of sexual partners; 3) use of condoms; and 4) types of sex (vaginal, oral, or anal). Receipt of other STD services was defined, for females, as receiving chlamydia testing in the past 12 months; for males, as receiving an STD test in the past 12 months; and for both females and males, as receiving treatment for an STD in the past 12 months.

Demographic characteristics of sexually experienced youths who would not seek sexual and reproductive health care because of concerns that their parents might find out were examined, and receipt of STD services was analyzed by demographic characteristics, sexual risk, and confidentiality-related issues. Analyses were weighted and adjusted to account for the complex survey design. Differences between groups were assessed using Wald chi-square tests, with statistical significance defined as $p<0.05$.

During 2013–2015, overall, 12.7% of sexually experienced persons aged 15–17 years and aged 18–25 years who were covered by a parent's insurance plan (13.5% of females and 12.0% of males) reported that they would not seek sexual and reproductive health care because of concerns that their parents

* https://www.cdc.gov/nchs/nsfg/.

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might find out (Table 1). A significantly higher percentage of youths aged 15–17 years (22.6%) said they would not seek sexual and reproductive health services for this reason than did those aged 20–22 years (8.2%) and 23–25 years (5.4%) (Table 1). Regarding receipt of STD services, persons aged 15–17 years who had time alone with a health care provider in the past 12 months reported significantly higher prevalences of receiving a sexual risk assessment (71.1%) than did those who did not have time alone with a provider (36.6%) (Table 2). Youths without health insurance reported the lowest prevalence of receiving a sexual risk assessment (38.2%), but the highest prevalence of receiving STD treatment (9.7%), compared with youths in other insurance categories.

Other recommended STD services also were examined by confidentiality-related issues. Significantly lower percentages of females who reported that they would not seek sexual and reproductive health care because of concerns that their parents might find out received a chlamydia test in the past 12 months (17.1%) than did those who did not report this concern (38.7%). In addition, females aged 15–17 years who had time alone with a health care provider were significantly more likely to have received a chlamydia test in the past 12 months (34.0%) than were those who had not had time alone with a provider (14.9%) (Table 2). Among males, the reported prevalence of receiving an STD test in the past 12 months did not differ significantly among those aged 15–25 years who would not go for sexual and reproductive health care because their parents might find out (13.0%) compared with those who would go (16.7%). The prevalence also did not differ significantly among males aged 15–17 years who had time alone with a provider in the past 12 months (13.6%) and those who did not (9.5%). Among males, the reported prevalences of receiving STD testing were significantly higher among those on public insurance (24.9%) and those with no insurance (24.7%) compared with those with private insurance (16.2%–19.4%).

Discussion

Overall, 12.7% of sexually experienced persons aged 15–17 years and those aged 18–25 years on a parent's insurance plan reported that they would not seek sexual and reproductive health care because of concerns that their parents might find out; these concerns were most commonly reported among persons aged 15–17 years (22.6%). Not seeking sexual and reproductive health care because of concerns that their parents might find out was associated with a lower prevalence of chlamydia testing among females. This finding is concerning because chlamydia is often asymptomatic, and chlamydia testing is a recommended preventive service for adolescent and young adult females (*7*). In addition, survey respondents who had time alone with their provider during their health care visit

TABLE 1. Percentage of sexually experienced* females and males aged 15–25 years who said they would not seek sexual or reproductive health care because their parents might find out,† by demographic and behavioral characteristics — National Survey of Family Growth, United States, 2013–2015

Characteristic	Estimated pop.	% (95% CI)	p-value
Total	**17,077,000**	**12.7 (10.1–15.4)**	—
Sex			
Female	8,058,000	13.5 (10.1–16.9)	0.510
Male	9,019,000	12.0 (8.5–15.6)	
Age group (yrs)			
15–17	4,915,000	22.6 (17.6–27.6)	<0.001
18–19	3,013,000	14.1 (6.5–21.7)	
20–22	5,361,000	8.2 (4.2–12.2)	
23–25	3,789,000	5.4 (2.4–8.3)	
Race/Ethnicity			
Hispanic	2,985,000	14.7 (8.3–21.1)	0.161
White, non-Hispanic	10,746,000	12.1 (8.8–15.4)	
Black, non-Hispanic	2,115,000	9.9 (4.9–14.9)	
Other or multiple race, non-Hispanic	1,232,000	18.5 (8.0–28.9)	
Composite sexual risk§			
At elevated STD risk	1,981,000	17.1 (9.6–24.7)	0.225
Not at elevated STD risk	14,995,000	12.2 (9.4–15.0)	

Abbreviations: CI = confidence interval; STD = sexually transmitted disease.
* Sexually experienced was defined as those who have ever had vaginal intercourse, oral sex, or anal sex, with an opposite-sex or same-sex partner in their lifetime.
† For respondents aged 18–25 years, this question was only asked if they were on a parent's private health insurance plan.
§ Included male-to-male sex, females who had a male sex partner who had sex with other males, five or more sexual partners, sex in exchange for money or drugs, a sex partner who injected illegal drugs, or a human immunodeficiency virus–positive partner in the past 12 months.

Summary

What is already known about this topic?

Issues related to confidentiality have been associated with youths not seeking care for some sexual or reproductive health–related services.

What is added by this report?

Nationally, 12.7% of sexually experienced adolescents and young adults who were on a parent's health insurance plan would not seek sexual and reproductive health care because of concerns that their parents might find out. This was highest among persons aged 15–17 years (22.6%). Overall, these persons reported lower prevalences of receiving certain recommended sexually transmitted disease (STD) services. However, receiving a sexual risk assessment (both males and females) and chlamydia test (females) was higher among persons aged 15–17 years who had time alone with a health care provider in the past 12 months compared with those who had not.

What are the implications for public health practice?

Confidentiality issues, including concerns that parents might find out, might be barriers to the use of STD services among some subpopulations. Public health efforts to reduce these confidentiality concerns might be useful. Some medical organizations suggest that providers have time alone with patients without a parent in the room.

TABLE 2. Percentage of sexually experienced* females and males aged 15–25 years who had received a selected STD-related service in the past 12 months, by confidentiality-related, sexual risk, and demographic characteristics — National Survey of Family Growth, United States, 2013–2015

	Total				Females		Males	
Characteristic	Sexual risk assessment % (95% CI)†	p-value	STD treatment % (95% CI)§	p-value	Chlamydia test % (95% CI)	p-value	STD test % (95% CI)¶	p-value
Total	**47.5 (44.8–50.3)**	**—**	**6.5 (5.3–7.6)**	**—**	**38.6 (35.9–41.2)**	**—**	**20.4 (17.5–23.2)**	**—**
Confidentiality-related factors								
Would ever not go for sexual or reproductive health care because their parents might find out**								
Yes	48.0 (39.6–56.4)	0.666	5.9 (1.3–10.5)	0.957	17.1 (6.6–27.7)	0.002	13.0 (4.4–21.6)	0.426
No	49.9 (46.1–53.7)		5.8 (3.8–7.7)		38.7 (34.0–43.4)		16.7 (13.0–20.4)	
Had time alone with provider in past 12 months (15–17 yr age group only)								
Yes	71.1 (62.8–79.3)	<0.001	6.6 (1.1–12.0)	0.072	34.0 (20.9–47.1)	0.021	13.6 (5.5–21.7)	0.424
No	36.6 (30.4–42.9)		1.4 (0.3–2.5)		14.9 (7.3–22.5)		9.5 (4.1–15.0)	
Current health insurance								
Private insurance, parent's plan	49.3 (45.3–53.3)	<0.001	5.7 (3.8–7.6)	0.013	36.3 (30.9–41.6)	0.242	16.2 (12.1–20.3)	0.034
Private insurance, other	44.4 (37.1–51.6)		4.1 (2.2–6.1)		40.2 (29.0–51.4)		19.4 (11.5–27.3)	
Public insurance	51.9 (46.4–57.5)		7.2 (4.9–9.6)		43.4 (37.8–49.0)		24.9 (18.9–30.8)	
No insurance	38.2 (33.6–42.8)		9.7 (6.2–13.2)		35.4 (28.0–42.7)		24.7 (18.4–31.0)	
Sexual risk								
Received sexual risk assessment in past 12 months†								
Yes	—	—	10.9 (9.1–12.8)	<0.001	51.1 (47.1–55.0)	<0.001	42.9 (37.2–48.5)	<0.001
No	—	—	2.4 (1.2–3.6)		18.8 (14.2–23.3)		8.7 (6.3–11.2)	
Composite sexual risk††								
At elevated STD risk	60.6 (54.3–66.9)	0.001	19.6 (13.4–25.8)	<0.001	61.1 (50.8–71.3)	<0.001	44.4 (32.3–56.6)	0.001
Not at elevated STD risk	45.8 (42.6–49.0)		4.9 (3.8–5.9)		36.9 (33.9–39.7)		15.9 (13.4–18.3)	
Demographics								
Age (yrs)								
15–17	50.9 (45.5–56.4)	0.196	3.5 (1.1–5.9)	0.045	23.5 (16.5–30.4)	<0.001	10.7 (6.6–14.9)	0.002
18–19	51.3 (44.4–58.3)		7.6 (4.5–10.7)		31.4 (24.0–38.9)		15.4 (9.9–21.0)	
20–22	47.0 (42.5–51.5)		5.6 (3.9–7.4)		46.1 (40.7–51.6)		20.7 (16.2–25.2)	
23–25	44.9 (40.8–48.9)		8.0 (5.6–10.3)		40.6 (35.3–45.9)		27.4 (20.8–34.1)	
Race/Ethnicity								
Hispanic	49.1 (43.7–54.5)	0.001	5.6 (3.7–7.6)	<0.001	35.8 (28.8–42.7)	<0.001	23.9 (18.5–29.4)	<0.001
White, non-Hispanic	44.0 (40.0–48.0)		4.9 (3.7–6.2)		35.4 (31.3–39.5)		14.3 (11.1–17.5)	
Black, non-Hispanic	59.9 (54.9–64.8)		12.6 (9.4–15.9)		56.1 (49.5–62.7)		38.4 (30.3–46.4)	
Other or multiple race, non-Hispanic	43.6 (36.1–51.1)		7.2 (2.4–12.1)		35.1 (24.9–45.4)		15.8 (5.9–25.7)	

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

* Sexually experienced was defined as those who have ever had vaginal intercourse, oral sex, or anal sex, with an opposite-sex or same-sex partner in their lifetime.

