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# Nonfatal Drug and Polydrug Overdoses Treated in Emergency Departments — 29 States, 2018–2019

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The U.S. drug overdose epidemic continues to cause substantial morbidity and mortality. In 2017, 967,615 nonfatal drug overdoses were treated in emergency departments (EDs), a 4.3% increase from 2016 in all overdoses and a 3.1% increase in opioid-involved overdoses (*1*). During 2017 and 2018, syndromic surveillance revealed that 37.2% of overdoses treated in EDs in 18 states involved multiple drugs (*2*). To describe changes in rates and proportions of suspected nonfatal drug and polydrug overdoses treated in EDs, CDC analyzed syndromic surveillance data from 2018 to 2019 in 29 states. Rates of overdoses involving opioids, cocaine, and amphetamines increased 9.7%, 11.0%, and 18.3%, respectively, and the rate of benzodiazepine-involved overdoses decreased 3.0%. Overdoses co-involving opioids and amphetamines increased from 2018 to 2019, overall, in both sexes, and in most age groups. In 2019, 23.6%, 17.1%, and 18.7% of overdoses involving cocaine, amphetamine, and benzodiazepines, respectively, also involved opioids. Expanding overdose prevention, treatment, and response efforts is needed to reduce the number of drug and polydrug overdoses. This includes linkage into treatment, harm reduction services, and community-based programs for persons who use drugs; expanding overdose prevention efforts, including increased naloxone provision, to persons who use stimulants; addressing the illicit drug supply; and identifying specific risk factors for populations using these drugs. Continued surveillance with expanded coverage of additional jurisdictions of the evolving drug overdose epidemic is important to the success of these efforts.

Suspected nonfatal drug overdose ED visits were identified from 29 states* funded through CDC's Overdose Data to Action program† that submitted data to the National Syndromic Surveillance Program (NSSP).§ Querying ED visit

* Alabama, Arizona, Arkansas, Colorado, Connecticut, Delaware, Georgia, Illinois, Kansas, Kentucky, Louisiana, Maine, Maryland, Montana, Nevada, New Jersey, New Mexico, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Utah, Virginia, Washington, West Virginia, and Wisconsin. Data from these 29 states were analyzed for ED visits from January 1, 2018, to December 31, 2019. The states included had visits with multiple diagnosis codes and <20% change in percentage of ED visits with valid discharge diagnosis codes from 2018 to 2019. The percentage of ED visits with informative discharge diagnosis codes across 29 states was 77.0% and 82.3% in 2018 and 2019, respectively, a change of 5.3%.

† https://www.cdc.gov/drugoverdose/od2a/index.html.

§ https://www.cdc.gov/nssp/documents/NSSP-overview.pdf; https://www.cdc.gov/nssp.

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data, initial encounter[¶] unintentional and undetermined intent overdoses were identified using *International Classification of Diseases, Tenth Revision, Clinical Modification* (ICD-10-CM) discharge diagnosis codes for opioids,[**] cocaine,[††] amphetamines,[§§] and benzodiazepines.[¶¶] Some overdoses involved more than one type of drug, and these were included in calculations for each relevant drug category; thus, categories are not mutually exclusive.[***] Data are at the ED-visit level rather than the patient level; therefore, a patient with multiple overdose visits would be included multiple times in analyses.[†††]

The changes in rates of suspected drug overdose per 100,000 ED visits from 2018 to 2019 were calculated overall, by sex, age group, U.S. Census region of the ED facility,[§§§] and county urbanization level of patient residence.[¶¶¶] Because syndromic surveillance data were used to examine meaningful changes in suspected overdose-related ED visits and not to estimate numbers of persons with nonfatal drug overdoses, results reported exclude counts and rates. Relative and absolute

¶ https://www.cdc.gov/injury/wisqars/pdf/ICD-10-CM_External_Cause_Injury_Codes-a.pdf.

** Nonfatal suspected unintentional and undetermined intent drug overdoses involving opioids are defined by the following ICD-10-CM discharge diagnosis codes: T40.0X1A, T40.0X4A, T40.1X1A, T40.1X4A, T40.2X1A, T40.2X4A, T40.3X1A, T40.3X4A, T40.4X1A, T40.4X4A, T40.601A, T40.604A, T40.691A, or T40.694A.

†† Nonfatal suspected unintentional and undetermined intent drug overdoses involving cocaine are defined by the following ICD-10-CM discharge diagnosis codes: T40.5X1A or T40.5X4A.

§§ Nonfatal suspected unintentional and undetermined intent drug overdoses involving amphetamines are defined by the following ICD-10-CM discharge diagnosis codes: T43.621A or T43.624A. Amphetamines are a specific stimulant drug class, distinct from cocaine, that encompass legal prescription medications (e.g., Adderall) and illicit drugs (e.g., methamphetamine). https://www.dea.gov/sites/default/files/drug_of_abuse.pdf.

¶¶ Nonfatal suspected unintentional and undetermined intent drug overdoses involving benzodiazepines are defined by the following ICD-10-CM discharge diagnosis codes: T42.4X1A or T42.4X4A.

*** As an example, an overdose co-involving opioid and cocaine would be included in both the opioid and cocaine change estimates as well as the estimates for polydrug overdoses involving both opioid and cocaine.

††† The unit of analysis was ED visits, not individual patients, and the absence of unique patient identifiers prevents linking ED visits across individual patients to determine the proportions treated in the ED during a single visit versus multiple visits. As an example, a patient treated for nonfatal overdoses in June 2018, October 2018, and March 2019, will reflect three individual ED visits included in the data, analyzed as distinct ED visits.

§§§ U.S. Census region is coded by state of the facility where emergency department visits occurred. The Northeast region includes hospitals located in five of nine possible states, the South region includes hospitals located in 12 of 16 possible states (17 including the District of Columbia), the Midwest region includes hospitals located in four of 12 possible states, and the West region includes hospitals located in eight of 13 possible states.

¶¶¶ County urbanization levels for patient residence county were determined using the 2013 National Center for Health Statistics Urban-Rural Classification Scheme for Counties (https://www.cdc.gov/nchs/data_access/urban_rural.htm). Urban included large central metro, large fringe metro, medium metro, and small metro and rural included micropolitan and noncore counties.

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rate changes**** were calculated from 2018 to 2019 by visit characteristics; chi-squared tests compared 2018 and 2019 rates. Absolute rate changes were included to provide context for relative changes, some of which were based on small numbers of overdoses. Changes presented represent statistically significant findings, unless otherwise specified. Percentages of suspected drug overdose ED visits†††† were calculated for specific polydrug combinations to examine the percentages of suspected cocaine-, amphetamine-, and benzodiazepine-involved overdoses that also involved opioids in 2019, overall, and for certain age groups. Chi-squared tests were used for pairwise comparisons between age groups for percentage of overdose ED visits§§§§ in 2019. For all analyses, p-values <0.05 were considered statistically significant. Analyses were conducted using SAS (version 9.4; SAS Institute).

From 2018 to 2019, overall relative and absolute rates increased for suspected nonfatal overdoses involving opioids (9.7%; 12.9 per 100,000 ED visits), cocaine (11.0%; 0.7), and amphetamines (18.3%; 1.3); rates decreased for overdoses involving benzodiazepines (–3.0%; –0.5) (Table 1). Relative and absolute rates for overdoses involving opioids increased from 2018 to 2019 among both females (7.1%; 6.0) and males (10.7%; 20.9), as well as all age groups. Cocaine- and amphetamine-involved overdose rates also increased among females (8.5%; 0.3 and 13.1%; 0.6, respectively) and males (12.4%; 1.1 and 20.5%; 2.2, respectively). Relative and absolute rate increases in amphetamine-involved overdoses occurred in all age groups except persons aged 15–24 years; relative and absolute rates of cocaine-involved overdoses increased only among persons aged 35–44 and ≥55 years. Relative and absolute rates of benzodiazepine-involved overdoses decreased among females (–4.4%; –0.7) and among persons aged 15–24 years (–7.3%; –1.7).

Among U.S. Census regions, relative and absolute increases in rates of opioid-involved overdoses were observed in the South (16.5%; 19.2), West (11.5%; 13.5), and Midwest (8.3%; 11.8); of amphetamine-involved overdoses in the Northeast (18.9%; 0.6), South (14.3%; 1.1), and West (21.2%; 3.2); and of cocaine-involved overdoses in the South (12.0%; 1.0) and Midwest (14.9%; 0.7). The Midwest experienced the only decline in relative and absolute rate for benzodiazepine-involved overdoses (–11.2%; –1.5). Relative and absolute rates of opioid-involved overdoses increased among persons living in both urban (13.6%; 16.9) and rural counties (10.1%; 6.1), as did rates of amphetamine-involved overdoses (21.7%; 1.3, urban and 20.8%; 1.9, rural).

Changes in rates of polydrug overdoses predominantly comprised those co-involving opioids and amphetamines (37.3% relative increase; 0.4 per 100,000 absolute increase) (Table 2). Relative and absolute rate increases for overdoses co-involving opioids and amphetamines were experienced by both females (32.7%; 0.2) and males (38.3%; 0.6) and all age groups except persons aged 45–54 years. Relative and absolute rate increases were identified in the Northeast (116.3%; 0.4), South (33.3%; 0.4), and West (26.7%; 0.7) Census regions. Relative and absolute increases in rates of overdoses co-involving opioids and amphetamines occurred among persons living in urban counties (54.1%; 0.5).

In 2019, opioids were involved in 40.2% of all suspected drug overdoses treated in EDs, including 28.7%, 56.9%, 49.9%, and 34.6% of overdoses among persons aged 15–24, 25–34, 35–54, and ≥55 years, respectively (Figure). In 2019, 23.6% of overdoses involving cocaine, 17.1% involving amphetamines, and 18.7% involving benzodiazepines also involved opioids. The highest percentages of cocaine- (35.0%), amphetamine- (21.1%), and benzodiazepine-involved (23.6%) overdoses that also involved opioids occurred among persons aged 25–34 years.


**Summary**

**What is already known about this topic?**

In 2017, a total of 967,615 nonfatal drug overdoses were treated in U.S. emergency departments (EDs); polydrug ED-treated overdoses increased from 2017 to 2018.

**What is added by this report?**

Rates of ED-treated suspected nonfatal drug overdoses involving opioids, cocaine, and amphetamines, and of polydrug overdoses co-involving opioids and amphetamines increased from 2018 to 2019. Rates of suspected benzodiazepine-involved overdoses declined. Opioids were substantially co-involved with cocaine, amphetamine, and benzodiazepine overdoses in 2019; 23.6%, 17.1%, and 18.7% of cocaine-, amphetamine-, and benzodiazepine-involved overdoses, respectively, involved opioids.

**What are the implications for public health practice?**

Opioids have substantial involvement in nonfatal overdoses, including those involving other drugs. Expanding syndromic surveillance to better inform overdose prevention efforts and increasing naloxone provision to persons who use stimulants are essential.


**** Absolute change is the difference in rates from 2018 to 2019. Relative change is the absolute rate change divided by the 2018 rate, multiplied by 100. Because syndromic surveillance data were used to examine meaningful changes in suspected overdose-related ED visits, and not to calculate prevalence estimates regarding numbers of persons with nonfatal drug overdoses, results reported exclude counts and rates.

†††† https://resources.cste.org/ICD-10-CM/Drug%20Overdose%20Indicator/Drug%20Overdose%20Indicator.pdf.

§§§§ Nonfatal drug overdose visits are classified using ICD-10-CM. ICD-10-CM diagnosis codes for all drugs included codes with T36–T50 with a sixth character of 1 or 4 (exceptions for T36.9, T37.9, T39.9, T41.4, T42.7, T43.9, T45.9, T47.9, and T49.9, which were included if the code had a fifth character of 1 or 4). Only codes with a seventh character of "A" (initial encounter) were included.