† Based on at least one "yes" response to four questions asking whether a doctor or other medical care provider asked about the sexual orientation or the sex of their sexual partners, number of sexual partners, use of condoms, and the types of sex they have (vaginal, oral, or anal).

§ "In the past 12 months, have you been treated or received medication from a doctor or other medical care provider for a sexually transmitted disease like gonorrhea, chlamydia, herpes, or syphilis?"

¶ "In the past 12 months, have you been tested by a doctor or other medical care provider for a sexually transmitted disease like gonorrhea, chlamydia, herpes, or syphilis?"

** For respondents aged 18–25 years, this question was only asked if they were on a parent's private health insurance plan.

†† Included male-to-male sex, females who had a male sex partner who had sex with other males, five or more sexual partners, sex in exchange for money or drugs, a sex partner who injects illegal drugs, or a human immunodeficiency virus (HIV)–positive partner in the past 12 months.

were more likely to have received a sexual risk assessment (both males and females) and a chlamydia test (females).

These findings are similar to those found for other sexual and reproductive health services (*8*). Several medical organizations have emphasized the need for confidentiality for youths seeking care such as STD services (*6*). Previous research has found that females might have more general and sexual and reproductive health–specific confidentiality concerns than do males (*9*). Finally, the frequency of STD testing among males with public insurance or no insurance was higher than among males with a parent's insurance or private insurance. It is possible that these males might be seeking services from safety net providers (i.e., those who provide health care to uninsured or underinsured populations) who have reduced or no fees (*10*).

The findings in this report are subject to at least two limitations. First, receipt of STD services was self-reported and might be subject to social desirability and recall biases. Second, the survey was cross-sectional, and the confidentiality-related questions were not directly linked to the STD service questions. Thus, a causal relationship between confidentiality concerns and receipt of STD services cannot be inferred.

Concerns about maintaining confidentiality for STD services, including privacy issues such as not spending time alone with a health care provider without a parent in the room, might limit the use of these services for some youths. Public health practitioners might consider work to reduce some confidentiality concerns and potentially increase use of recommended STD services. Some medical organizations suggest that patients having time alone with a provider during a health care visit can be useful for sensitive services.

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CDC Grand Rounds: Public Health Strategies to Prevent Neonatal Abstinence Syndrome

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Public Health Burden of Neonatal Abstinence Syndrome

Neonatal abstinence syndrome (NAS) is a drug withdrawal syndrome that most commonly occurs in infants after in utero exposure to opioids, although other substances have also been associated with the syndrome (*1*). NAS usually appears within 48–72 hours of birth with a constellation of clinical signs, including central nervous system irritability (e.g., tremors), gastrointestinal dysfunction (e.g., feeding difficulties), and temperature instability (*1*) (Box 1). Opioid exposure during pregnancy might result from clinician-approved use of prescription opioids for pain relief; misuse or abuse of prescription opioids; illicit use (e.g., heroin); or medication-assisted treatment (MAT) of opioid use disorder (*2*) (Box 2).

Opioid pain reliever sales quadrupled in the United States from 1999 to 2010. From 2000 to 2014, opioid-related overdoses among U.S. adults increased 200% (*3*). Opioid use during pregnancy has also increased nationally in recent years. The percentage of Medicaid-enrolled women who filled at least one opioid prescription during pregnancy increased 23% during 2000–2010, from 18.5% to 22.8% (*4*). The prevalence of opioid abuse or dependence among pregnant women has increased from 1.7 per 1,000 delivery admissions in 1998 to 3.9 in 2011 (*5*). Reflective of increasing maternal opioid exposure, the incidence of NAS has increased approximately 400% nationally, from 1.2 per 1,000 hospital births in 2000 to 5.8 in 2012, with some states reporting rates in excess of 30 per 1,000 hospital births (*6*,*7*). By 2012, on average, one NAS-affected infant was born every 25 minutes in the United States (*6*).

Respiratory and feeding difficulties, low birth weight, and seizures are more prevalent among infants with NAS (*1*). Care for infants with NAS has placed a substantial burden on hospitals, particularly on neonatal intensive care units. In 2012, a term infant without complications had a mean length of stay of 2.1 days and charge of $3,500; whereas, an infant with NAS had a mean hospital stay of 16.9 days and a mean hospital charge of $66,700 (*6*).

This is another in a series of occasional MMWR *reports titled CDC Grand Rounds. These reports are based on grand rounds presentations at CDC on high-profile issues in public health science, practice, and policy. Information about CDC Grand Rounds is available at https://www.cdc.gov/about/grand-rounds.*

Aggregate hospital charges for all infants with NAS in 2012 were estimated to be $1.5 billion; approximately 80% was financed by Medicaid programs (*6*). Public health measures to prevent and treat opioid dependence before and during pregnancy are essential to reducing the incidence of NAS and its related health care burden. Strategies include promoting responsible opioid prescribing, decreasing unplanned pregnancies among women who abuse opioids, screening and treatment during pregnancy, and standardizing postnatal treatment for infants with NAS (Figure).

Prevention and Intervention Strategies

Primary prevention. Strategies to prevent the incidence of NAS center on responsible opioid prescribing and access to preconception care and family planning services (Figure). The 2016 *CDC Guideline for Prescribing Opioids for Chronic Pain* (*8*) recommends that clinicians address the unique sensitivities of prescribing opioid medications to pregnant women and nonpregnant women of reproductive age. Recommended actions include discussing how long-term opioid use might affect current and future pregnancies and how women of reproductive age with a need for long-term opioid use can avoid unintended pregnancy. Clinicians and patients together should carefully weigh risks and benefits when deciding whether to initiate opioid therapy for chronic pain during pregnancy. Other specific recommendations for women of reproductive age include considering nonopioid pharmacologic therapy for chronic pain management and prescribing the lowest effective dose when opioids are started. As of March 2016, the Food and Drug Administration requires both sustained and immediate-release opioid medication to include a black box warning, informing patients that prolonged opioid use during pregnancy might lead to NAS.

Prescription drug monitoring programs (PDMPs) are an important public health tool to support responsible opioid prescribing. PDMPs are state-based databases that track controlled prescription drugs dispensed by pharmacies and allow prescribers to review a patient's prescription history before prescribing. Every state except Missouri has implemented a PDMP (*9*). Preliminary research suggests that PDMPs have been associated with a reduction in opioid-related deaths in the general population (*9*). Successful application of PDMPs requires that prescribing health care providers are both aware of and regularly use the PDMP database (*9*). However, barriers, such as provider time

BOX 1. Signs of neonatal abstinence syndrome

Central nervous system irritability
- High-pitched, continuous crying
- Decreased sleep
- Tremors
- Increased muscle tone
- Hyperactive Moro reflex
- Seizures
- Gastrointestinal dysfunction
- Feeding difficulties
- Vomiting
- Loose/watery stools

Autonomic nervous system activation
- Sweating
- Fever
- Frequent yawning and sneezing
- Increased respiratory rate
- Nasal stuffiness and flaring

BOX 2. Opioid exposures associated with neonatal abstinence syndrome

Central nervous system irritability
- Prescription pain relievers, such as Vicodin, OxyContin, Percocet
- Illicit substances: heroin or nonpharmaceutical formulations of fentanyl
- Opioid-assisted maintenance therapy (also known as medication-assisted treatment): long-term treatment for opioid use disorder, under medical supervision, with a longer-acting but less euphoric opioid
  - Methadone or buprenorphine is recommended by the American College of Obstetricians and Gynecologists during pregnancy

constraints and lack of data integration into electronic medical records, might prevent universal adoption of PDMPs by health care providers. CDC continues to fund states for prescription drug overdose prevention activities, including maximizing PDMP use and improving timeliness of data availability.*

Another primary prevention strategy that might reduce the incidence of NAS is ensuring access to family planning and preconception care for women who use opioids. Among women who abuse opioids, 86% of pregnancies are unintended (*10*). CDC and the Office of Population Affairs of the U.S. Department of Health and Human Services recommend that health care providers support family planning services, which include preconception services, pregnancy intention screening, and contraceptive counseling to prevent unintended pregnancy by increasing access to the full range of contraceptive methods, including long-acting reversible contraception (e.g., intrauterine devices and implants) (*11*).

Two national initiatives encourage clinicians to practice responsible prescribing and help women of reproductive age optimize their health before pregnancy. CDC's Treating for Two: Safer Medication Use in Pregnancy initiative† encourages evidence-based prescribing practices and informed decision-making specifically for pregnant women and for nonpregnant women of reproductive age. The second, the National Preconception Health and Health Care Initiative,§ provides educational resources to clinicians and their patients, and coordinates outreach and social media campaigns related to improving preconception health, including reducing substance use and treating substance use disorders before pregnancy.

Intervention strategies and treatment for women with opioid use disorder. Provision of treatment for pregnant women with opioid use disorder is important. Medically supervised tapering of opioids in pregnant women is associated with high relapse rates as compared to methadone maintenance (*2*). The Substance Abuse and Mental Health Services Administration (SAMHSA) and the American College of Obstetricians and Gynecologists recommend that pregnant women with opioid use disorder receive MAT with methadone or buprenorphine (*2*,*12*). SAMHSA's Substance Abuse Prevention and Treatment block grants have recently been revised to strengthen capacity to deliver MAT for pregnant women with substance use disorders. It is important that clinical providers evaluate concurrent substance use (e.g., tobacco) and common maternal psychiatric (e.g., depression) and infectious (e.g., hepatitis C) comorbidities of opioid use disorder (*13*). In addition, clinical providers should anticipate that infants born to women receiving MAT might have NAS (*8*). Collaboration with pediatric care teams is necessary to assess infants with in utero opioid exposure for signs of NAS and provide appropriate treatment.

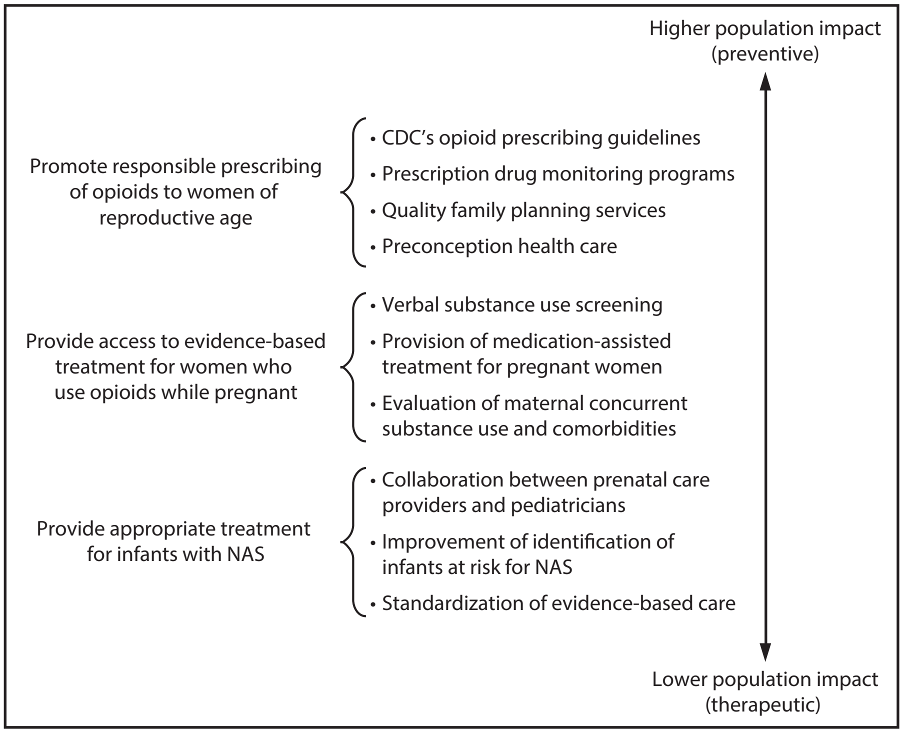
Strategies to mitigate the effects of NAS. Improvements in the identification of infants at risk and standardized treatment of infants with NAS could greatly mitigate the effects of NAS and the associated health care burden. To enable state health departments identify and provide interventions to areas with high NAS incidence, four states (Florida, Georgia, Kentucky, and Tennessee) have designated NAS a reportable condition.

Treatment of NAS begins with nonpharmacological strategies, such as minimizing environmental stimuli (e.g., placement in a dark, quiet space), careful swaddling, and, in the absence of other contraindications, breastfeeding. In addition,

* https://www.cdc.gov/drugoverdose/states/state_prevention.html.

† https://www.cdc.gov/pregnancy/meds/treatingfortwo/.
§ https://beforeandbeyond.org/.

FIGURE. Specific strategies to reduce the health care burden of neonatal abstinence syndrome (NAS), by population impact



severe NAS requires tapered dosages of morphine or methadone as recommended by the American Academy of Pediatrics, to ease infants' withdrawal, coupled with nonpharmacologic strategies (*1*). Further, recent studies have found that hospital-level strategies, including rooming-in, rather than infant placement in neonatal intensive care units, increased family involvement during hospitalization (*14*), and standardized opioid-weaning guidelines (*15*), were associated with shorter lengths of hospital stay for infants with NAS. A multicenter quality improvement study aimed at standardization of hospital care for infants with NAS demonstrated that implementation of standardized procedures for assessing infants at risk and treating infants with NAS decreased both their length of hospital stay and need for pharmacological treatment (*16*). State perinatal quality collaboratives are networks of perinatal care providers and public health professionals working together to advance evidence-based clinical practices and processes through quality improvement. Quality improvement projects addressing the care of infants with NAS are ongoing.[¶]

Barriers to prevention and treatment. As a part of complete obstetric care, The American College of Obstetricians and Gynecologists recommends that all pregnant women be routinely asked about their substance use, including prescription opioids and other medications used for nonmedical reasons (*2*). Despite the importance of detecting substance use disorders among pregnant women to offer timely treatment, there is little consensus regarding the best screening tool to identify substance use among pregnant women, the best time during pregnancy to screen, and whether biologic specimens should be used in conjunction with or in lieu of verbal screening. To address the need for reliable substance use screening during pregnancy, CDC is currently funding a three-site research study to assess the performance of five different substance use screening tools for pregnant women (NIH RePORT Project number: 5R21DP006082–02).

Stigma, provider bias, and legal consequences pose additional barriers to screening and subsequent identification of women in need of treatment. Screening for substance abuse during pregnancy and compliance with legally mandated reporting might be subject to provider bias in contrast to adherence to objective medical criteria (*17*). Furthermore, legal ramifications for maternal substance use vary by state. Eighteen states classify maternal substance use as child abuse and three states consider it grounds for involuntary hospitalization.[**] Conversely, 19 states provide specialized drug treatment programs for pregnant women, 13 states prioritize pregnant women in state-funded drug treatment programs, and four states legally prohibit discrimination against pregnant women who seek substance abuse treatment. The impacts of these varied state legislations on prenatal care attendance, disclosure of substance use, and treatment seeking or receipt are unclear.

Federal Legislation and Awareness

Two recent legislative initiatives and a nationwide call to action address maternal opioid use and NAS. The Protecting Our Infants Act of 2015[††] stipulates that the U.S. Department of Health and Human Services conduct a review of intra-agency work related to NAS and prenatal opioid exposure to identify gaps or overlap in research or programs and to provide technical assistance to states and American Indian tribes when implementing public health measures, including NAS surveillance systems. The Comprehensive Addiction and Recovery Act of 2016[§§] extends the federal grant program for state-based PDMPs and support for various substance use disorder treatment services for pregnant women and infants.

In addition, the U.S. Surgeon General's Turn the Tide campaign[¶¶] calls for clinicians to treat pain safely and effectively,

¶ https://opqc.net/projects/NAS.

** https://www.guttmacher.org/state-policy/explore/substance-abuse-during-pregnancy.
†† https://www.congress.gov/bill/114th-congress/senate-bill/799.
§§ https://www.congress.gov/bill/114th-congress/senate-bill/524/text.
¶¶ http://turnthetiderx.org/.

screen patients for opioid use disorder, and provide or connect them with evidence-based treatment, and recognize and treat addiction as a chronic illness, and not a moral failing.

Conclusion

NAS is an often hidden consequence of the opioid epidemic. The incidence of NAS has increased sharply over the last decade and is associated with substantial health care expenditures. Responsible opioid prescribing practices, including use of PDMPs, and increased availability of preconception health services are vital primary prevention strategies. Access to treatment for maternal opioid use disorder and standardized treatment for infants with NAS might further decrease the effects of NAS.

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Vital Signs: Prevalence of Doctor-Diagnosed Arthritis and Arthritis-Attributable Activity Limitation — United States, 2013–2015

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On March 7, 2017 this report was posted as an MMWR Early Release on the MMWR website (https://www.cdc.gov/mmwr).

Abstract

Background: In the United States, doctor-diagnosed arthritis is a common and disabling chronic condition. Arthritis can lead to severe joint pain and poor physical function, and it can negatively affect quality of life.

Methods: CDC analyzed 2013–2015 data from the National Health Interview Survey, an annual, nationally representative, in-person interview survey of the health status and behaviors of the noninstitutionalized civilian U.S. adult population, to update previous prevalence estimates of arthritis and arthritis-attributable activity limitations.

Results: On average, during 2013–2015, 54.4 million (22.7%) adults had doctor-diagnosed arthritis, and 23.7 million (43.5% of those with arthritis) had arthritis-attributable activity limitations (an age-adjusted increase of approximately 20% in the proportion of adults with arthritis reporting activity limitations since 2002 [p-trend <0.001]). Among adults with heart disease, diabetes, and obesity, the prevalences of doctor-diagnosed arthritis were 49.3%, 47.1%, and 30.6%, respectively; the prevalences of arthritis-attributable activity limitations among adults with these conditions and arthritis were 54.5% (heart disease), 54.0% (diabetes), and 49.0% (obesity).

Conclusions and Comments: The prevalence of arthritis is high, particularly among adults with comorbid conditions, such as heart disease, diabetes, and obesity. Furthermore, the prevalence of arthritis-attributable activity limitations is high and increasing over time. Approximately half of adults with arthritis and heart disease, arthritis and diabetes, or arthritis and obesity are limited by their arthritis. Greater use of evidence-based physical activity and self-management education interventions can reduce pain and improve function and quality of life for adults with arthritis and also for adults with other chronic conditions who might be limited by their arthritis.

Introduction

In the United States, doctor-diagnosed arthritis is a common and widespread chronic condition (*1*,*2*). Arthritis is a leading cause of disability (*3*) and is projected to affect 78.4 million adults by 2040 (*4*). The most common form of arthritis is osteoarthritis; other forms include, but are not limited to, rheumatoid arthritis, gout, lupus, and fibromyalgia. The annual direct medical costs attributable to arthritis are approximately $81 billion in the United States (*5*). About one million knee and hip joint replacements occur each year; 99% occur because of arthritis-related pain and functional limitations (*6*). Among adults with arthritis, 27% report severe joint pain (*7*); one third of adults aged ≥45 years report anxiety or depression (*8*); three in 10 find stooping, bending, or kneeling very difficult; approximately 20% cannot or find it very difficult to walk three blocks (approximately one quarter mile) or push/pull large objects (*9*). Adults with arthritis are more than twice as likely to report an injury related to a fall (*10*), and working-aged adults with arthritis have lower employment rates compared with adults without arthritis (*5*).

Arthritis is a common comorbid condition among adults with heart disease, diabetes, or obesity, and the combination of arthritis and one of these chronic conditions has been found to be associated with greater levels of physical inactivity (*11*). Moreover, arthritis may also hinder the ability of adults with prediabetes to engage in the physical activity recommended to prevent diabetes (*12*).