**TABLE 1. Annual change in rates per 100,000 emergency department (ED) visits for suspected unintentional and undetermined intent nonfatal overdoses* involving opioids,† cocaine,§ amphetamines,¶ or benzodiazepines,** by sex, age, U.S. Census region, and county urbanization level — 29 states,†† 2018 to 2019**

| ED patient/ visit characteristic | Rate change from 2018 to 2019§§ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Opioids | | Cocaine | | Amphetamines | | Benzodiazepines | |
| | Relative (%) | Absolute | Relative (%) | Absolute | Relative (%) | Absolute | Relative (%) | Absolute |
| **All** | **9.7¶¶** | **12.9¶¶** | **11.0¶¶** | **0.7¶¶** | **18.3¶¶** | **1.3¶¶** | **−3.0¶¶** | **−0.5¶¶** |
| **Sex** | | | | | | | | |
| Female | 7.1¶¶ | 6.0¶¶ | 8.5¶¶ | 0.3¶¶ | 13.1¶¶ | 0.6¶¶ | −4.4¶¶ | −0.7¶¶ |
| Male | 10.7¶¶ | 20.9¶¶ | 12.4¶¶ | 1.1¶¶ | 20.5¶¶ | 2.2¶¶ | −1.3 | −0.2 |
| **Age group, yrs** | | | | | | | | |
| 15–24 | 3.7¶¶ | 4.3¶¶ | −0.4 | 0.0 | 4.3 | 0.4 | −7.3¶¶ | −1.7¶¶ |
| 25–34 | 7.8¶¶ | 22.9¶¶ | 2.0 | 0.2 | 18.5¶¶ | 2.9¶¶ | −3.5 | −0.8 |
| 35–44 | 15.2¶¶ | 32.9¶¶ | 20.1¶¶ | 1.9¶¶ | 16.4¶¶ | 2.3¶¶ | −0.8 | −0.2 |
| 45–54 | 14.4¶¶ | 23.2¶¶ | 9.8 | 1.1 | 35.8¶¶ | 2.5¶¶ | −5.2 | −1.1 |
| ≥55 | 12.9¶¶ | 9.8¶¶ | 26.4¶¶ | 1.1¶¶ | 60.0¶¶ | 0.9¶¶ | 3.3 | 0.4 |
| **U.S. Census region***** | | | | | | | | |
| Northeast | 0.0 | 0.0 | 10.0 | 0.6 | 18.9¶¶ | 0.6¶¶ | −2.1 | −0.3 |
| South | 16.5¶¶ | 19.2¶¶ | 12.0¶¶ | 1.0¶¶ | 14.3¶¶ | 1.1¶¶ | −3.3 | −0.6 |
| Midwest | 8.3¶¶ | 11.8¶¶ | 14.9¶¶ | 0.7¶¶ | 2.2 | 0.1 | −11.2¶¶ | −1.5¶¶ |
| West | 11.5¶¶ | 13.5¶¶ | 8.1 | 0.3 | 21.2¶¶ | 3.2¶¶ | −0.8 | −0.2 |
| **County urbanization††††** | | | | | | | | |
| Urban | 13.6¶¶ | 16.9¶¶ | 16.2¶¶ | 1.0¶¶ | 21.7¶¶ | 1.3¶¶ | −1.0 | −0.2 |
| Rural | 10.1¶¶ | 6.1¶¶ | −7.5 | -0.3 | 20.8¶¶ | 1.9¶¶ | −5.8 | −0.8 |

* Suspected unintentional and undetermined intent nonfatal overdoses identified using International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) discharge diagnosis codes.

† Nonfatal suspected unintentional and undetermined intent drug overdoses involving opioids are defined by the following ICD-10-CM discharge diagnosis codes: T40.0X1A, T40.0X4A, T40.1X1A, T40.1X4A, T40.2X1A, T40.2X4A, T40.3X1A, T40.3X4A, T40.4X1A, T40.4X4A, T40.601A, T40.604A, T40.691A, or T40.694A.

§ Nonfatal suspected unintentional and undetermined intent drug overdoses involving cocaine are defined by the following ICD-10-CM discharge diagnosis codes: T40.5X1A or T40.5X4A.

¶ Nonfatal suspected unintentional and undetermined intent drug overdoses involving amphetamines are defined by the following ICD-10-CM discharge diagnosis codes: T43.621A or T43.624A.

** Nonfatal suspected unintentional and undetermined intent drug overdoses involving benzodiazepines are defined by the following ICD-10-CM discharge diagnosis codes: T42.4X1A or T42.4X4A.

†† Alabama, Arizona, Arkansas, Colorado, Connecticut, Delaware, Georgia, Illinois, Kansas, Kentucky, Louisiana, Maine, Maryland, Montana, Nevada, New Jersey, New Mexico, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Utah, Virginia, Washington, West Virginia, and Wisconsin.

§§ Estimates are rounded to the nearest tenth. Because of this rounding, estimates of 0.0 are displayed in the tables. These estimates are rounded down from <0.05 and do not represent an absence of a change in rate.

¶¶ Statistically significant change (p<0.05).

*** U.S. Census region coded by location of the facility where emergency department visits occurred using values for hospital state. The Northeast region includes hospitals located in five of nine possible states, the South region includes hospitals located in 12 of 16 possible states (17 including the District of Columbia), the Midwest region includes hospitals located in four of 12 possible states, and the West region includes hospitals located in eight of 13 possible states.

††† County urbanization levels for residence county were determined using the 2013 National Center for Health Statistics Urban-Rural Classification Scheme for Counties (https://www.cdc.gov/nchs/data_access/urban_rural.htm). Urban included large central metro, large fringe metro, medium metro, and small metro and rural included micropolitan and noncore counties.

## Discussion

From 2018 to 2019, rates of suspected nonfatal overdoses involving opioids, cocaine, and amphetamines treated in EDs increased, and those involving benzodiazepines decreased. Despite the decline in nonfatal benzodiazepine-involved overdoses, benzodiazepines were identified in 12.2% of nonfatal overdoses treated in EDs during 2017 (*1*). Benzodiazepines were also one of the most common drug classes identified in overdose deaths,¶¶¶¶ likely because of co-use with opioids (*3*). Increases in overdose rates involving other drugs highlight the complicated nature of and challenges associated with addressing the evolving U.S. drug overdose epidemic (*1*). Deaths involving synthetic opioids, primarily illicitly manufactured fentanyl, have been increasing since 2013 (*4*,*5*). In addition, the availability of cocaine and methamphetamine has increased in the United States in recent years, and according to the Drug Enforcement Administration, methamphetamine was the most frequently reported drug among all drug submissions in 2019.*****

Consistent with prior research, opioids constituted a large percentage of drug overdoses overall and were substantially co-involved with stimulant overdoses (*2*). Notably, rates of suspected overdoses co-involving opioids and amphetamines significantly increased from 2018 to 2019, overall, and in both

¶¶¶¶ https://www.cdc.gov/nchs/data/nvsr/nvsr68/nvsr68_12-508.pdf.

***** https://www.nflis.deadiversion.usdoj.gov/DesktopModules/ReportDownloads/Reports/13408NFLISDrugMidYear2019.pdf; https://www.dea.gov/sites/default/files/2020-01/2019-NDTA-final-01-14-2020_Low_Web-DIR-007-20_2019.pdf.

**TABLE 2. Annual change in rates per 100,000 emergency department (ED) visits for suspected unintentional and undetermined intent nonfatal overdoses* of cocaine,† amphetamines,§ benzodiazepines¶ co-involving opioids,** by sex, age, U.S. Census region, and county urbanization level — 29 states,†† 2018 to 2019**

| ED patient/ visit characteristic | Rate change from 2018 to 2019§§ | | | | | |
|---|---|---|---|---|---|---|
| | Opioids and cocaine | | Opioids and amphetamines | | Opioids and benzodiazepines | |
| | Relative (%) | Absolute | Relative (%) | Absolute | Relative (%) | Absolute |
| **All** | **4.4** | **0.1** | **37.3¶¶** | **0.4¶¶** | **2.6** | **0.1** |
| **Sex** | | | | | | |
| Female | 0.6 | 0.0 | 32.7¶¶ | 0.2¶¶ | 0.3 | 0.0 |
| Male | 6.2 | 0.1 | 38.3¶¶ | 0.6¶¶ | 4.9 | 0.2 |
| **Age group, yrs** | | | | | | |
| 15–24 | 1.6 | 0.0 | 50.3¶¶ | 0.5¶¶ | −8.5 | −0.2 |
| 25–34 | −0.1 | 0.0 | 35.5¶¶ | 1.0¶¶ | 14.6 | 0.6 |
| 35–44 | 22.1¶¶ | 0.6¶¶ | 38.6¶¶ | 0.9¶¶ | −7.2 | −0.3 |
| 45–54 | −0.9 | 0.0 | 26.0 | 0.3 | −7.6 | −0.3 |
| ≥55 | 15.3 | 0.1 | 66.0¶¶ | 0.2¶¶ | 14.5¶¶ | 0.4¶¶ |
| **U.S. Census region***** | | | | | | |
| Northeast | −1.4 | 0.0 | 116.3¶¶ | 0.4¶¶ | 5.2 | 0.1 |
| South | 6.1 | 0.1 | 33.3¶¶ | 0.4¶¶ | −0.6 | 0.0 |
| Midwest | 19.2 | 0.2 | 21.1 | 0.1 | 3.0 | 0.1 |
| West | −13.7 | −0.1 | 26.7¶¶ | 0.7¶¶ | 2.6 | 0.1 |
| **County urbanization†††** | | | | | | |
| Urban | 11.3¶¶ | 0.2¶¶ | 54.1¶¶ | 0.5¶¶ | 4.3 | 0.1 |
| Rural | −26.1 | −0.2 | 15.2 | 0.2 | 6.8 | 0.2 |

* Suspected unintentional and undetermined intent nonfatal overdoses identified using International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) discharge diagnosis codes.

† Nonfatal suspected unintentional and undetermined intent drug overdoses involving cocaine are defined by the following ICD-10-CM discharge diagnosis codes: T40.5X1A or T40.5X4A.

§ Nonfatal suspected unintentional and undetermined intent drug overdoses involving amphetamines are defined by the following ICD-10-CM discharge diagnosis codes: T43.621A or T43.624A.

¶ Nonfatal suspected unintentional and undetermined intent drug overdoses involving benzodiazepines are defined by the following ICD-10-CM discharge diagnosis codes: T42.4X1A or T42.4X4A.

** Nonfatal suspected unintentional and undetermined intent drug overdoses involving opioids are defined by the following ICD-10-CM discharge diagnosis codes: T40.0X1A, T40.0X4A, T40.1X1A, T40.1X4A, T40.2X1A, T40.2X4A, T40.3X1A, T40.3X4A, T40.4X1A, T40.4X4A, T40.601A, T40.604A, T40.691A, or T40.694A.

†† Alabama, Arizona, Arkansas, Colorado, Connecticut, Delaware, Georgia, Illinois, Kansas, Kentucky, Louisiana, Maine, Maryland, Montana, Nevada, New Jersey, New Mexico, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Utah, Virginia, Washington, West Virginia, and Wisconsin.

§§ Estimates are rounded to the nearest tenth. Because of this rounding, estimates of 0.0 are displayed in the tables. These estimates are rounded down from <0.05 and do not represent an absence of a change in rate.

¶¶ Statistically significant change ($p<0.05$).

*** U.S. Census region coded by location of the facility where emergency department visits occurred using values for hospital state. The Northeast region includes hospitals located in five of nine possible states, the South region includes hospitals located in 12 of 16 possible states (17 including the District of Columbia), the Midwest region includes hospitals located in four of 12 possible states, and the West region includes hospitals located in eight of 13 possible states.

††† County urbanization levels for residence county were determined using the 2013 National Center for Health Statistics Urban-Rural Classification Scheme for Counties (https://www.cdc.gov/nchs/data_access/urban_rural.htm). Urban included large central metro, large fringe metro, medium metro, and small metro and rural included micropolitan and noncore counties.

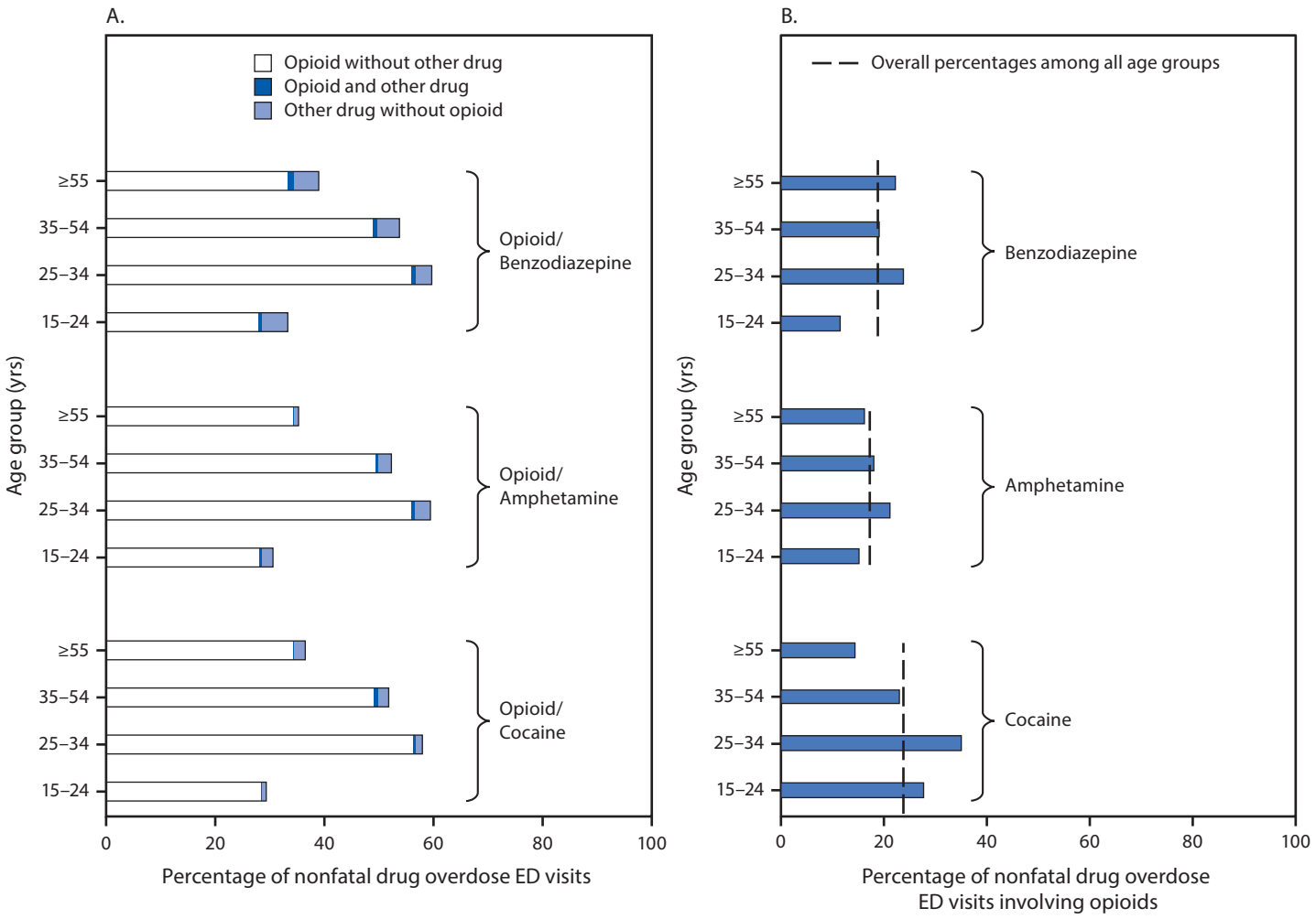
sexes and nearly all age groups. Findings are consistent with previous studies that have highlighted increases in methamphetamine use initiation,†††† co-use between stimulants and opioids (*6*,*7*), nonfatal stimulant-involved overdoses treated in EDs (*8*), and co-involvement of opioids and stimulants in overdose deaths (*9*).

These findings have important programmatic implications regarding the evolving U.S. overdose epidemic. Syndromic surveillance is a critical data source for identifying overdose spikes and clusters to inform deployment of public health and public safety resources. Expanding coverage to include all ED visits in the United States would help further identify certain population characteristics and geographic regions that should be prioritized for prevention, treatment, and response efforts. The increases observed in polydrug overdose rates highlight the complexity of the overdose epidemic and the need to intervene more rapidly before nonfatal polydrug overdoses increase further or result in fatal overdoses.

The findings in this report are subject to at least seven limitations. First, overdose case definitions relied on discharge diagnosis codes, which were missing in 20.3% of ED visits available in NSSP for the 29 states analyzed. Improvements in submission of discharge diagnosis codes might have influenced the changes observed. However, in all included states, visits with valid discharge diagnosis codes increased 5.3% from 2018 to 2019. Second, discharge diagnosis codes might be used

†††† https://www.cdc.gov/drugoverdose/pdf/pubs/2019-cdc-drug-surveillance-report.pdf.

**FIGURE. Percentage of nonfatal emergency department (ED) visits for suspected unintentional and undetermined intent nonfatal overdoses* involving combinations of opioids† with and without cocaine,§ amphetamines,¶ or benzodiazepines** (A)†† and percentage of cocaine, amphetamine, and benzodiazepine overdoses involving opioids (B),§§ by age group — 29 states,¶¶ 2019**




* Suspected unintentional and undetermined intent nonfatal overdoses identified using *International Classification of Diseases, Tenth Revision, Clinical Modification* (ICD-10-CM) discharge diagnosis codes.

† Nonfatal suspected unintentional and undetermined intent drug overdoses involving opioids are defined by the following ICD-10-CM discharge diagnosis codes: T40.0X1A, T40.0X4A, T40.1X1A, T40.1X4A, T40.2X1A, T40.2X4A, T40.3X1A, T40.3X4A, T40.4X1A, T40.4X4A, T40.601A, T40.604A, T40.691A, or T40.694A.

§ Nonfatal suspected unintentional and undetermined intent drug overdoses involving cocaine are defined by the following ICD-10-CM discharge diagnosis codes: T40.5X1A or T40.5X4A.

¶ Nonfatal suspected unintentional and undetermined intent drug overdoses involving amphetamines are defined by the following ICD-10-CM discharge diagnosis codes: T43.621A or T43.624A.

** Nonfatal suspected unintentional and undetermined intent drug overdoses involving benzodiazepines are defined by the following ICD-10-CM discharge diagnosis codes: T42.4X1A or T42.4X4A.

†† For overdoses of opioids combined with other drugs, the sum of the bars for "Opioid without other drug" and for "Opioid and other drug" are the percentage totals for opioid-involved overdoses. Opioids were involved in 28.7%, 56.9%. 49.9%, and 34.6% of suspected unintentional and undetermined intent drug overdoses among persons aged 15–24, 25–34, 35–54, and ≥55 years, respectively.

§§ For overdoses of cocaine, amphetamines, and benzodiazepines also involving opioid, using pairwise comparisons between age groups, statistically significant ($p<0.05$) differences include cocaine, persons aged 25–34 years compared with each other age group; amphetamine, persons aged 25–34 years compared with each other age group; benzodiazepines, persons aged 25–34 years compared with persons aged 15–24 and 35–54 years. Overall percentage among all age groups was 18.7% for benzodiazepine, 17.1% for amphetamine, and 23.6% for cocaine-involved overdoses also involving opioids.

¶¶ Alabama, Arizona, Arkansas, Colorado, Connecticut, Delaware, Georgia, Illinois, Kansas, Kentucky, Louisiana, Maine, Maryland, Montana, Nevada, New Jersey, New Mexico, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Utah, Virginia, Washington, West Virginia, and Wisconsin.

inconsistently by hospitals and providers, which could result in misclassification. Third, comprehensive toxicology testing of patients experiencing overdose rarely occurs in overdose ED visits (*10*), which might have underestimated polydrug overdoses. Fourth, hospital participation in NSSP varied across years; thus, results might be related to changes in hospital participation. Fifth, NSSP coverage is not necessarily uniform across or within all states, leading to different levels of coverage by region. Sixth, data are not generalizable beyond states participating in NSSP. Finally, analyses of overdoses stratified by race and ethnicity were not conducted because these data were not available in approximately one third and one half of visits, respectively.

EDs provide an opportunity to intervene and link persons into treatment, harm reduction services, and other community-based programs. Although rates of overdoses co-involving opioids and benzodiazepines were stable from 2018 to 2019, efforts to ensure safe prescribing practices remain critical.[§§§§§] Provision of naloxone, expanding overdose education to more groups who are at risk, including persons using stimulants, utilizing partnerships between public health and public safety, and an improved understanding of social and structural factors that contribute to overdose are necessary to prevent drug overdoses.

[§§§§§] https://www.cdc.gov/drugoverdose/prescribing/guideline.html.

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# Support for Transition from Adolescent to Adult Health Care Among Adolescents With and Without Mental, Behavioral, and Developmental Disorders — United States, 2016–2017

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Clinical guidelines recommend that primary care providers (PCPs) provide guidance and support to ensure a planned transition from pediatric to adult health care for adolescents, beginning at age 12 years (*1*). However, most adolescents do not receive the recommended health care transition planning (*2*). This is particularly concerning for adolescents with diagnosed mental, behavioral, and developmental disorders (MBDDs) (*3*), who account for approximately 20% of U.S. adolescents (*4*). Childhood MBDDs are linked to increased long-term morbidity and mortality; timely health care transition planning might mitigate adverse outcomes (*5*,*6*). CDC analyzed pooled, parent-reported data from the 2016 and 2017 National Survey of Children's Health (NSCH), comparing adolescents, aged 12–17 years, with and without MBDDs on a composite measure and specific indicators of recommended health care transition planning by PCPs. Overall, approximately 15% of adolescents received recommended health care transition planning: 15.8% (95% confidence interval [CI] = 14.1%–17.5%) of adolescents with MBDDs, compared with 14.2% (95% CI = 13.2%–15.3%) of adolescents without MBDDs. Relative to peers without MBDDs and after adjusting for age, adolescents with anxiety were 36% more likely to receive recommended health care transition planning, and those with depression were 69% more likely; adolescents with autism spectrum disorder (ASD) were 35% less likely to receive such transition planning, and those with developmental delay* were 25% less likely. Fewer than 20% of adolescents with MBDDs receiving current treatment met the transition measure. These findings suggest that a minority of adolescents with MBDDs receive recommended transition planning, indicating a potential missed public health opportunity to prevent morbidity and mortality in a population at high risk for health care disengagement (*1*). Improving access to comprehensive and coordinated programs and services,† as well as increasing provider training concerning adolescents' unique mental and physical health care needs (*7*), could help increase the number of adolescents benefiting from successful health care transitions (*4*).

NSCH, a nationally representative, cross-sectional survey of parents and guardians, is funded and directed by the Health Resources and Services Administration's Maternal and Child Health Bureau (HRSA MCHB) and conducted by the U.S. Census Bureau.§ MBDDs were identified based on parents' affirmative responses to the question "Has a doctor or other health care provider ever told you that this child has (specified disorder)?" and whether the child currently had the MBDD; adolescents with no reported MBDDs constituted the comparison group. MBDDs were categorized as "behavioral disorders" (attention-deficit/hyperactivity disorder [ADHD], behavioral or conduct problems, or Tourette syndrome), "emotional disorders" (anxiety problems or depression), and "developmental disorders" (ASD, learning disability, intellectual disability, developmental delay, or speech or other language disorder).¶ Parents reported whether each current MBDD was "mild," "moderate," or "severe." Treatment was based on whether 1) the child had taken any medication for emotional, concentration, or behavioral difficulties in the past 12 months or was currently taking medication for ADHD or ASD; or 2) the child was currently receiving behavioral services, such as speech, occupational, or behavioral therapy; treatment or counseling from a mental health professional; or behavioral treatment for ADHD or ASD in the past 12 months.

Consistent with previous research (*2*,*3*), a three-element** transition measure aligning with the HRSA MCHB National Performance Measure†† for health care transition planning was used: 1) any time alone with PCP at last preventive visit§§;

* The clinical diagnosis of developmental delay (global developmental delay) is reserved for persons aged <5 years and requires reassessment for another diagnostic determination after a given period. Parent report of developmental delay in response to NSCH survey questions does not reflect a clinical diagnosis of developmental delay in adolescence.

† For example, HRSA MCHB Adolescent and Young Adult programs: https://mchb.hrsa.gov/maternal-child-health-topics/adolescent-and-young-adult-health.

§ https://mchb.hrsa.gov/data/national-surveys/data-user.

¶ These categories are not mutually exclusive.

** Four survey items were used to measure the three transition elements: 1) At his or her last preventive check-up, did this child have a chance to speak with a doctor or other health care provider privately, without you or another adult in the room? (Time alone with HCP); 2) Has this child's doctor or other HCP actively worked with this child to a) gain skills to manage his or her health and health care? (e.g., by understanding current health needs, knowing what to do in a medical emergency, or taking medications he or she may need?) or b) understand the changes in health care that happen at age 18 years (e.g., by understanding changes in privacy, consent, access to information, or decision-making) (HCP worked with adolescent); 3) [Has this child's doctor or other HCP] talked with you about having this child eventually see doctors or other HCPs who treat adults? (HCP discussed shift).