Many adults with arthritis are prescribed opioids (*13*), but safer options exist to help manage arthritis-associated pain. The CDC Guideline for Prescribing Opioids for Chronic Pain states that insufficient evidence for and serious risks associated with long-term use of opioid therapy to treat chronic pain exist, and recommends use of exercise therapy, cognitive behavioral therapy, certain interventional procedures, acetaminophen, and nonsteroidal anti-inflammatory drugs for the treatment of arthritis (*14*). Although medications can help, nonpharmaceutical

Key Points

- Arthritis is common, expensive, and a leading cause of disability. An estimated 54.4 million adults (22.7%) had doctor-diagnosed arthritis.
- Approximately 24 million adults with arthritis had activity limitations attributable to arthritis. Among adults with arthritis, the percentage limited by arthritis has increased by almost 20% over time.
- Approximately half of all adults with heart disease or diabetes had arthritis. Nearly one third of adults with obesity also had arthritis. Arthritis makes managing these conditions harder.
- Adults with arthritis are often prescribed opioids in the United States; however, better ways to help manage arthritis often exist. For example, physical activity can reduce pain and improve physical function by approximately 40%. However, one in three adults with arthritis report no leisure time physical activity.
- Using confidence and skills learned in self-management education workshops can help reduce pain, fatigue, and depression by 10% to 20%. However, only 11% had taken a self-management education workshop.
- Health care providers can play an important role in the management of arthritis. For example, adults with arthritis are more likely to attend a self-management education program when it is recommended by a health care provider.
- Additional information is available at https://www.cdc.gov/vitalsigns.

measures help as well. For example, physical activity decreases pain and improves function, each by almost 40% (*15*), and self-management education interventions produce improvements in a person's confidence and skills to manage their condition and can reduce pain, fatigue, and depression by 10% to 20% (*16*). However, self-management education interventions are underused by adults with arthritis; only about 11% reported ever having taken a course (*17*). Furthermore, approximately one in three adults with arthritis report no leisure-time physical activity (*18*). A health care provider's recommendation to patients with arthritis is important, because adults with arthritis are significantly more likely to attend a self-management education program to learn to manage their condition when recommended by a provider than adults with arthritis who were not recommended (*19*,*20*). Physical activity programs can reduce yearly health care costs. For example, an analysis found that participation in EnhanceFitness,* an evidence-based physical activity intervention, reduced total health care costs by $945 per person (*21*), and produced substantial improvements (up to 18%) in function (e.g., muscle strength and balance) and self-reported health at follow-up at 8 months (*22*).

To update prevalence estimates of arthritis and arthritis-attributable activity limitations, CDC analyzed 2013–2015 data from the National Health Interview Survey (NHIS).

Methods

NHIS is an annual, nationally representative, in-person interview survey of the health status and behaviors of the noninstitutionalized civilian U.S. adult population. In each household identified, one adult is randomly selected in each family to complete the "sample adult" questionnaire.† Sampling weights were applied to account for household nonresponse and oversampling of non-Hispanic blacks (blacks), Hispanics, and non-Hispanic Asians (Asians). Poststratification adjustments were applied by the National Center for Health Statistics using 2010 census estimates for the years 2013–2015. NHIS data from 2013 (N = 34,557), 2014 (36,697), and 2015 (33,672) were combined and weighted. Annualized unadjusted and age-adjusted prevalence estimates (standardized to the projected 2000 U.S. standard population) (*23*) were calculated overall and stratified by selected demographic (sex, age group, race/ethnicity, education level, and employment status) and health (body mass index category,§ physical activity level,¶ health status, doctor-diagnosed heart disease,** and doctor-diagnosed diabetes) characteristics. Absolute percent differences for all comparisons to the referent subgroups within each characteristic were considered statistically significant if the 95% confidence intervals of the differences of the age-adjusted estimates did not include zero. Orthogonal linear contrasts were performed to examine trends over time since 2002 in the age-adjusted prevalence of doctor-diagnosed

* https://www.ncoa.org/resources/program-summary-enhancefitness/.

† Survey description documents are available at https://www.cdc.gov/nchs/nhis/quest_data_related_1997_forward.htm.

§ Body mass index = weight (kg)/(height [m])^2; categorized as underweight/normal weight (<25.0), overweight (25.0 to <30.0), or obese (≥30.0).

¶ Determined from responses to six questions regarding frequency and duration of participation in leisure-time activities of moderate or vigorous intensity and categorized according to the U.S. Department of Health and Human Services 2008 Physical Activity Guidelines for Americans. Total minutes (moderate to vigorous) of physical activity per week were categorized as follows: meeting recommendations (≥150 min per week); insufficient activity (1–149 min); or inactive (0 min).

** Adults were considered to have doctor-diagnosed heart disease if they answered yes to any of the following four questions: "Have you ever been told by a doctor or other health professional that you had coronary heart disease? Angina, also called angina pectoris? A heart attack (also called myocardial infarction)? Any kind of heart condition or heart disease (other than the ones I just asked about)?"

arthritis and arthritis-attributable activity limitations among adults with arthritis.

Having doctor-diagnosed arthritis was defined as answering "yes" to the question "Have you ever been told by a doctor or other health professional that you have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia?" That standard question, in use since 2002, was designed to incorporate key elements of the 1994 public health definition of arthritis developed by the National Arthritis Data Workgroup, which sought to capture conditions treated by a rheumatologist or considered arthritis or a rheumatic condition by health care providers. Those who responded "yes" to arthritis also were asked "Are you now limited in any way in any of your usual activities because of arthritis or joint symptoms?" Persons responding "yes" to both questions were categorized as having arthritis-attributable activity limitations.

Results

During 2013–2015, an estimated 22.7% (54.4 million; age-adjusted prevalence = 21.0%) of all U.S. adults had doctor-diagnosed arthritis. Almost half (49.6%, 22.2 million) of adults aged ≥65 years had arthritis; 7.1% (8.0 million) of young adults (aged 18–44 years) and 29.3% (24.2 million) of middle-aged adults (aged 45–64 years) had arthritis (Table 1). The majority of adults with arthritis (59.0%, 32.2 million) were aged <65 years. The age-adjusted prevalence of arthritis was significantly higher among women (23.5%) than men (18.1%), and was significantly lower among Hispanics (15.4%) and Asians (11.8%) than non-Hispanic whites (whites) (22.6%), and among adults who completed college or higher (17.9%) than adults who had less than a high school education (21.2%). The age-adjusted prevalence of arthritis was highest among adults who were unable to work (43.9%) (Table 1). The age-adjusted prevalence of arthritis was lower among adults meeting physical activity recommendations (18.1%) than adults who reported insufficient activity (23.1%) or inactivity (23.6%), and higher among adults with fair/poor health (40.5%) than adults with very good/excellent health (15.4%) (Table 1).

The unadjusted prevalences of arthritis among adults with obesity, heart disease, or diabetes were 30.6%, 49.3%, and 47.1%, respectively (Table 1) After adjustment for age, adults who had obesity compared with no obesity, had diabetes compared with no diabetes, or had heart disease compared with no heart disease were approximately 1.5, 1.7, and 1.9 times more likely to have arthritis, respectively (Figure 1).

Among adults with arthritis, an estimated 43.5% (23.7 million; age-adjusted prevalence = 41.7%) had arthritis-attributable activity limitations (Table 2). The age-adjusted prevalence of arthritis-attributable activity limitations was higher among women (43.8%) than men (38.5%); among blacks (48.6%), Hispanics (44.3%), and non-Hispanic multiracial adults (50.5%) than among whites (40.1%); among adults with less than a high school education (52.1%) than among adults with higher education (32.1%–43.6%); and among adults who were unable to work (80%) or unemployed (48.4%) than among adults who were employed (28.3%) (Table 2). The age-adjusted prevalence of arthritis-attributable activity limitations was higher among adults who were physically inactive (54.0%) than adults meeting recommendations (30.1%); among adults with fair/poor health (70.6%) than adults with very good/excellent health (23.2%); and among adults who had obesity (45.2%), heart disease (54.8%), and diabetes (52.5%) (Table 2).

The age-adjusted prevalence of arthritis-attributable activity limitations among adults with arthritis was significantly higher in 2015 (42.8%; 95% CI = 40.5–45.1) compared with 2002 (35.9%; 95% CI = 34.1–37.6), an increase of 19.2% (p-trend <0.001) (Figure 2). The age-adjusted prevalence of doctor-diagnosed arthritis did not change significantly over time (p-trend = 0.71).

Conclusions and Comments

During 2013–2015, an average of more than one in five (54.4 million) adults in the United States had doctor-diagnosed arthritis, with 43.5% (23.7 million) of adults with arthritis reporting arthritis-attributable activity limitations. The prevalence of arthritis-attributable activity limitations among adults with arthritis increased by almost 20% over time (2002–2015) independent of the aging of the U.S. population, resulting in greater pain, disability, costs, and decreased quality of life.

As found in analyses of earlier NHIS surveys (*1*), women and adults who were unable to work, with fair/poor health, or with obesity, heart disease, or diabetes, not only had a higher prevalence of arthritis, but also had a higher prevalence of arthritis-attributable activity limitations. The prevalence of arthritis among adults who were unemployed was similar to the prevalence among employed adults, but unemployed adults had a much higher prevalence of arthritis-attributable activity limitations, suggesting that arthritis-attributable activity limitations might play a role in their unemployment (*5*). Similar to past analyses, blacks and whites had a similar prevalence of arthritis, but the prevalence of arthritis-attributable activity limitations was higher among blacks. Hispanics had a much lower prevalence of arthritis, but a proportionately higher prevalence of arthritis-attributable activity limitations.

Our findings suggest that the burden of arthritis is increasing and requires more widespread use of existing, underused evidence-based interventions. Physical activity is a proven strategy for managing arthritis, with known benefits for the management of many other chronic conditions (*15*). Arthritis

TABLE 1. Unadjusted and age-adjusted* annualized weighted prevalence of doctor-diagnosed arthritis† in the adult (aged ≥18 years) population, by selected characteristics — National Health Interview Survey, United States, 2013–2015