†† https://mchb.tvisdata.hrsa.gov/PrioritiesAndMeasures/NationalPerformanceMeasures.

§§ The survey item on which this element is based was asked only for adolescents with a preventive visit in the past 12 months. Adolescents with no preventive visit were coded for analyses as not meeting this element.

2) PCP worked with the adolescent to gain health management skills or understand health care changes occurring at age 18 years; and 3) PCP discussed the shift to an adult PCP. Adolescents who met all three elements met the transition measure.

Weighted response rates overall for NSCH were 40.7% for 2016 and 37.4% for 2017.¶¶ Analyses included 29,286 adolescents aged 12–17 years with data*** for current MBDDs and transition questions. Weighted prevalence estimates for adolescents meeting the transition measure were compared by MBDD status across sociodemographic subgroups using unadjusted prevalence ratios (PRs) and 95% Clopper-Pearson CIs. Prevalences of meeting the transition measure and the three elements were calculated by MBDD status and MBDD category and compared using age-adjusted prevalence ratios (aPRs)††† and 95% CIs. Analyses were conducted using SAS-callable SUDAAN (version 11.0.3; RTI International) to accommodate the complex sample design and sampling weights.

Overall, 14.6% (95% CI = 13.7%–15.5%) of adolescents met the transition planning measure; 24.2% (95% CI = 23.1%–25.4%) had one or more MBDDs. Meeting the transition measure did not differ significantly by MBDD status (with MBDDs = 15.8%, without MBDDs = 14.2%) (Table 1), but subgroup differences were detected. Adolescents with MBDDs were more likely to meet the transition measure than were those without MBDDs among females (19.0% versus 13.6%), non-Hispanic whites (17.3% versus 14.8%), other non-Hispanic race/ethnicity groups (20.2% versus 13.4%), those with private insurance (17.3% versus 14.4%), and those without insurance (14.8% versus 6.8%). Older adolescents (aged 15–17 years) were more likely than were younger

¶¶ A total of 71,811 adolescents were included in the NSCH in 2016 and 2017. Additional information about response rates for the 2016 and 2017 NSCH can be found at https://www.census.gov/content/dam/Census/programs-surveys/nsch/tech-documentation/methodology/NSCH-2016-FAQs.pdf (2016) and https://www.census.gov/content/dam/Census/programs-surveys/nsch/tech-documentation/methodology/2017-NSCH-FAQs.pdf (2017).

*** Adolescents with responses to at least seven of the 10 sets of MBDD questions and no reported MBDDs were included in the no MBDD group.

††† Both MBDD type and the transition planning measure were strongly associated with age. To address this association, age-adjusted prevalence ratios were calculated to provide more appropriate comparisons across groups.

**TABLE 1. Percentage of U.S. adolescents aged 12—17 years meeting the transition planning measure, by mental, behavioral, or developmental disorder (MBDD) status among sociodemographic subgroups — National Survey of Children's Health, United States, 2016–2017**

| | With MBDD | | No MBDD | | Comparison of adolescents with and without MBDDs* |
|---|---|---|---|---|---|
| **Characteristic** | **No. (unweighted)** | **% (95% CI)** | **No. (unweighted)** | **% (95% CI)** | **PR (PR 95% CI)** |
| **Total** | 7,622 | 15.8 (14.1–17.5) | 21,664 | 14.2 (13.2–15.3) | 1.11 (0.98–1.26) |
| **Sex** | | | | | |
| Male | 4,187 | 13.3 (11.2–15.7) | 10,714 | 14.8 (13.2–16.4) | 0.90 (0.74–1.10) |
| Female | 3,435 | 19.0 (16.4–21.8) | 10,950 | 13.6 (12.3–15.0) | 1.40** (1.18–1.66) |
| **Age group (yrs)** | | | | | |
| 12–14 | 3,345 | 10.2 (8.0–12.6) | 9,725 | 8.8 (7.7–10.0) | 1.16 (0.90–1.49) |
| 15–17 | 4,277 | 21.5 (19.0–24.1) | 11,939 | 19.5 (17.8–21.3) | 1.10 (0.95–1.27) |
| **Race/Ethnicity** | | | | | |
| White, non-Hispanic | 5,662 | 17.3 (15.3–19.6) | 15,212 | 14.8 (13.8–15.7) | 1.18** (1.02–1.35) |
| Black, non-Hispanic | 467 | 16.5 (11.6–22.6) | 1,342 | 14.1 (11.1–17.6) | 1.18 (0.80–1.73) |
| Hispanic | 750 | 9.0 (6.0–12.9) | 2,310 | 13.5 (10.6–16.8) | 0.67 (0.44–1.03) |
| Other, non-Hispanic | 743 | 20.2 (15.3–25.9) | 2,800 | 13.4 (11.2–15.8) | 1.51 (1.11–2.05) |
| **Urbanicity†** | | | | | |
| Living outside an MSA (rural) | 1,500§ | 19.5 (15.9–23.6) | 4,000§ | 15.8 (13.9–18.0) | 1.23 (0.97–1.56) |
| Living in an MSA (urban or suburban) | 6,100§ | 15.2 (13.4–17.1) | 17,500§ | 14.0 (12.9–15.2) | 1.09 (0.94–1.26) |
| **Health insurance status** | | | | | |
| Public insurance only | 1,851 | 13.7 (11.0–16.8) | 2,938 | 15.3 (12.6–18.4) | 0.90 (0.68–1.18) |
| Private insurance only | 4,884 | 17.3 (15.0–19.8) | 16,856 | 14.4 (13.4–15.5) | 1.20** (1.03–1.40) |
| Public and private insurance | 507 | 12.0 (8.2–16.6) | 550 | 14.0 (8.5–21.2) | 0.85 (0.50–1.47) |
| Unspecified insurance | 64 | 32.7 (13.1–58.1) | 210 | 20.2¶ (4.7–47.6) | 1.61 (0.49–5.31) |
| No insurance | 262 | 14.8 (8.0–24.2) | 941 | 6.8 (4.6–9.6) | 2.18** (1.17–4.07) |

**Abbreviations:** CI = confidence interval; MSA = metropolitan statistical area; PR = prevalence ratio.

* Reference group is adolescents without MBDDs.

† Residence in or not in an MSA was used as a proxy for urbanicity. Adolescents living in an MSA were considered to be living in an urban or suburban area, and adolescents not living in an MSA were considered to be living in a rural area. The U.S. Census Bureau reviewed the urban/rural status estimates for unauthorized disclosure of confidential information and approved the disclosure avoidance practices applied to the data release (Approval ID CBDRB-FY20-POP001–0053).

§ The unweighted n for each urbanicity subgroup has been rounded to the nearest hundred to follow U.S. Census Bureau disclosure avoidance practices for data release.

¶ Estimate does not meet the National Center for Health Statistics standards of precision and should be interpreted with caution. The absolute width of the 95% CI is >30 percentage points and the effective sample size is <30.

** CI of adjusted PR does not include 1.

adolescents to meet the transition measure regardless of MBDD status (Supplementary Figure 1, https://stacks.cdc.gov/view/cdc/92137). Adolescents with emotional disorders tended to be older than were adolescents with behavioral or developmental disorders (Supplementary Figure 2, https://stacks.cdc.gov/view/cdc/92137). Adolescents with MBDDs were more likely to have time alone with their PCP at their last preventive visit (aPR = 1.18; 95% CI = 1.10–1.27) and work with their PCP to gain health management skills or understand health care changes occurring at age 18 years (aPR = 1.08; 95% CI = 1.02–1.13) than were adolescents without MBDDs; however, they were less likely to have discussed the shift to an adult provider with their PCP (PR = 0.90; 95% CI = 0.85–0.96) (Table 2).

The highest percentage of adolescents meeting the transition planning measure was those with emotional disorders (20.4%), specifically depression (26.8%). The lowest percentage of adolescents was those with developmental disorders (12.6%), specifically ASD (8.9%). Among adolescents with MBDDs, neither the presence of two or more co-occurring MBDDs (aPR = 1.07; 95% CI = 0.86–1.33) nor MBDD severity (aPR = 1.01; 95% CI = 0.82–1.25) was associated with meeting the transition planning measure. Adolescents with MBDDs who received treatment were more likely to meet the transition measure than were those with MBDDs who did not receive treatment (aPR = 1.38; 95% CI = 1.09–1.74) (Table 3).

**TABLE 2. Prevalence of meeting the transition planning measure and individual indicators among adolescents aged 12–17 years, by mental, behavioral, or developmental disorder (mental, behavioral, or developmental disorder [MBDD] category and individual condition) status — National Survey of Children's Health, United States, 2016–2017**

| | Composite measure* | | Time alone with PCP | | PCP worked with adolescent | | PCP discussed shift | |
|---|---|---|---|---|---|---|---|---|
| **Characteristic (no.)** | **% (95% CI)** | **aPR† (95% CI)** | **% (95% CI)** | **aPR (95% CI)** | **% (95% CI)** | **aPR (95% CI)** | **% (95% CI)** | **aPR (95% CI)** |
| **No MBDD (21,664)** | 14.2 (13.2–15.3) | Ref. | 36.8 (35.3–38.3) | Ref. | 59.7 (58.0–61.4) | Ref. | 50.8 (49.2–52.5) | Ref. |
| **Any MBDD§ (7,622)** | 15.8 (14.1–17.5) | 1.12 (0.99–1.27) | 43.3 (40.7–46.0) | 1.18¶ (1.10–1.27) | 64.2 (61.4–66.9) | 1.08 (1.02–1.13) | 45.7 (43.0–48.4) | 0.90 (0.85–0.96) |
| **MBDD category**** | | | | | | | | |
| **Behavioral disorder (4,354)** | 14.7 (12.5–17.1) | 1.08 (0.92–1.28) | 41.8 (38.5–45.1) | 1.16 (1.07–1.26) | 63.9 (60.4–67.3) | 1.07 (1.01–1.14) | 43.9 (40.4–47.4) | 0.88 (0.81–0.96) |
| ADHD (3,612) | 14.5 (12.1–17.2) | 1.07 (0.89–1.29) | 43.2 (39.5–46.9) | 1.20 (1.10–1.31) | 65.1 (61.1–68.9) | 1.10 (1.03–1.17) | 41.3 (37.4–45.3) | 0.84 (0.76–0.92) |
| Behavior/Conduct problem (2,083) | 13.5 (10.8–16.7) | 1.03 (0.82–1.29) | 37.9 (33.4–42.7) | 1.07 (0.95–1.21) | 58.4 (52.9–63.7) | 0.99 (0.90–1.08) | 45.7 (40.5–50.9) | 0.93 (0.83–1.04) |
| Tourette syndrome (107) | 12.4†† (4.7–25.0) | 0.82 (0.37–1.84) | 48.9§§ (31.6–66.3) | 1.29 (0.89–1.88) | 74.1 (60.0–85.3) | 1.24 (1.05–1.46) | 48.8†† (31.4–66.4) | 0.93 (0.66–1.33) |
| **Emotional disorder (4,117)** | 20.4 (17.9–22.9) | 1.36 (1.18–1.56) | 47.8 (44.6–51.0) | 1.26 (1.17–1.37) | 68.0 (65.0–71.0) | 1.13 (1.08–1.19) | 46.9 (43.7–50.1) | 0.90 (0.83–0.96) |
| Anxiety (3,651) | 19.8 (17.2–22.5) | 1.32 (1.14–1.53) | 47.2 (43.8–50.6) | 1.25 (1.15–1.36) | 67.4 (64.1–70.6) | 1.12 (1.06–1.19) | 45.8 (42.4–49.1) | 0.88 (0.81–0.95) |
| Depression (2,030) | 26.8 (22.8–31.1) | 1.69 (1.43–2.00) | 54.1 (49.6–58.6) | 1.39 (1.27–1.53) | 71.8 (67.6–75.7) | 1.19 (1.11–1.27) | 51.1 (46.6–55.6) | 0.95 (0.86–1.04) |
| **Developmental disorder (3,221)** | 12.6 (10.6–14.9) | 0.93 (0.78–1.11) | 39.1 (34.9–43.5) | 1.08 (0.96–1.22) | 60.6 (56.2–64.9) | 1.02 (0.94–1.10) | 43.5 (39.3–47.7) | 0.87 (0.80–0.96) |
| ASD (887) | 8.9 (5.8–12.9) | 0.65 (0.45–0.95) | 39.5 (29.4–50.4) | 1.09 (0.83–1.44) | 55.8 (45.9–65.4) | 0.94 (0.79–1.12) | 40.1 (31.0–49.6) | 0.81 (0.66–0.98) |
| Learning disability (2,499) | 13.0 (10.7–15.7) | 0.95 (0.78–1.16) | 40.5 (35.5–45.6) | 1.12 (0.98–1.27) | 62.4 (57.4–67.1) | 1.05 (0.97–1.14) | 42.7 (38.0–47.5) | 0.86 (0.77–0.96) |
| Intellectual disability (400) | 10.1 (5.2–17.3) | 0.69 (0.39–1.21) | 24.0 (16.4–33.1) | 0.64 (0.45–0.90) | 55.8 (44.9–66.3) | 0.93 (0.77–1.12) | 50.3 (39.6–60.9) | 0.98 (0.79–1.20) |
| Developmental delay (1,367) | 10.1 (7.6–13.2) | 0.75 (0.57–0.99) | 28.8 (24.2–33.7) | 0.80 (0.68–0.95) | 55.8 (49.9–61.7) | 0.94 (0.84–1.05) | 43.7 (38.0–49.6) | 0.88 (0.78–1.00) |
| Speech/Language disorder (863) | 9.2 (6.1–13.2) | 0.73 (0.51–1.04) | 33.3 (22.8–45.1) | 0.96 (0.69–1.33) | 62.3 (53.9–70.2) | 1.06 (0.93–1.20) | 38.1 (30.1–46.7) | 0.80 (0.66–0.97) |