Demographic/ Health characteristic	Unweighted sample size§	Annualized weighted sample size (millions)§	Weighted population distribution (%)	Prevalence of doctor-diagnosed arthritis % (95% CI)		
				Unadjusted	Age-adjusted	APD¶
Overall	**104,784**	**239.5**	**(100)**	**22.7 (22.2 to 23.2)**	**21.0 (20.6 to 21.3)**	**NA**
Age group (yrs)						
18–44	44,928	112.1	(46.8)	7.1 (6.8 to 7.5)	NA	NA
45–64	35,165	82.6	(34.5)	29.3 (28.6 to 30.0)	NA	NA
≥65	24,691	44.8	(18.7)	49.6 (48.6 to 50.5)	NA	NA
Sex						
Men	46,851	115.4	(48.2)	19.1 (18.5 to 19.7)	18.1 (17.6 to 18.6)	Referent
Women	57,933	124.1	(51.8)	26.0 (25.5 to 26.6)	23.5 (23.1 to 24.0)	5.4 (4.9 to 6.0)
Race/Ethnicity						
White, non-Hispanic	64,108	157.0	(65.5)	26.3 (25.7 to 26.9)	22.6 (22.2 to 23.1)	Referent
Black, non-Hispanic	14,493	27.9	(11.6)	21.8 (20.9 to 22.8)	22.2 (21.4 to 23.0)	-0.4 (-1.3 to 0.4)
Hispanic	17,571	36.6	(15.3)	12.1 (11.4 to 12.8)	15.4 (14.6 to 16.1)	-7.3 (-8.2 to -6.4)
Asian, non-Hispanic	5,957	13.1	(5.5)	11.1 (10.1 to 12.2)	11.8 (10.9 to 12.8)	-10.8 (-11.9 to -9.8)
Multiple race, non-Hispanic	1,716	3.2	(1.3)	21.7 (19.1 to 24.5)	25.2 (22.7 to 27.9)	2.6 (-0.2 to 5.3)
American Indian/Alaska Native, non-Hispanic	741	1.3	(0.5)	24.6 (20.5 to 29.1)	24.4 (20.4 to 28.8)	1.7 (-2.4 to 5.9)
Education level						
<High school diploma	15,489	31.6	(13.3)	25.9 (24.9 to 26.8)	21.2 (21.2 to 22.6)	Referent
High school diploma	26,699	61.0	(25.6)	25.3 (24.5 to 26.1)	22.1 (21.5 to 22.8)	0.3 (-0.7 to 1.2)
At least some college	32,073	73.7	(30.9)	22.8 (22.1 to 23.5)	22.8 (22.2 to 23.4)	0.9 (0.0 to 1.7)
Completed college or greater	30,054	72.0	(30.2)	19.1 (18.4 to 19.8)	17.9 (17.4 to 18.5)	-3.9 (-4.9 to -3.0)
Employment status						
Employed/Self-employed	61,427	147.7	(61.7)	14.9 (14.5 to 15.4)	17.7 (17.2 to 18.2)	Referent
Unemployed	5,577	13.6	(5.7)	14.3 (13.1 to 15.5)	19.3 (17.6 to 21.1)	1.7 (-0.2 to 3.5)
Unable to work	8,241	16.5	(6.9)	52.0 (50.3 to 53.7)	43.9 (42.2 to 45.7)	26.2 (24.5 to 28.0)
Other**	29,491	61.6	(25.7)	35.4 (34.5 to 36.2)	21.1 (20.4 to 21.7)	3.4 (2.6 to 4.2)
Physical activity						
Meeting recommendations	49,063	115.8	(49.2)	17.3 (16.7 to 17.9)	18.1 (17.6 to 18.6)	Referent
Insufficient activity	20,398	46.9	(19.9)	26.0 (25.1 to 26.9)	23.1 (22.4 to 23.9)	5.1 (4.2 to 5.9)
Inactive	33,565	72.5	(30.9)	29.2 (28.5 to 30.0)	23.6 (23.1 to 24.2)	5.6 (4.8 to 6.3)
Health status						
Very good/Excellent	60,381	145.1	(60.6)	14.5 (14.0 to 14.9)	15.4 (15.1 to 15.8)	Referent
Good	28,719	63.3	(26.5)	28.1 (27.3 to 29.0)	23.8 (23.2 to 24.5)	8.4 (7.7 to 9.1)
Fair/Poor	15,642	31.0	(13.0)	50.0 (48.9 to 51.2)	40.5 (39.3 to 41.7)	25 (23.7 to 26.4)
Body mass index						
Underweight/Normal weight	36,317	84.3	(36.5)	16.4 (15.8 to 16.9)	16.4 (16.0 to 16.9)	Referent
Overweight	34,617	79.1	(34.2)	22.5 (21.8 to 23.2)	19.7 (19.1 to 20.2)	3.2 (2.6 to 3.9)
Obese	30,240	67.8	(29.3)	30.6 (29.7 to 31.4)	27.7 (27.0 to 28.4)	11.3 (10.5 to 11.5)
Heart disease						
No	91,280	211.6	(88.4)	19.2 (18.8 to 19.6)	19.1 (18.8 to 19.5)	Referent
Yes	13,387	27.6	(11.6)	49.3 (48.1 to 50.5)	36.4 (34.9 to 38.0)	17.3 (15.7 to 18.9)
Diabetes						
No	93,715	217.1	(90.7)	20.2 (19.7 to 20.7)	19.8 (19.4 to 20.2)	Referent
Yes	11,044	22.4	(9.3)	47.1 (45.8 to 48.4)	33.7 (32.0 to 35.4)	13.9 (12.1 to 15.6)

Abbreviations: APD = absolute percent difference; CI = confidence interval; NA = not applicable.

* Age adjusted to the 2000 U.S. projected adult population, using three age groups: 18–44, 45–64, and ≥65 years.

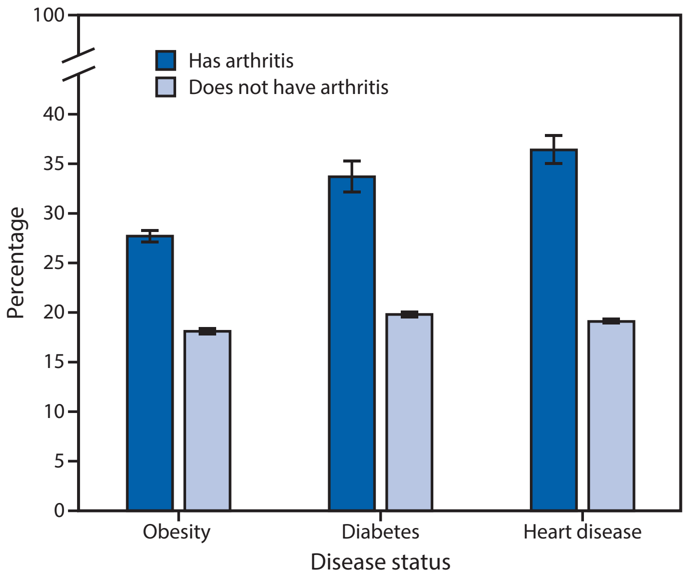
† Doctor-diagnosed arthritis was defined as an affirmative response to the question "Have you ever been told by a doctor or other health professional that you have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia?

§ Some categories might not sum to overall because of missing information on some characteristics.

¶ APD for age-adjusted estimates.

** Students, volunteers, homemakers, retirees.

FIGURE 1. Age-adjusted percentage* of adults with doctor-diagnosed arthritis, by obesity, diabetes, and heart disease status — National Health Interview Survey, United States, 2013–2015



* With 95% confidence intervals indicated by error bars.

is common among adults with heart disease, diabetes, or obesity, and the combination of arthritis and one of these chronic conditions has been associated with higher levels of physical inactivity (*11*), suggesting that arthritis-specific barriers to physical activity (concerns about worsening pain, damaging joints, and safely exercising) might be important concerns for adults with those conditions. Improving the health of adults with arthritis, including those with these combined chronic conditions, needs to include wider dissemination and implementation of evidence-based interventions. These interventions meet the unique needs of adults with arthritis and have been found to reduce pain and improve function, mood, and confidence to manage health and quality of life (*15*,*16*).

A U.S. Department of Health and Human Services initiative addresses the effects of multiple chronic conditions,[††] which now affect one in four adults and are becoming increasingly common as the population ages. A previous study on multiple chronic conditions among adults aged ≥25 years found that arthritis is frequently present among the most common combinations of two and three conditions (*24*). CDC is promoting greater coordination among chronic disease programs within state health departments to address these chronic disease comorbidity concerns.[§§] Active promotion of evidence-based self-management education and physical activity interventions is appropriate for various chronic conditions. The self-management education[¶¶] and physical activity interventions[***] that CDC recommends for adults with arthritis are examples of proven, low-cost, community interventions that can benefit adults with arthritis, physical limitations, and other chronic conditions.

The findings in this report are subject to at least six limitations. First, doctor-diagnosed arthritis was self-reported and not confirmed by a health care professional; however, this case definition was validated for public health surveillance (*25*). Second, because NHIS is a cross-sectional survey, a causal relationship between risk factors (i.e., obesity or physical activity) and arthritis and arthritis-attributable activity limitations could not be established, although strong evidence exists that indicates obesity is associated with an increased risk for incident knee osteoarthritis (a common form of arthritis) (*26*). Third, social desirability bias might play a role in some self-reported characteristics, with underreporting of weight and overreporting of height and leisure-time physical activity. Fourth, from 2013 to 2015, the NHIS response rates were 61.2%, 58.9%, 55.2%, respectively, indicating potential nonresponse bias, although survey weights were applied to address this bias and improve external validity (*27*). Fifth, if multivariate analyses were to be performed, certain observed group differences, such as those related to race/ethnicity and arthritis-attributable activity limitations, might have been explained by differences in prevalence of comorbid conditions or other factors (e.g., health care access). Finally, NHIS does not survey persons in long-term care institutions (e.g., nursing homes for the elderly and hospitals for the chronically ill or physically or intellectually disabled); therefore, this analysis likely underestimates the prevalence of arthritis and arthritis-attributable activity limitations.

Arthritis is a large and growing clinical and public health problem. In 2017, CDC is funding arthritis programs in 12 states to disseminate arthritis-appropriate evidence-based physical activity and self-management education interventions in their communities.[†††] Given the high prevalence of arthritis and the increase in arthritis-attributable activity limitations in the United States, health care providers and public health practitioners can address arthritis and other chronic conditions by prioritizing proven, nonpharmaceutical interventions, such as self-management education and appropriate physical activity, as effective ways to improve health outcomes, especially for groups with the highest prevalence of arthritis and arthritis-attributable activity limitations.

†† https://www.hhs.gov/ash/about-ash/multiple-chronic-conditions/index.html.
§§ https://www.cdc.gov/chronicdisease/about/state-public-health-actions.htm.
¶¶ https://www.cdc.gov/arthritis/interventions/self_manage.htm.
*** https://www.cdc.gov/arthritis/pa_overview.htm.
††† https://www.cdc.gov/arthritis/state_programs/programs.