**Abbreviations:** ADHD = attention-deficit/hyperactivity disorder; aPR = age-adjusted prevalence ratio; ASD = autism spectrum disorder; CI = confidence interval; PCP = primary health care provider.

* The composite measure of transition planning comprises the three individual elements: Time alone with PCP, PCP worked with adolescent, and PCP discussed shift. If an adolescent met all three elements, they were considered to have met the transition planning measure.

† Prevalence ratios adjusted for age (aPR); all comparisons using aPRs use the "No MBDD" group as the reference group.

§ Children with any current MBDDs were identified based on the question "Has a doctor or other health care provider ever told you that this child has (specified disorder)?"; if the parent responded affirmatively, a follow-up question asked whether the child currently had the specified disorder. The "Any MBDD" category included parent report of one or more of the following: anxiety problems, depression, attention-deficit/hyperactivity disorder (ADHD), behavioral or conduct problems, Tourette syndrome, autism spectrum disorder (ASD), learning disability, intellectual disability, developmental delay, and speech or other language disorder. The clinical diagnosis of developmental delay (global developmental delay) is reserved for persons aged <5 years and requires reassessment for another diagnostic determination after a given period of time. Parent report of developmental delay in response to NSCH survey questions does not reflect a clinical diagnosis of developmental delay in adolescence.

¶ CI does not include 1.

** Individual MBDDs and MBDD categories are not mutually exclusive.

†† Estimate does not meet National Center for Health Statistics standards of precision and should be interpreted with caution. This percentage has a relative CI width >130%.

§§ Estimate does not meet National Center for Health Statistics standards of precision and should be interpreted with caution. The absolute width of the 95% CI is >30 percentage points.

## Discussion

Consistent with recent findings (*2*,*3*), this study found that a minority of U.S. adolescents receive recommended transition planning. Overall, rates of transition planning are higher among adolescents aged 15–17 years than among their younger peers (aged 12–14 years) suggesting that PCPs might be addressing transition to adult care as the transition becomes imminent. However, among adolescents aged 15–17 years, only 21.5% of those without MBDDs and 19.5% of those with MBDDs were receiving transition planning guidance, indicating a significant gap in transition planning for all adolescents.

Three subgroups of adolescents with MBDDs might be especially vulnerable to transition planning gaps. First, adolescents with ASD and other developmental disorders were least likely to meet the transition measure, suggesting that PCPs should work with families to better address the transition needs of these adolescents (*3*). Second, although adolescents with behavioral and emotional disorders had similar or higher levels of transition planning than did adolescents without MBDDs, only one in five adolescents with emotional disorders, and one in seven adolescents with behavioral disorders met the transition measure. Adolescents with behavioral and emotional disorders are at increased risk for disengagement from health care services during the transition to adult care, which can result in poor health outcomes (*1*,*6*,*8*). Finally, fewer than 20% of adolescents receiving medication, behavioral treatment, or both for MBDDs met the transition planning measure; this group might benefit from an increased emphasis on transition planning. Treatment continuity from adolescence into young adulthood is critical to long-term mental and physical health, and support during transition can increase the likelihood of maintaining adherence to current treatment (*1*,*4*,*5*). Together, these findings suggest increased attention to the transition needs of adolescents with MBDDs is warranted.

The findings in this report are subject to at least five limitations. First, the data are cross-sectional, so causality cannot be ascertained. Second, NSCH response rates were relatively low and might lead to nonresponse bias; however, sampling weights were applied to address nonresponse and produce nationally representative estimates. Third, indicators rely on parent-reported data, which might be subject to recall or social desirability bias; in addition, parents might not be aware of information provided during private discussions between adolescents and PCPs. Fourth, some PCPs may delay transition planning for adolescents in their care. Finally, treatment indicators might not record all treatments received.

All adolescents, especially those with MBDDs, could benefit from receiving earlier transition planning as recommended (*1*). Those with MBDDs might also benefit from condition-specific transition protocols with extended transition timelines, modified transition goals, and increased opportunities for comanagement between pediatric and adult PCPs (*1*,*9*). School-based transition programs and treatment appointments, including medication checks, provide opportunities outside preventive visits for transition planning work (*10*). Improving access to comprehensive and coordinated programs and services, as well as increasing provider training concerning adolescents' unique mental and physical health care needs (*7*), could help increase

**TABLE 3. Adolescents with mental, behavioral, and developmental disorders (MBDDs) aged 12–17 years, meeting the composite transition planning measure and individual indicators, by MBDD co-occurrence, treatment status, and severity (unweighted n = 7,622) — National Survey of Children's Health, United States, 2016–2017**

| | Composite measure | | Time alone with PCP | | PCP worked with adolescent | | PCP discussed shift | |
|---|---|---|---|---|---|---|---|---|
| **Characteristic (no.)** | **% (95% CI)** | **aPR (95% CI)** | **% (95% CI)** | **aPR (95% CI)** | **% (95% CI)** | **aPR (95% CI)** | **% (95% CI)** | **aPR (95% CI)** |
| **Co-occurrence of MBDDs** | | | | | | | | |
| 1 MBDD* (3,176) | 15.0 (12.4–17.8) | Ref. | 45.1 (41.1–49.2) | Ref. | 62.0 (57.8–66.1) | Ref. | 45.9 (41.8–50.1) | Ref. |
| ≥2 MBDDs (4,437) | 16.4 (14.2–18.7) | 1.07 (0.86–1.33) | 42.0 (38.4–45.6) | 0.92 (0.81–1.04) | 65.7 (62.0–69.2) | 1.06 (0.97–1.15) | 45.6 (42.1–49.3) | 0.99 (0.88–1.11) |
| **Severity of MBDD†** | | | | | | | | |
| Only mild MBDD (3,419) | 15.4 (13.2–17.8) | Ref. | 43.1 (39.4–47.0) | Ref. | 64.4 (60.4–68.3) | Ref. | 46.3 (42.4–50.2) | Ref. |
| ≥1 moderate/severe MBDD (4,203) | 16.1 (13.7–18.7) | 1.01 (0.82–1.25) | 43.5 (39.7–47.3) | 0.99 (0.88–1.12) | 64.1 (60.2–67.8) | 0.99 (0.91–1.08) | 45.2 (41.5–49.0) | 0.96 (0.86–1.08) |
| **Treatment§ status among adolescents with MBDDs** | | | | | | | | |
| No treatment (2,056) | 12.6 (10.1–15.5) | Ref. | 38.1 (33.4–42.9) | Ref. | 55.9 (50.4–61.3) | Ref. | 47.8 (42.7–52.9) | Ref. |
| Any treatment (5,548) | 17.0 (15.0–19.3) | 1.38¶ (1.09–1.74) | 45.6 (42.4–48.8) | 1.21 (1.05–1.39) | 67.9 (64.8–70.9) | 1.22 (1.09–1.35) | 44.7 (41.5–48.0) | 0.94 (0.84–1.07) |

**Abbreviations:** aPR = age adjusted prevalence ratio; CI = confidence interval; PCP = primary health care provider.

* Children with current MBDDs were identified based on the answer to the question "Has a doctor or other health care provider ever told you that this child has (specified disorder)?"; if the parent responded affirmatively, a follow-up question asked whether the child currently had the specified disorder. Any disorder included parent report of one of the following: anxiety problems, depression, attention-deficit/hyperactivity disorder (ADHD), behavioral or conduct problems, Tourette syndrome, autism spectrum disorder (ASD), learning disability, intellectual disability, developmental delay, and speech or other language disorder.

† For each current MBDD indicated, the parent reported whether the MBDD was "mild," "moderate," or "severe."

§ Treatment was indicated if the parent reported that the child with an MBDD was currently receiving medication treatment (i.e., medication for ADHD or ASD, or had taken any medication for emotional, concentration, or behavioral difficulties in the past 12 months) or behavioral services (i.e., speech, occupational, or behavioral therapy, treatment or counseling from a mental health professional in the past 12 months, or behavioral treatment for ADHD or ASD in the past 12 months).

¶ CI does not include 1.

**Summary**

What is already known about this topic?

Adolescents with diagnosed mental, behavioral, and developmental disorders (MBDDs) are likely to disengage from and experience gaps in health care as they approach adulthood.

What is added by this report?

During 2016–2017, approximately 15% of adolescents, regardless of MBDD status, received transition guidance from their health care provider, but only 10% of adolescents aged 12–14 years received guidance. Among all adolescents with MBDDs, approximately 20% of those with emotional disorders and 13% of those with developmental disorders met the transition planning measure.

What are the implications for public health practice?

Improving access to comprehensive and coordinated programs and services, as well as increasing provider training concerning adolescents' unique mental and physical health care needs, could help increase the number of adolescents benefiting from successful health care transitions.

the number of adolescents benefiting from successful health care transitions (*4*).

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# Progress Toward Hepatitis B and Hepatitis C Elimination Using a Catalytic Funding Model — Tashkent, Uzbekistan, December 6, 2019–March 15, 2020

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In 2016, the World Health Organization (WHO) set hepatitis elimination targets of 90% reduction in incidence and 65% reduction in mortality worldwide by 2030 (*1*). Hepatitis B virus (HBV) and hepatitis C virus (HCV) infection prevalences are high in Uzbekistan, which lacks funding for meeting WHO's targets. In the absence of large financial donor programs for eliminating HBV and HCV infections, insufficient funding is an important barrier to achieving those targets in Uzbekistan and other low- and middle-income countries. A pilot program using a catalytic funding model, including simplified test-and-treat strategies, was launched in Tashkent, Uzbekistan, in December 2019. Catalytic funding is a mechanism by which the total cost of a program is paid for by multiple funding sources but is begun with upfront capital that is considerably less than the total program cost. Ongoing costs, including those for testing and treatment, are covered by payments from 80% of the enrolled patients, who purchase medications at a small premium that subsidizes the 20% who cannot afford treatment and therefore receive free medication. The 1-year pilot program set a target of testing 250,000 adults for HBV and HCV infection and treating all patients who have active infection, including those who had a positive test result for hepatitis B surface antigen (HBsAg) and those who had a positive test result for HCV core antigen. During the first 3 months of the program, 24,821 persons were tested for HBV and HCV infections. Among those tested, 1,084 (4.4%) had positive test results for HBsAg, and 1,075 (4.3%) had positive test results for HCV antibody (anti-HCV). Among those infected, 275 (25.4%) initiated treatment for HBV, and 163 (15.2%) initiated treatment for HCV, of whom 86.5% paid for medications and 13.5% received medications at no cost. Early results demonstrate willingness of patients to pay for treatment if costs are low, which can offset elimination costs. However, improvements across the continuum of care are needed to recover the upfront investment. Lessons learned from this program, including the effectiveness of using simplified test-and-treat guidelines, general practitioners in lieu of specialist physicians, and innovative financing to reduce costs, can guide similar initiatives in other countries and help curb the global epidemic of viral hepatitis, especially among low- and middle-income countries.