TABLE 2. Unadjusted and age-adjusted* annualized weighted prevalence of arthritis-attributable activity limitation among persons with doctor-diagnosed arthritis,† by selected characteristics — National Health Interview Survey, United States, 2013–2015

Demographic/ Health characteristic	Unweighted sample size§	Annualized weighted sample size (millions)§	Weighted distribution of characteristic (%)	Prevalence of arthritis-attributable activity limitations % (95% CI)		
				Unadjusted	Age-adjusted	APD¶
Overall	**26,442**	**54.3**	**(100)**	**43.5 (42.6 to 44.4)**	**41.7 (40.3 to 43.1)**	**NA**
Age group (yrs)						
18–44	3,360	8.0	(14.7)	39.4 (37.0 to 41.8)	NA	NA
45–64	10,761	24.1	(44.5)	44.5 (43.1 to 45.8)	NA	NA
≥65	12,321	22.2	(40.9)	44.0 (42.8 to 45.2)	NA	NA
Sex						
Men	9,740	22.0	(40.5)	40.7 (39.2 to 42.1)	38.5 (36.4 to 40.7)	Referent
Women	16,702	32.3	(59.5)	45.4 (44.5 to 46.4)	43.8 (42.2 to 45.5)	5.3 (2.7 to 7.8)
Race/Ethnicity						
White, non-Hispanic	18,563	41.3	(76.0)	42.1 (41.0 to 43.2)	40.1 (38.4 to 41.9)	Referent
Black, non-Hispanic	3,888	6.1	(11.2)	49.9 (47.8 to 52.0)	48.6 (45.2 to 52.0)	8.5 (4.7 to 12.2)
Hispanic	2,577	4.4	(8.1)	47.7 (45.1 to 50.3)	44.3 (41.0 to 47.6)	4.1 (0.5 to 7.8)
Asian, non-Hispanic	716	1.5	(2.7)	38.9 (34.3 to 43.7)	37.6 (27.5 to 49.0)	-2.5 (-13.5 to 8.5)
Multiple race, non-Hispanic	468	0.7	(1.3)	51.3 (44.5 to 58.0)	50.5 (41.7 to 59.2)	10.3 (1.1 to 19.5)
American Indian/Alaska Native, non-Hispanic	201	0.3	(0.6)	54.0 (44.0 to 63.6)	51.6 (37.9 to 65.0)	11.4 (-2.6 to 25.5)
Education level						
<High school diploma	4,634	8.2	(15.1)	55.1 (52.9 to 57.2)	52.1 (47.9 to 56.3)	Referent
High school diploma	7,421	15.4	(28.5)	44.0 (42.4 to 45.7)	43.1 (40.5 to 45.7)	-9 (-13.9 to -4.2)
At least some college	8,154	16.8	(31.1)	44.9 (43.5 to 46.4)	43.6 (41.5 to 45.7)	-8.5 (-13.2 to -3.8)
Completed college or greater	6,131	13.7	(25.4)	34.2 (32.5 to 36.0)	32.1 (29.4 to 34.8)	-20 (-25.0 to -15.1)
Employment status						
Employed/Self-employed	9,600	22.0	(40.5)	28.3 (27.1 to 29.6)	28.3 (26.8 to 29.9)	Referent
Unemployed	915	1.9	(3.6)	47.5 (43.2 to 51.7)	48.4 (43.8 to 53.1)	20.1 (15.2 to 25.0)
Unable to work	4,511	8.6	(15.8)	81.3 (79.6 to 82.8)	80.0 (76.9 to 82.8)	51.7 (48.5 to 54.9)
Other**	11,411	21.8	(40.1)	43.7 (42.5 to 44.9)	44.9 (40.8 to 49.1)	16.6 (12.4 to 20.8)
Physical activity						
Meeting recommendations	9,380	20.0	(37.5)	30.1 (28.9 to 31.4)	30.1 (28.4 to 31.9)	Referent
Insufficient activity	5,804	12.2	(22.8)	43.8 (42.0 to 45.7)	43.0 (40.2 to 45.8)	12.9 (9.6 to 16.1)
Inactive	10,800	21.2	(39.7)	55.8 (54.4 to 57.1)	54.0 (51.4 to 56.6)	23.9 (20.8 to 27.0)
Health status						
Very good/Excellent	9,632	21.0	(38.6)	23.4 (22.3 to 24.6)	23.2 (21.6 to 24.9)	Referent
Good	8,729	17.8	(32.8)	42.4 (41.0 to 43.8)	41.3 (38.8 to 43.7)	18.1 (15.0 to 21.2)
Fair/Poor	8,072	15.5	(28.6)	72.0 (70.6 to 73.4)	70.6 (68.0 to 73.2)	47.4 (44.5 to 50.4)
Body mass index						
Underweight/Normal weight	6,770	13.8	(26.3)	39.7 (38.2 to 41.3)	39.3 (36.6 to 42.0)	Referent
Overweight	8,514	17.8	(34.0)	39.7 (38.2 to 41.2)	38.7 (36.5 to 41.0)	-0.6 (-3.8 to 2.7)
Obese	10,172	20.7	(39.6)	49.0 (47.7 to 50.4)	45.2 (43.3 to 47.1)	5.9 (2.8 to 9.0)
Heart disease						
No	19,455	40.6	(74.9)	39.9 (38.8 to 40.8)	38.7 (37.2 to 40.3)	Referent
Yes	6,931	13.6	(25.1)	54.5 (53.0 to 56.1)	54.8 (50.9 to 58.6)	16 (11.8 to 20.8)
Diabetes						
No	21,048	43.8	(80.6)	41.0 (40.0 to 41.9)	39.9 (38.5 to 41.4)	Referent
Yes	5,386	10.5	(19.4)	54.0 (52.1 to 55.8)	52.5 (47.7 to 57.2)	12.5 (7.6 to 17.4)

Abbreviation: APD = absolute percent difference, CI = confidence interval; NA = not applicable.

* Age adjusted to the 2000 U.S. projected adult population, using three age groups: 18–44, 45–64, and ≥65 years.

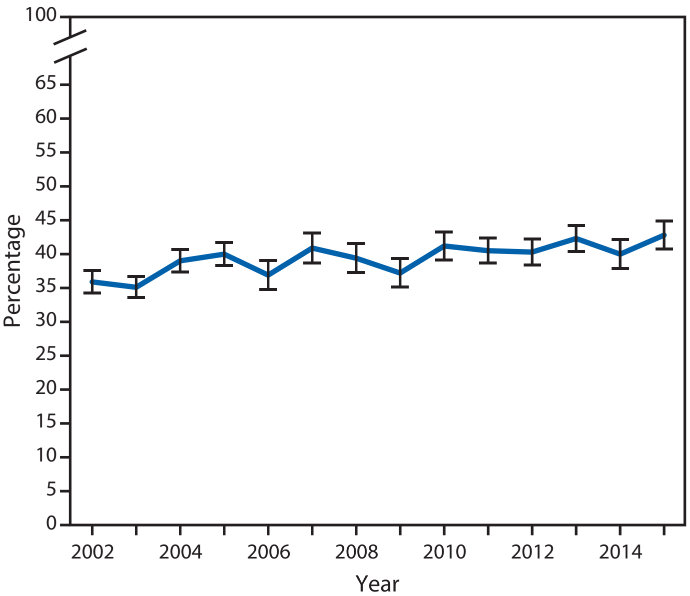
† Doctor-diagnosed arthritis was defined as an affirmative response to the question "Have you ever been told by a doctor or other health professional that you have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia? Those who answered "yes" were asked "Are you now limited in any way in any of your usual activities because of arthritis or joint symptoms?" Persons responding "yes" to both questions were defined as having arthritis-attributable activity limitations.

§ Some categories might not sum to overall because of missing information on some characteristics.

¶ APD for age-adjusted estimates.

** Students, volunteers, homemakers, retirees.

FIGURE 2. Age-adjusted percentage* of persons with arthritis-attributable activity limitations among adults with doctor-diagnosed arthritis — National Health Interview Survey, United States, 2002–2015



* With 95% confidence intervals indicated by error bars.

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Increase in Human Infections with Avian Influenza A(H7N9) Virus During the Fifth Epidemic — China, October 2016–February 2017

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On March 3, 2017, this report was posted as an MMWR *Early Release on the* MMWR *website (https://www.cdc.gov/mmwr).*

During March 2013–February 24, 2017, annual epidemics of avian influenza A(H7N9) in China resulted in 1,258 avian influenza A(H7N9) virus infections in humans being reported to the World Health Organization (WHO) by the National Health and Family Planning Commission of China and other regional sources (*1*). During the first four epidemics, 88% of patients developed pneumonia, 68% were admitted to an intensive care unit, and 41% died (*2*). Candidate vaccine viruses (CVVs) were developed, and vaccine was manufactured based on representative viruses detected after the emergence of A(H7N9) virus in humans in 2013. During the ongoing fifth epidemic (beginning October 1, 2016),* 460 human infections with A(H7N9) virus have been reported, including 453 in mainland China, six associated with travel to mainland China from Hong Kong (four cases), Macao (one) and Taiwan (one), and one in an asymptomatic poultry worker in Macao (*1*). Although the clinical characteristics and risk factors for human infections do not appear to have changed (*2*,*3*), the reported human infections during the fifth epidemic represent a significant increase compared with the first four epidemics, which resulted in 135 (first epidemic), 320 (second), 226 (third), and 119 (fourth epidemic) human infections (*2*). Most human infections continue to result in severe respiratory illness and have been associated with poultry exposure. Although some limited human-to-human spread continues to be identified, no sustained human-to-human A(H7N9) transmission has been observed (*2*,*3*).

CDC analysis of 74 hemagglutinin (HA) gene sequences from A(H7N9) virus samples collected from infected persons or live bird market environments during the fifth epidemic, which are available in the Global Initiative on Sharing All Influenza Data (GISAID) database (*4*,*5*), indicates that A(H7N9) viruses have diverged into two distinct genetic lineages. Available fifth epidemic viruses belong to two distinct lineages, the Pearl River Delta and Yangtze River Delta lineage, and ongoing analyses have found that 69 (93%) of the 74 HA gene sequences to date have been Yangtze River Delta lineage viruses. Preliminary antigenic analysis of recent Yangtze River Delta lineage viruses isolated from infections detected in Hong Kong indicate reduced cross-reactivity with existing CVVs, whereas viruses belonging to the Pearl River Delta lineage are still well inhibited by ferret antisera raised to CVVs. These preliminary data suggest that viruses from the Yangtze River Delta lineage are antigenically distinct from earlier A(H7N9) viruses and from existing CVVs. In addition, ongoing genetic analysis of neuraminidase genes from fifth epidemic viruses indicate that approximately 7%–9% of the viruses analyzed to date have known or suspected markers for reduced susceptibility to one or more neuraminidase inhibitor antiviral medications. The neuraminidase inhibitor class of antiviral drugs is currently recommended for the treatment of human infection with A(H7N9) virus. Antiviral resistance can arise spontaneously or emerge during the course of treatment. Many of the A(H7N9) virus samples collected from human infections in China might have been collected after antiviral treatment had begun.