Viral hepatitis is a ubiquitous infectious disease. In 2015, an estimated 257 million persons had active HBV infection (*1*), 71 million persons had active HCV (*2*) infection, and approximately 1.3 million died from viral hepatitis and resulting liver disease (*1*). Despite the availability of hepatitis B vaccines and treatment for hepatitis B and C, few low- and middle-income countries have sustainable and scalable elimination programs. Lack of financing for large-scale testing and treatment is the main barrier to elimination, despite evidence of a positive return on investment (*3*). Certain countries require innovative approaches to financing because traditional funding mechanisms, such as donations and grants, remain largely unavailable for hepatitis elimination programs (*4*).

During 2016, Uzbekistan, with a population of approximately 30 million persons, had an estimated 2.5 million (8.3%) persons living with HBV infection (i.e., had a positive test result for HBsAg). Among those infected persons, 10% had a diagnosis, and only 0.5% (approximately 12,500) had been treated (*5*). An estimated 1.3 million (4.3%) persons were living with HCV infection (i.e., had a positive test result for HCV RNA), but only 5% of these persons had received a diagnosis, and only 2% of infected persons (approximately 26,000) had been treated (*6*). During 2017, the president of Uzbekistan issued a decree calling for the elimination of HBV and HCV infections to meet WHO's 2030 hepatitis elimination targets (*1*). Initial assessments indicated that meeting these targets would cost US$1.3–1.7 billion (*7*) over 10 years, and the allocated funding of US$1.0 million per year for treatment and US$0.3 million per year for testing would be insufficient (*7*). To achieve elimination, an innovative catalytic funding model for providing low-cost, sustainable access to hepatitis B and C testing, care, and treatment was begun in 2019; this report describes program initiation and early findings.

The Center for Disease Analysis Foundation (CDAF)* developed a catalytic funding mechanism to allow low- and middle-income countries to fund HBV and HCV elimination programs with a low upfront investment and reduced overall cost. On December 6, 2019, CDAF began a pilot program to test the concept in Uzbekistan, in partnership with the Uzbekistan Research Institute of Virology and Ministry of Health. The catalytic funding model presumes that even among low- and middle-income countries, most people are willing to pay for HBV and HCV treatment if drug prices are below

* https://cdafound.org/.

a catastrophic health care expenditure level[†] (*8*). The model also presumes that a large portion of the population would be willing to take a free test. The catalytic investment is used to cover upfront costs for purchasing the first round of diagnostic tests and medications. All participants receive free testing. An estimated 20% of infected persons will receive free treatment, based on income level. A markup on treatment pricing for the 80% who can afford to pay for treatment funds the purchase of subsequent rounds of diagnostics and medication and repays the catalytic investment at the end of the program. Markups were calculated by dividing total project costs by the number of patients expected to pay for medicines (*7*). Performance indicators and minimum success criteria were developed to measure program performance relating to screening volumes, linkage and adherence to care rates, and repayment of the upfront capital investment (*7*).

The study protocol was approved by the national Institutional Review Board and the Uzbekistan Ministry of Health. Quality-assured medications and diagnostics were purchased at high volumes and low prices through the Global Procurement Fund, a nonprofit procurement service (*9*). The government waived most import duties and fees and provided human resources, clinic space, laboratory equipment, and disposables. A national pharmacy chain was contracted to sell medications at only a 5% markup.

Simplified testing algorithms were developed to minimize the number of tests required before starting treatment. Patients were tested using an HBsAg rapid diagnostic test (Alere Determine HBsAg 2, Alere Medical Company), followed by rapid human immunodeficiency virus (HIV) and creatinine tests (to assess renal function) if they had a positive HBsAg test. All patients with a positive HBsAg test, a negative HIV test, and normal renal function (estimated glomerular filtration rate [eGFR] >50 mL/min/1.73 $m^2$) were determined to be eligible for treatment for hepatitis B infection. Patients who tested HBsAg positive were offered a 12-month prescription for tenofovir disoproxil fumarate, with instructions to return after 12 months for free follow-up tests (HBsAg, HIV, and creatinine). All patients who had a positive test result for HIV were referred to HIV clinics for treatment outside the Uzbekistan Hepatitis Elimination Program (UHEP).

An HCV rapid diagnostic test (InTec Products Inc.) was used concurrently with the HBsAg test to determine anti-HCV antibody positivity. Patients who had a positive anti-HCV antibody test had their blood drawn for HCV core antigen testing to confirm current infection (ARCHITECT HCV Antigen Assay, Abbott Laboratories), and for creatinine, aspartate aminotransferase (AST), and platelet tests. An AST to platelet ratio index (APRI) score was calculated to predict the likelihood of cirrhosis. Patients with APRI >1.5 or eGFR <30 mL/min/1.73 $m^2$ (evidence of cirrhosis or impaired renal function) were referred to the Uzbekistan Research Institute of Virology for consultation with a specialist physician. All other patients with positive HCV core antigen test results were considered eligible for hepatitis C treatment and were offered a 3-month prescription for sofosbuvir/daclatasvir. All patients were instructed to return in 12 weeks, after completion of treatment, for a free HCV core antigen test to determine whether they had achieved a sustained virologic response (i.e., cure). Patients with cirrhosis and patients with impaired renal function were referred for treatment at the Uzbekistan Research Institute of Virology outside the UHEP.

In Tashkent, the capital city, 13 polyclinics were recruited to test an estimated 250,000 adults aged >18 years, over a 12-month period. Approximately 16,662 HBV patients and 6,866 HCV patients were estimated to be eligible for treatment during the program. Training on the use of rapid diagnostic tests, motivational interviewing (*10*), and patient registration was provided to all nurses participating in the program. Doctors were trained on the interpretation of laboratory results, medication contraindications, drug interactions, comorbidities, medication dosing, and patient registration. Handheld tablets or laptops and the open-source REDCap (Research Electronic Data Capture) patient registry were used to record patients' consent, contact information, medical history, test results, and doctors' notes.

Total UHEP costs, based on the calculated number of treated patients (Table), were estimated to be US$3,238,000, approximately one quarter of the estimated US$13,419,000 for a non-UHEP program of the same scope and size (*7*). The simplified testing and cost-containment measures (e.g., pooled procurement, waived duty taxes, and negotiated markups) substantially lowered total cost. Using the catalytic funding model, only US$1,616,000 in upfront costs were required to conduct the same program, with total program costs, including the upfront catalytic investment, covered by patient payments (*7*).

During December 6, 2019–March 15, 2020, a total of 24,821 persons were tested in Tashkent (approximately 10% of the number targeted for the year); 1,084 (4.4%) had positive test results for HBsAg and 1,075 (4.3%) had positive test results for anti-HCV (Figure). Fifty-one (4.7%) persons had positive test results for hepatitis B and hepatitis C. Three times more women (75.9%) than men (24.1%) participated in the program. A total of 428 (39%) persons who had positive test results for HBsAg and 291 (27%) who had positive test results for anti-HCV were already aware of their infection, and 176

[†] The catastrophic health-care expenditure level is a financial metric that determines the limit of out-of-pocket spending that will prevent a family from becoming financially destitute; the amount for Uzbekistan was calculated to be US$925, using per capita expenditure data from the World Bank and household size data from the United Nations.

(16.2%) patients who had positive test results for HBsAg and 128 (11.9%) who had positive test results for anti-HCV previously had been treated. Among persons who had a positive test result for anti-HCV, the hepatitis C core antigen positivity rate was 65.1% (68.4% if those already aware of their infection status were excluded). Overall prevalence of newly diagnosed HBV infection was 2.7%; prevalence was higher among men (4.7%; 271 of 5,798) than among women (2.1%; 391 of 18,595). Overall prevalence of newly diagnosed HCV infection was 3.2%; prevalence was higher among men (4.2%; 250 of 5,883) than among women (2.9%; 531 of 18,647).

Among the 1,084 patients who had positive test results for HBsAg, 988 (91.1%) received follow-up testing, as did 979 (91.1%) of the 1,075 patients who had positive test results for anti-HCV (Figure). Among those patients who received follow-up testing, 31.5% of those who had positive test results for HBsAg and 40.6% of those who had positive test results for anti-HCV did not attend their specialist physician consultation to discuss the test results and were lost to follow-up. Only 510 (75.3%) of the 677 treatment-eligible HBV patients and 335 (68.9%) of the 486 treatment-eligible HCV patients received prescriptions. Among all 1,084 patients who had positive test results for HBsAg and all 1,075 patients with HCV infection, 275 (25.4%) initiated treatment for HBV and 163 (15.2%) for HCV.

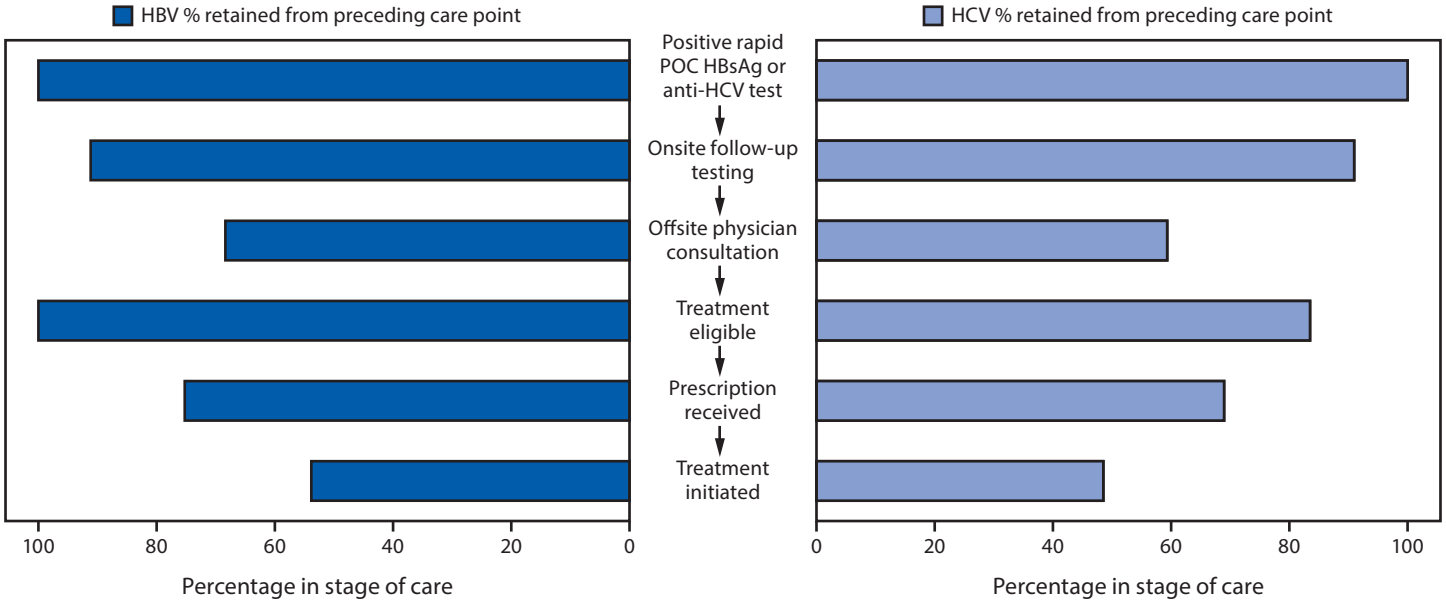
To succeed, the financial model needs a minimum of 55% of all patients who are diagnosed with chronic HCV and HBV to start and adhere to treatment (*7*). Initial data from the first 3 months of the programs show that only 23.0% of patients had started treatment, indicating that patient attrition in the cascade of care is currently too high to recover the upfront catalytic investment by program conclusion.

**TABLE. Comparison of market pricing* for hepatitis B and hepatitis C tests, diagnostics, and treatments — Uzbekistan Hepatitis Elimination Program (UHEP), December 6, 2019–March 15, 2020**

| Item | Price (US$) per patient | |
|---|---|---|
| | Market pricing* | UHEP catalytic funding |
| **Hepatitis B** | | |
| HBsAg testing | 2.30† | Free† |
| Additional laboratory tests¶ | 55.25§ | Free¶ |
| Treatment (20% of patients) | 365.00/yr** | Free** |
| Treatment (80% of patients) | 365.00/yr** | 180.00/yr** |
| **Hepatitis C** | | |
| Anti-HCV testing | 2.40†† | Free†† |
| Additional laboratory tests§§ | 43.50¶¶ | Free¶¶ |
| Treatment (20% of patients) | 507.00*** | Free*** |
| Treatment (80% of patients) | 507.00*** | 204.00*** |

**Abbreviations:** anti-HCV = hepatitis C virus antibody; HBsAg = hepatitis B surface antigen; HCV = hepatitis C virus.
* Market pricing reflects year 2019 costs.
† Hepatitis B surface antigen rapid diagnostic test.
§ Hepatitis B virus enzyme linked immunosorbent assay, quantitative polymerase chain reaction, liver-staging, and blood workup.
¶ Human immunodeficiency virus rapid diagnostic test and creatinine.
** Tenofovir disoproxil fumarate.
†† HCV antibody rapid diagnostic test.
§§ Creatinine, aspartate aminotransferase, platelet, and hepatitis C virus core antigen to measure sustained virologic response.
¶¶ Viral load (times 2), and blood workup.
*** Sofosbuvir/daclatasvir 3-month prescription.

**FIGURE. Percentage of persons who had positive test results for HBsAg or anti-HCV who were retained at each stage of care* — Uzbekistan Hepatitis Elimination Program — Tashkent, Uzbekistan, December 6, 2019–March 15, 2020**




**Abbreviations:** anti-HCV = hepatitis C virus antibody; HBsAg = hepatitis B surface antigen; HBV = hepatitis B virus; HCV = hepatitis C virus; POC = point-of-care.
* Treatment was initiated for 25.4% of all persons who had positive test results for HBsAg and 15.2% of all persons who had positive test results for anti-HCV.

## Discussion

As of March 15, 2020, the UHEP in Tashkent had tested 24,821 persons for HBV or HCV. Among 2,159 persons with a positive test result, 438 had initiated treatment, including 275 (25.4%) persons who had positive test results for HBsAg and 163 (15.2%) persons who had positive test results for anti-HCV. Program success is attributed to free testing for all and lower treatment prices for those asked to pay, achieved through pooled procurement and negotiated markups. Although the overall male-to-female ratio in Tashkent is equal,[§] women accounted for approximately three quarters of the tested population, but the prevalence of positive test results for HBV and for HCV was higher among men. The reasons for higher participation of women than men in the program are unknown.

Achieving WHO 2030 hepatitis B and C elimination targets will require substantial improvement in identifying and linking all eligible patients to treatment. This interim analysis identified a high rate of attrition in the cascade of care, with only 25.4% of persons with a positive HBsAg test result and 15.2% of persons with diagnosed HCV infection initiating treatment. The catalytic program funding model relies on 80% of infected persons paying for and initiating treatment; for the program to remain sustainable, treatment initiation must be increased. As the program moves forward, it will be important to identify reasons for attrition and to develop and implement strategies to improve rates of initiation and adherence to care.

The findings in this report are subject to at least two limitations. First, the population in Tashkent and the response to this program might not be representative of all of Uzbekistan. Second, the study was not designed to identify causes of nonparticipation, dropout, and loss to follow-up. Additional data are needed to help identify the barriers to recruitment and program participation.

Although some success was achieved during the first 3 months of the program, challenges to achieving the program targets remain. Despite notable reduction of costs and strong public participation in UHEP, improvements across the continuum of care are needed to fully recover program costs, repay the catalytic investment, and demonstrate a scalable and sustainable funding mechanism. CDAF is working with a consortium of international partners, including its technical advisory board, to address program challenges and introduce innovative strategies for success. Lessons learned from this program can guide similar initiatives in other countries, especially among low- and middle-income countries, to help curb the global epidemic of viral hepatitis in areas where donor support is limited. Catalytic funding models have the potential to substantially increase access to testing, diagnosis, and care and treatment for hepatitis B and hepatitis C.

[§] https://www.indexmundi.com/uzbekistan/demographics_profile.html.

**Summary**

**What is already known about this topic?**

Hepatitis B virus and hepatitis C virus infection prevalences are high in Uzbekistan, which lacks funding for meeting the World Health Organization's 2030 elimination targets.

**What is added by this report?**

In December 2019, the Center for Disease Analysis Foundation initiated a pilot treatment program using innovative catalytic funding. During the first 3 months, >24,000 persons were tested and 438 initiated treatment, 87% of whom paid for medications and 14% received free medications.

**What are the implications for public health practice?**

Early results demonstrate willingness of patients to pay for treatment if costs are low, which can offset elimination costs. However, improvements across the continuum of care are needed to recover the upfront investment.

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# COVID-19 Among American Indian and Alaska Native Persons — 23 States, January 31–July 3, 2020

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*On August 19, 2020, this report was posted as an* MMWR *Early Release on the* MMWR *website (https://www.cdc.gov/mmwr).*

Although non-Hispanic American Indian and Alaska Native (AI/AN) persons account for 0.7% of the U.S. population,* a recent analysis reported that 1.3% of coronavirus disease 2019 (COVID-19) cases reported to CDC with known race and ethnicity were among AI/AN persons (*1*). To assess the impact of COVID-19 among the AI/AN population, reports of laboratory-confirmed COVID-19 cases during January 22†–July 3, 2020 were analyzed. The analysis was limited to 23 states§ with >70% complete race/ethnicity information and five or more laboratory-confirmed COVID-19 cases among both AI/AN persons (alone or in combination with other races and ethnicities) and non-Hispanic white (white) persons. Among 424,899 COVID-19 cases reported by these states, 340,059 (80%) had complete race/ethnicity information; among these 340,059 cases, 9,072 (2.7%) occurred among AI/AN persons, and 138,960 (40.9%) among white persons. Among 340,059 cases with complete patient race/ethnicity data, the cumulative incidence among AI/AN persons in these 23 states was 594 per 100,000 AI/AN population (95% confidence interval [CI] = 203–1,740), compared with 169 per 100,000 white population (95% CI = 137–209) (rate ratio [RR] = 3.5; 95% CI = 1.2–10.1). AI/AN persons with COVID-19 were younger (median age = 40 years; interquartile range [IQR] = 26–56 years) than were white persons (median age = 51 years; IQR = 32–67 years). More complete case report data and timely, culturally responsive, and evidence-based public health efforts that leverage the strengths of AI/AN communities are needed to decrease COVID-19 transmission and improve patient outcomes.

Individual COVID-19 case reports submitted to CDC using the CDC COVID-19 case report form¶ and through the National Notifiable Diseases Surveillance System** during January 22–July 3, 2020 were analyzed. Laboratory-confirmed†† and probable§§ COVID-19 cases are reported by state and local health jurisdictions based on reports submitted by health care providers and laboratories. Cases with missing report date were excluded. Probable cases (12,081) and cases among persons repatriated to the United States from Wuhan, China (two cases), and the Diamond Princess cruise ship (41 cases) (*2*) were also excluded. Analysis was limited to the 23 states with >70% complete race/ethnicity information and five or more laboratory-confirmed cases each among AI/AN and white persons. Arizona, which accounts for at least one third of all COVID-19 cases among AI/AN persons nationwide, was excluded from analysis because >30% of race/ethnicity data were missing. Because approximately 2.3 million of 5.2 million AI/AN persons identify with multiple races (*3*), AI/AN race/ethnicity was classified as either AI/AN alone or in combination with other races and ethnicities. White (non-Hispanic) was chosen as the comparator group to avoid comparing rates among AI/AN persons to other marginalized populations that experience similar health disparities. Whereas previous reports focused on COVID-19 incidence among black and Hispanic persons, the race/ethnicity categorization in this analysis maximized these data to allow for the calculation of more stable RR estimates. A generalized estimating equations Poisson regression model was used to calculate cumulative incidence (cumulative cases per 100,000 population), RRs,

* Based on 2018 U.S. Census single-race estimates for non-Hispanic AI/AN (https://wonder.cdc.gov/Single-Race-v2018.HTML). This represents a subset of the AI/AN population. The total AI/AN population (AI/AN alone or in combination with other races/ethnicities) constitutes 1.4% of the United States population (https://wonder.cdc.gov/Bridged-Race-v2019.HTML). Some have estimated the AI/AN population to constitute up to 1.7% of the United States population (https://www.census.gov/history/pdf/c2010br-10.pdf).

† The first laboratory-confirmed case in the 23 analyzed states was reported on January 31, 2020.

§ Alabama, Alaska, Florida, Iowa, Kansas, Kentucky, Maine, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Carolina, Ohio, Oregon, Tennessee, Utah, Wisconsin, and Wyoming.

¶ https://www.cdc.gov/coronavirus/2019-ncov/php/reporting-pui.html.

** https://wwwn.cdc.gov/nndss; https://wwwn.cdc.gov/nndss/covid-19-response.html.

†† A laboratory-confirmed COVID-19 case was defined as a person with a positive test result for SARS-CoV-2, the virus that causes COVID-19, from a respiratory specimen, using real time reverse transcription–polymerase chain reaction testing.

§§ According to the Council of State and Territorial Epidemiologists position statement Interim 20-ID-01, a probable case must 1) meet clinical criteria and epidemiologic criteria with no confirmatory laboratory testing performed; 2) have presumptive laboratory evidence, including detection of specific antigen or antibody in a clinical specimen, and meet clinical criteria or epidemiologic criteria; or 3) meet vital records criteria with no confirmatory laboratory testing performed. (https://cdn.ymaws.com/www.cste.org/resource/resmgr/2020ps/interim-20-id-01_covid-19.pdf).

and 95% CIs for AI/AN and white race/ethnicity categories. Generalized estimating equations models, which perform well for estimating rates with correlated data, were used to account for nonindependence (i.e., clustering) by state (*4*). CDC's National Center for Health Statistics (NCHS) postcensal bridged-race estimates were used as population denominators (*5*). Symptoms, underlying health conditions, hospitalizations, intensive care unit (ICU) admissions, and deaths were not analyzed because a large percentage of these data were missing. Analyses were conducted using SAS software (version 9.4; SAS Institute).

Among the 1,613,949 laboratory-confirmed COVID-19 cases voluntarily reported to CDC during January 22–July 3, 2020, 424,899 (26.3%) were reported by the 23 included states. Among these cases, 340,059 (80.0%) had complete race/ethnicity data, including 9,072 (2.7%) among AI/AN persons and 138,960 (40.9%) among white persons. These cases represented 51% of 17,709 reported cases among AI/AN persons and 41% of 339,789 reported cases among whites in all U.S. states and territories. Among the 340,059 cases with complete race/ethnicity data, the cumulative incidence among AI/AN persons was 594 cases per 100,000 (95% CI = 203–1,740), 3.5 (95% CI = 1.2–10.1) times that among white persons (169 per 100,000; 95% CI = 137–209). The magnitude of this reported RR estimate is affected by the elevated RR in New Mexico (RR = 14.9).[¶¶] Median age among AI/AN and white patients was 40 years (IQR = 26–56 years) and 51 years (IQR = 32–67 years), respectively. AI/AN persons with COVID-19 tended to be younger than white persons with COVID-19: a higher proportion of AI/AN patients were aged <18 years (12.9%) and a smaller proportion were aged ≥65 years (12.6%), compared with white patients aged <18 and ≥65 years (4.3% and 28.6%, respectively) (Table).

Completeness of data on underlying health conditions (e.g., cardiovascular disease and diabetes), symptoms, hospitalization status, ICU admission, and death was lower for AI/AN patients than for white patients. Data on underlying health conditions were available for 762 (8.4%) AI/AN patients and 37,993 (27.3%) white patients, and symptom data were available for 998 (11.0%) AI/AN patients and 39,225 (28.2%) white patients. Whereas hospitalization status, ICU admission status, and vital status (i.e., outcome of death) were known for 78.9%, 26.7%, and 74.4%, respectively, of white COVID-19 patients, this information was available for approximately one third of those percentages of AI/AN patients (24.2%, 9.4%, and 22.5%, respectively). Because of the high prevalence of these missing data elements among AI/AN patients, analysis to identify overall prevalence, possible risk factors for COVID-19, and patient outcomes was not possible.