Although all A(H7N9) viruses characterized from the previous four epidemics have been low pathogenic avian influenza viruses, analysis of human (three) and environmental (seven) samples from the fifth epidemic demonstrate that these viruses contain a four–amino acid insertion in a host protease cleavage site in the HA protein that is characteristic of highly pathogenic avian influenza (HPAI) viruses. Chinese authorities are investigating and monitoring closely for outbreaks of HPAI A(H7N9) among poultry.

Since April 2013, the Influenza Risk Assessment Tool has been used by CDC to assess the risk posed by certain novel influenza A viruses. Although the current risk to the public's health from A(H7N9) viruses is low, among the 12 novel influenza A viruses evaluated with this tool, A(H7N9) viruses have the highest risk score and are characterized as posing moderate–high potential pandemic risk (*6*). Experts from the World Health Organization (WHO) Global Influenza Surveillance and Response System (GISRS) met in Geneva, Switzerland, February 27–March 1, 2017, to review available epidemiologic and virologic data related to influenza A(H7N9) viruses to evaluate the need to produce additional CVVs to maximize influenza pandemic preparedness. Two additional H7N9 CVVs were recommended for development: a new CVV derived from an A/Guangdong/17SF003/2016-like virus (HPAI), which is a

* Epidemics refer to the seasonal increases in human infections; the fifth epidemic began on October 1, 2016.

highly pathogenic virus from the Yangtze River Delta lineage; and a new CVV derived from A/Hunan/2650/2016-like virus, which is a low pathogenic virus also from the Yangtze River Delta lineage (*1*). At this time, CDC is preparing a CVV derived from an A/Hunan/2650/2016-like virus using reverse genetics. Further preparedness measures will be informed by ongoing analysis of genetic, antigenic, and epidemiologic data and how these data impact the risk assessment. CDC will continue to work closely with the Chinese Center for Disease Control and Prevention to support the response to this epidemic. Guidance for U.S. clinicians who might be evaluating patients with possible H7N9 virus infection and travelers to China is available online (https://www.cdc.gov/flu/avianflu/h7n9-virus.htm).

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Notes from the Field

An Outbreak of *Salmonella* Typhimurium Associated with Playground Sand in a Preschool Setting — Madrid, Spain, September–October 2016

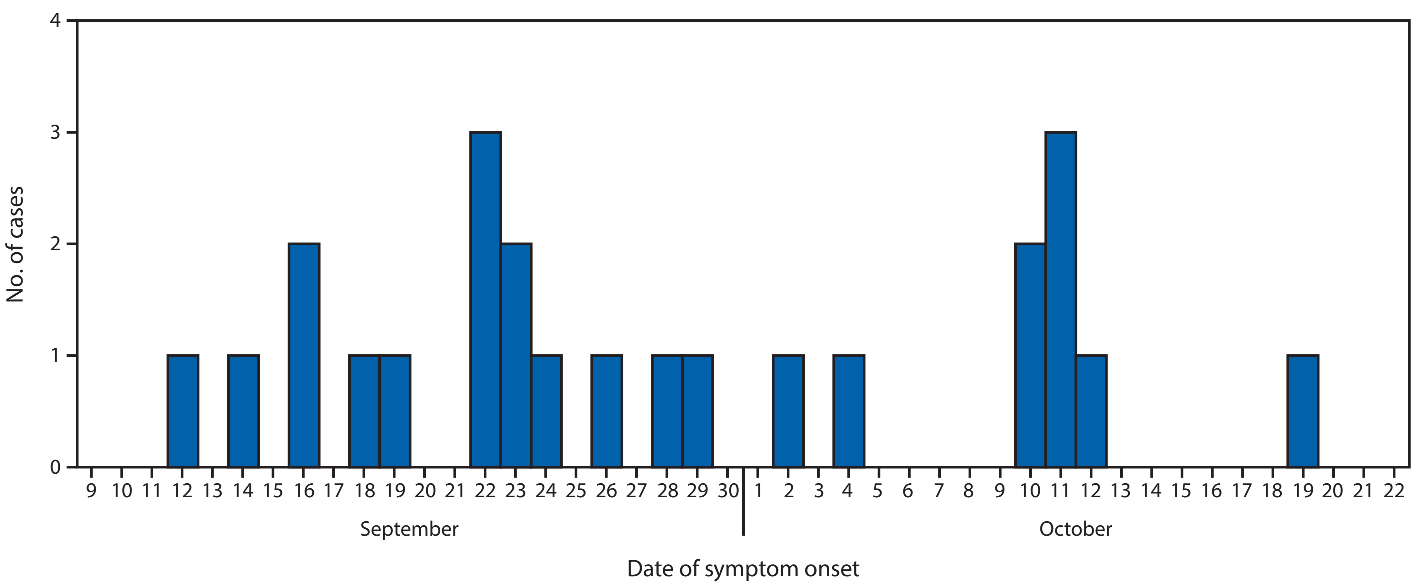
Carmen Olmedo Lucerón[1]; Ana Pérez Meixeira[1]; Isabel Abad Sanz[1]; Victoria Cid Deleyto[1]; Silvia Herrera León[2]; Leonor Gutierrez Ruiz[1]

On September 23, 2016, a gastroenteritis outbreak among young children in a preschool and primary education center located in Getafe, a city in the southern part of the Madrid metropolitan area, was reported to the Community of Madrid Public Health Services. The first five cases occurred on September 14 and affected children aged 3–5 years, who developed symptoms after attending school. An epidemiologic investigation was initiated and included clinical investigation of the identified cases, an active search for additional cases based on school absences, and an environmental assessment.

Three hundred children aged 3–5 years attend the preschool, with classes of approximately 25 students, and the preschool area is separated from the primary school area. A total of 24 cases of gastroenteritis (defined as at least one of four signs or symptoms [fever, diarrhea, abdominal pain, and vomiting] and microbiological confirmation or epidemiologic link to a confirmed case) were identified with symptom onset from September 12 to October 19, 2016 (Figure). Three children were hospitalized and fully recovered. Among the 24 patients, six (25%) were aged 3 years, five (21%) were aged 4 years, and 13 (54%) were aged 5 years. Fifteen cases (63%) occurred in boys. Eighteen (75%) of the affected children used the school meal service and six (25%) did not. Stool specimens were obtained from 17 (71%) affected children; all were positive for non-Typhi *Salmonella* (confirmed cases). Three confirmed cases occurred among six children who did not use the school meal service and 14 occurred among 18 children who did use the meal service. Seven other patients had an epidemiologic link to a laboratory-confirmed case of *Salmonella* and were classified as probable cases. The attack rate for probable and confirmed cases was 8% (24/300). The *Salmonella* isolates were sent to the National Center of Microbiology Reference Laboratory, Carlos III Institute of Health (National Laboratory) for characterization. All isolates were serotyped and found to be *Salmonella* serotype Typhimurium 4,12:i:1,2 (var. Copenhagen). This serotype is widely distributed and associated with foodborne illness, and has been shown to carry a variety of antibiotic resistance genes (*1*).

On the day the outbreak was reported, the facilities were inspected, and meal service personnel were interviewed. Samples of potable water and available food prepared during the 2 days before first symptoms began were collected and analyzed; no pathogens were detected. The epidemic curve suggested an ongoing common source (Figure). The only recognized common exposures were attending the early childhood education section of the school, which included children aged 3–5 years, and use of the school playground. No animals were kept at the school. School management hypothesized

FIGURE. Date of symptom onset among 24 children with *Salmonella* Typhimurium gastroenteritis associated with playground sand — Madrid, Spain, September 12–October 19, 2016



that the school's playground, which contains all of the school's playground equipment, might have become contaminated with animal feces. This area is quite large and covered with loose sand, and contains numerous trees, in which birds roost. On October 10 and November 3, samples of sand from five playground locations were collected for analysis. One sample collected on each date grew *Salmonella* of the same serotype as that identified from the infected children. Both positive samples corresponded to the area of the playground containing swings, seesaws, and slides.

The phagetype (195), the pulsetype (XbaI.0145), and the resistance to tetracycline identified in all isolates is uncommon in humans and was identified in only 4.2% of all isolates typed at the National Laboratory during 2016. This strain has been identified at the National Laboratory from wild and domestic birds (personal communication, S. Herrera, National Laboratory, January 2017). The temporal distribution and microbiologic results suggest that the most likely cause was contact with playground sand contaminated with feces from birds that usually nest in trees above the playground.

Cleaning, sanitation, and structural measures were recommended, and consisted of closing the contaminated areas and renovating the entire playground area. No new cases have been reported since these actions were taken. Long-term control will require a comprehensive strategy that includes environmental interventions and bird population control.

The findings in this report are subject to at least two limitations. First, person-to-person transmission might have occurred. Second, there might have been an underestimation of cases, which can occur in any outbreak investigation. However, these findings support other studies that have identified playground sand as an animal-human interface that facilitates transmission of *Salmonella* (*2*,*3*), particularly among children, and highlight the necessity for enforcement of guidelines to prevent contamination in playground sand and infections among young children (*4*).

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Notes from the Field

Hepatitis C Transmission from Inappropriate Reuse of Saline Flush Syringes for Multiple Patients in an Acute Care General Hospital — Texas, 2015

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In October 2015, the Texas Department of State Health Services (DSHS) was notified that a hospital telemetry unit nurse had been reusing saline flush prefilled syringes in the intravenous (IV) lines of multiple patients, a risk factor for patient-to-patient transmission of bloodborne pathogens (*1*).* This practice was discovered through an investigation undertaken by the hospital after the nurse was observed to frequently leave a partially filled syringe near a computer work station. State, regional, and local health departments, with consultation from CDC, collaborated with the hospital to investigate infection prevention lapses, assess risk to patients, perform patient notification, and provide bloodborne pathogen testing.†

Upon interview, the nurse reported reusing syringes during the previous 6 months, erroneously believing that this was a safe, cost-saving measure if no fluids were withdrawn into the syringe before injection of the saline flush (*1*,*2*). The nurse had been working in this unit for 18 months, had not worked at another health care facility before or during employment at the hospital, and reported that this practice was not taught by the hospital. The hospital voluntarily notified patients and offered bloodborne pathogen screening to patients who might have been cared for by the nurse during employment from April 2014 to October 2015, when the practice was recognized and corrected (*3*). Because all telemetry unit patients were required to have IV access, all patients cared for on the unit during shifts worked by the nurse were included in the notification.

During October 2015, notification letters were sent to patients via both certified and registered mail to inform them of a possible bloodborne pathogen exposure and a need for laboratory testing for Hepatitis B (HBV), Hepatitis C (HCV), and human immunodeficiency virus (HIV). The notification included locations where testing would be offered, a laboratory order form, and a 24-hour hospital hotline number for questions and concerns. The hospital provided testing free of charge through a commercial laboratory that coordinated testing at many satellite locations. Recommended laboratory testing consisted of a baseline screening test and a follow-up test at 6 months after the last potential exposure; exposure was defined as the last time a patient was on the telemetry unit while the nurse was working.§

Patients who did not have bloodborne pathogen testing or whose letter had been returned as undeliverable, and who had valid contact telephone information were telephoned individually by hospital staff members to provide notification, encourage testing, and request a current mailing address. Notification materials were re-sent to contacted patients; for those who could not be reached, additional address investigation was performed by DSHS using a search of state databases. As of October 2016, among 392 potentially exposed living patients, 262 (67%) had completed initial screening, and 182 (46%) had completed all recommended testing.

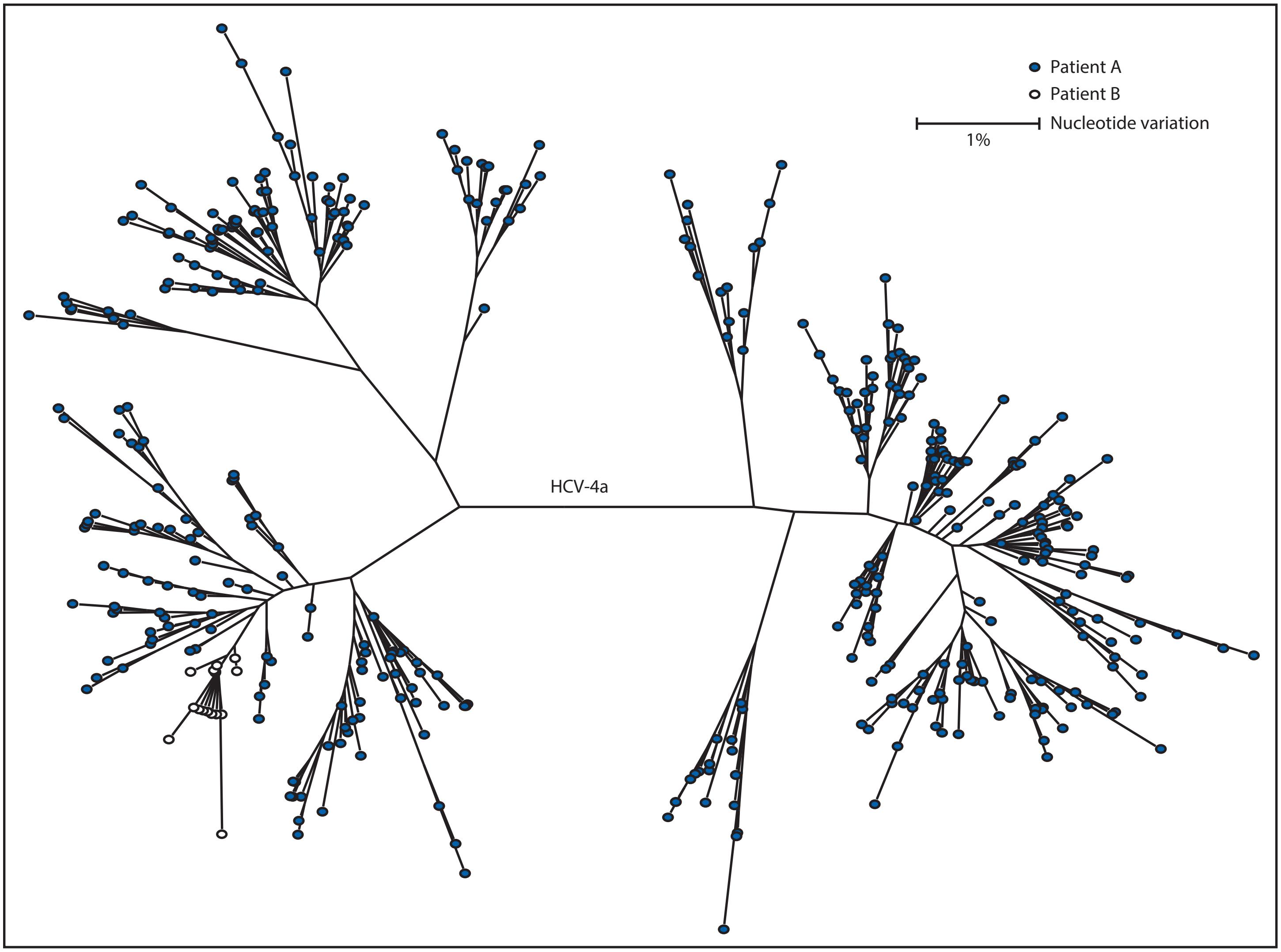
Among the 262 patients tested at least once for HBV, HCV, and HIV, four patients with newly diagnosed bloodborne pathogen infections were identified: two with HBV and two with HCV. A patient with known preexisting chronic HCV infection (patient A) had been hospitalized on the telemetry unit on the same day as patient B, one of the patients with newly diagnosed HCV. The second patient with newly diagnosed HCV infection did not share overlapping hospital days with any patient with known HCV infection, and the two patients with newly diagnosed HBV infection did not share overlapping hospital days with each other or any patient with a known HBV infection. Thus, no further epidemiologic evidence was identified that linked these three patients with newly diagnosed infections to a potential source patient.

Specimens from patients A and B were sent to the laboratory in CDC's Division of Viral Hepatitis for genotyping and molecular sequencing. Both patients were infected with HCV genotype 4a, which represents approximately 1% of all infections in the United States. Quasispecies (HCV intra-genotype variants) analysis was performed, and <0.38% nucleotide variation among intrahost HCV sequences from these two patients was detected (Figure). This result indicates transmission linkage between these two patients (*4*). Further epidemiologic investigation indicated that it was unlikely that these two patients had any contact outside the facility.

Taken together, these findings indicate that at least one HCV infection was likely transmitted in the telemetry unit as a result of inappropriate reuse and sharing of saline flush syringes for multiple patients. This investigation illustrates a need for ongoing education and oversight of health care providers regarding safe injection practices. Hospitals and

* https://www.cdc.gov/injectionsafety/unsafepractices.html.
† https://www.cdc.gov/hepatitis/outbreaks/healthcareinvestigationguide.htm.
§ https://www.cdc.gov/hepatitis/outbreaks/toolkit.htm.

FIGURE. Genotyping and molecular sequencing* of hepatitis C virus† specimens from two patients§ in an acute care general hospital — Texas, 2015



Abbreviations: HCV = hepatitis C virus; bp = base pairs.

* Both patients were infected with genotype 4a and quasispecies (HCV intra-genotype variants) analysis demonstrates maximum nucleotide identity of 99.62% among intra-host HCV sequences.

† E1-HVR1 region, 264 bp in length, only NGS454 unique sequences are shown.

§ Solid dots represent the quasispecies from the patient with known chronic HCV infection (patient A), and open dots represent quasispecies from the patient with newly diagnosed HCV infection (patient B). Although the viral variants are not identical between the two cases, the genetic distances in nucleotide variation between the cases are well below the threshold for defining transmission linkage.

other settings where injections are prepared and administered should perform routine audits (*1–3*). Syringe reuse, if identified, should be immediately corrected and patient notification should be included as part of the institutional response (*1–3*).

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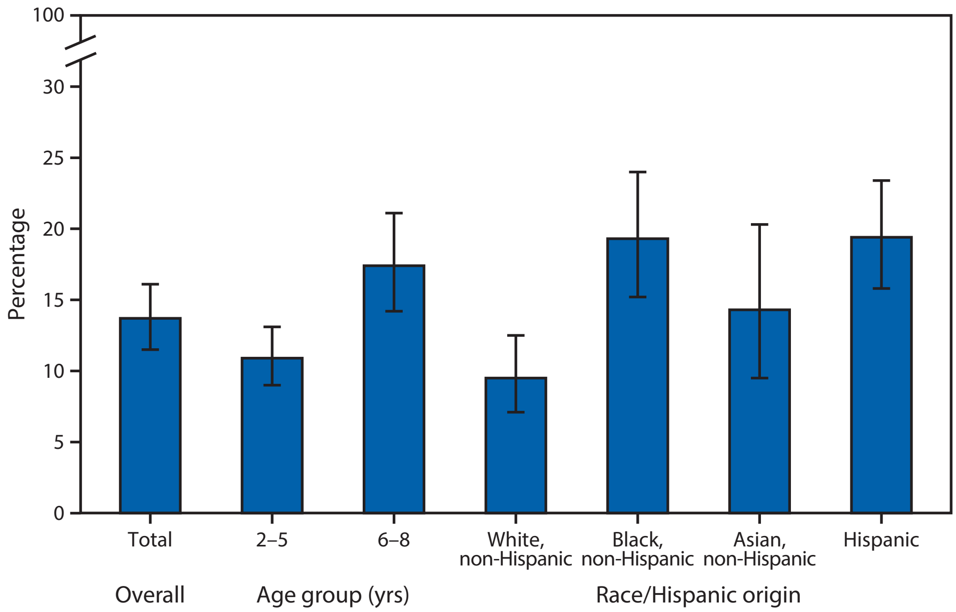
QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Prevalence* of Untreated Dental Caries† in Primary Teeth§ Among Children Aged 2–8 Years, by Age Group and Race/Hispanic Origin — National Health and Nutrition Examination Survey, 2011–2014



* With 95% confidence intervals indicated with error bars.
† Untreated dental caries are defined as tooth decay (dental cavities) that have not received appropriate treatment. Data were collected by dentists in the mobile examination center as part of the oral health component of the National Health and Nutrition Examination Survey.
§ Primary teeth are the first teeth (baby teeth), which are shed and replaced by permanent teeth.

During 2011–2014, 13.7% of children aged 2–8 years had untreated dental caries in their primary teeth (baby teeth). The proportion of children with untreated dental caries in their primary teeth increased with age: 10.9% among children aged 2–5 years and 17.4% among children aged 6–8 years. A larger proportion of Hispanic (19.4%) and non-Hispanic black children (19.3%) had untreated dental caries in primary teeth compared with non-Hispanic white (9.5%) children.

Source: CDC/NCHS. National Health and Nutrition Examination Survey Data. Hyattsville, MD: US Department of Health and Human Services, CDC, National Center for Health Statistics; 2011–2014. https://www.cdc.gov/nchs/nhanes.htm.

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