[¶¶] New Mexico accounts for 6,130 (68%) of the AI/AN cases but 16% of the total AI/AN population of the 23 states analyzed.

## Discussion

In 23 states with sufficient COVID-19 patient race/ethnicity data, the overall COVID-19 incidence among AI/AN persons was 3.5 times that among white persons. Although this disparity is mostly influenced by the elevated RR in New Mexico, variability in the RR among states is reflected in the wide confidence interval (95% CI = 1.2, 10.1). Among 345,093 COVID-19 cases meeting the study inclusion criteria, 2.7% of cases occurred in AI/AN persons, more than twice the percentage of non-Hispanic AI/AN cases reported in CDC COVID-19 case surveillance data from all states (1.3%) (*1*). However, this analysis included AI/AN persons who identified as multiple races and ethnicities, which increased AI/AN case identification by 4%, from 8,691 to 9,072 cases in the 23 states. The higher proportion of AI/AN persons in this analysis is also the result of the more completely reported race/ethnicity data in these states.

Historical trauma and persisting racial inequity have contributed to disparities in health and socioeconomic factors between AI/AN and white populations that have adversely affected AI/AN communities; these factors likely contribute to the observed elevated incidence of COVID-19 among the AI/AN population (*6*). The elevated incidence within this group might also reflect differences in reliance on shared transportation, limited access to running water, household size, and other factors that might facilitate COVID-19 community transmission (*6*). Although the elevated prevalence of underlying health conditions among AI/AN persons is well documented (*7,8*), in this analysis, data on underlying health conditions were unknown or missing for 91.6% of AI/AN patients compared with 72.7% of white patients, preventing examination of the association between underlying health conditions and COVID-19 incidence. The excessive absence of data among AI/AN persons represents an important gap in public health data for AI/AN persons and suggests a need for additional resources to support case investigation and reporting infrastructure in AI/AN communities.

The findings in this report are subject to at least three limitations. First, data are presented as reported to CDC through a passive case surveillance system. Case data are voluntarily reported to CDC by states without active case finding. The high prevalence of missing data on symptoms, underlying health conditions, hospitalization, ICU admission, and death precluded the analysis of these characteristics and outcomes. Missing data likely reflect state, local, and tribal health jurisdictions' ability to collect these data given their current case loads, incomplete reporting to CDC, or both. Second, this analysis represents an underestimate of the actual COVID-19 incidence among AI/AN persons for several reasons. Reporting of detailed case data to CDC by states is

**TABLE. Demographic characteristics and data quality among laboratory-confirmed COVID-19 cases, by race/ethnicity — 23 states,* January 31–July 3, 2020**

| Characteristic | No. (%) American Indian and Alaska Native† (N = 9,072) | No. (%) White, non-Hispanic (N = 138,960) |
|---|---|---|
| **Age group, yrs** | | |
| Median (IQR) | 40 (26–56) | 51 (32–67) |
| 0–18 | 1,171 (12.9) | 6,000 (4.3) |
| 19–44 | 4,091 (45.1) | 50,772 (36.5) |
| 45–54 | 1,384 (15.3) | 19,923 (14.3) |
| 55–64 | 1,284 (14.2) | 22,518 (16.2) |
| ≥65 | 1,141 (12.6) | 39,737 (28.6) |
| Missing | 1 (—) | 10 (—) |
| **Sex** | | |
| Female | 4,819 (53.5) | 72,921 (52.6) |
| Male | 4,181 (46.5) | 65,701 (47.4) |
| Missing | 72 (—) | 338 (—) |
| **Symptoms known§** | | |
| Yes | 998 (11.0) | 39,225 (28.2) |
| No | 8,074 (89.0) | 99,735 (71.8) |
| **Underlying health conditions known¶** | | |
| Yes | 762 (8.4) | 37,993 (27.3) |
| No | 8,310 (91.6) | 100,967 (72.7) |
| **Hospitalization status** known†† ** | | |
| Yes | 2,197 (24.2) | 109,638 (78.9) |
| No | 6,875 (75.8) | 29,322 (21.1) |
| **ICU admission status known††** | | |
| Yes | 855 (9.4) | 37,150 (26.7) |
| No | 8,217 (90.6) | 101,810 (73.3) |
| **Death status known††** | | |
| Yes | 2,039 (22.5) | 103,371 (74.4) |
| No | 7,033 (77.5) | 35,589 (25.6) |

**Abbreviations:** COVID-19 = coronavirus disease 2019; ICU = intensive care unit; IQR = interquartile range.

* Alabama, Alaska, Florida, Iowa, Kansas, Kentucky, Maine, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Carolina, Ohio, Oregon, Tennessee, Utah, Wisconsin, and Wyoming.

† Alone or in combination with other races and ethnicities.

§ Symptoms were classified as "known" if any of the following symptoms were reported as present or absent: fever (measured >100.4°F [38°C] or subjective), cough, shortness of breath, wheezing, difficulty breathing, chills, rigors, myalgia, rhinorrhea, sore throat, chest pain, nausea or vomiting, abdominal pain, headache, fatigue, diarrhea (≥3 loose stools in a 24-hour period), or other symptom not otherwise specified on the form.

¶ Underlying health conditions were classified as "known" if any of the following conditions were reported as present or absent: diabetes mellitus, cardiovascular disease (including hypertension), severe obesity (body mass index ≥40 kg/m$^2$), chronic renal disease, chronic liver disease, chronic lung disease, immunocompromising condition, autoimmune condition, neurologic condition (including neurodevelopmental, intellectual, physical, visual, or hearing impairment), psychologic/psychiatric condition, and other underlying medical condition not otherwise specified.

** Includes hospitalization with or without ICU admission.

†† Hospitalization, ICU admission, and death status were considered known if the response was "yes" or "no" (not "missing" or "unknown").

known to be incomplete; therefore, this analysis was restricted to 23 states with more complete reporting of race and ethnicity. As a result, the analysis included only one half of reported laboratory-confirmed COVID-19 cases among AI/AN persons nationwide, and the examined states represent approximately one third of the national AI/AN population.*** In addition, AI/AN persons are commonly misclassified as non-AI/AN races and ethnicities in epidemiologic and administrative data sets, leading to an underestimation of AI/AN morbidity and mortality (*9*). Finally, the NCHS bridged-race estimates used as population denominators are known to inflate the Hispanic AI/AN population in the United States, resulting in the underestimation of mortality rates among AI/AN populations that include Hispanic AI/AN persons (*10*).

Despite these limitations, these findings suggest that the AI/AN population in the 23 examined states, particularly AI/AN persons aged <65 years, has been disproportionately affected by the COVID-19 pandemic, compared with the white population. More complete case information is needed to more effectively guide the public health response to COVID-19 among the AI/AN population. The collection of this information can be facilitated by more consistent, complete, and accurate collection and reporting by providers, reporting laboratories, and local, state, federal, and tribal public health practitioners, and ensuring the resources to do so. Race/ethnicity data should be collected following best practices for AI/AN data collection, including allowing for the reporting of multiple races and ethnicities and providing adequate training about asking about race and ethnicity in a culturally sensitive manner.§§§ Further, among federally recognized tribes, AI/AN race is a political status that confers access to health care services under treaty obligations of the U.S. government¶¶¶; these findings highlight the important contribution of adequate health care and public health infrastructure resources to culturally responsive public health efforts intended to sustain the strengths of AI/AN communities.

*** https://wonder.cdc.gov/Bridged-Race-v2018.html.

§§§ https://www.uihi.org/resources/best-practices-for-american-indian-and-alaska-native-data-collection/.

¶¶¶ https://www.ihs.gov/aboutihs/.

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**Summary**

**What is already known about this topic?**

American Indian and Alaska Native (AI/AN) persons appear to be disproportionately affected by the COVID-19 pandemic; however, limited data are available to quantify the disparity in COVID-19 incidence, severity, and outcomes among AI/AN persons compared with those among other racial/ethnic groups.

**What is added by this report?**

In 23 states with adequate race/ethnicity data, the cumulative incidence of laboratory-confirmed COVID-19 among AI/AN persons was 3.5 times that among non-Hispanic white persons. A large percentage of missing data precluded analysis of some characteristics and outcomes.

**What are the implications for public health practice?**

Adequate health care and public health infrastructure resources are needed to support a culturally responsive public health effort that sustains the strengths of AI/AN communities. These resources would facilitate the collection and reporting of more complete case report data to support evidence-based public health efforts.

# Limited Secondary Transmission of SARS-CoV-2 in Child Care Programs — Rhode Island, June 1–July 31, 2020

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On June 1, 2020, with declines in coronavirus disease 2019 (COVID-19) cases and hospitalizations in Rhode Island,* child care programs in the state reopened after a nearly 3-month closure implemented as part of mitigation efforts. To reopen safely, the Rhode Island Department of Human Services (RIDHS) required licensed center- and home-based child care programs to reduce enrollment, initially to a maximum of 12 persons, including staff members, in stable groups (i.e., staff members and students not switching between groups) in physically separated spaces, increasing to a maximum of 20 persons on June 29. Additional requirements included universal use of masks for adults, daily symptom screening of adults and children, and enhanced cleaning and disinfection according to CDC guidelines.† As of July 31, 666 of 891 (75%) programs were approved to reopen, with capacity for 18,945 children, representing 74% of the state's January 2020 child care program population (25,749 children).

High compliance with RIDHS requirements was observed during 127 unannounced program monitoring visits (C Molina, RIDHS, personal communication, 2020). Program administrators reported that maintaining stable staffing was the most difficult requirement to implement because of the need to rotate staff members to cover teacher breaks, vacation, and sick leave and that continued adherence to small, stable classes might not be feasible without additional funding.

During June 1–July 31, the Rhode Island Department of Health (RIDOH) conducted investigations of any reported COVID-19 case in a child or adult, including staff members, parents, or guardians, present at a child care program. Reported cases were classified as confirmed if a person received a positive reverse transcription–polymerase chain reaction (RT-PCR) test result for SARS-CoV-2, the virus that causes COVID-19, or probable if a person met clinical and epidemiologic criteria with no laboratory testing.§ Child care classes with a symptomatic person identified were required to close for 14 days or until the case could be ruled out by a negative RT-PCR test result. RIDOH quarantined contacts¶ and conducted symptom monitoring via a weekly phone call or daily text message; symptomatic contacts were referred for testing.

A total of 101 possible child care–associated COVID-19 cases were reported during June 1–July 31. Among them, 49 (49%) symptomatic persons were excluded after receiving negative laboratory test results, 33 persons (33%) had confirmed cases, and 19 (19%) were classified as having probable cases. Among the 52 confirmed and probable cases, 30 (58%) were among children (median age = 5 years), and 22 (42%) were among adults (20 teachers and two parents [median age = 30 years]) (Table). Overall, 39 (75%) cases occurred from mid- to late July, when incidence in the state was increasing (Figure). Cases were confirmed a median of 2 days (range = 0–11 days) after specimen collection. The identification of 101 possible child care–associated COVID-19 cases resulted in closures of 89 classes and quarantine of 687 children and 166 staff members, including contacts.

Cases occurred in 29 child care programs, 20 (69%) of which had a single case with no apparent secondary transmission. Five (15%) programs had two to five cases; however, RIDOH excluded child care–related transmission because of the timing of symptom onset. In late June, a child aged 2 years attended child care for 6 days while potentially infectious, including 3 days before symptom onset (parent-reported fever to 100.3°F [37.9°C] and chills) and 3 days after symptom resolution. Ten of 11 child care contacts were tested for SARS-CoV-2 a median of 2 days after last exposure (range = 1–3 days); none had a positive test result. Epidemiologic investigation by RIDOH indicated adherence to RIDHS regulations.

Secondary transmission in four child care programs after July 15 could not be ruled out. In one program, RIDOH epidemiologic investigation identified lack of adherence to RIDHS regulations, including switching between groups. Ten confirmed cases (five children, four staff members, and one parent) were identified among contacts in the program. The program was closed, and 60 children and 21 staff members were quarantined for 14 days. In the second program, three

*https://www.bostonglobe.com/2020/05/29/metro/new-covid-19-cases-hospitalizations-fall-ri-governor-gives-update-friday/.

†https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/guidance-for-childcare.html#CleanDisinfect.

§https://wwwn.cdc.gov/nndss/conditions/coronavirus-disease-2019-covid-19/case-definition/2020/.

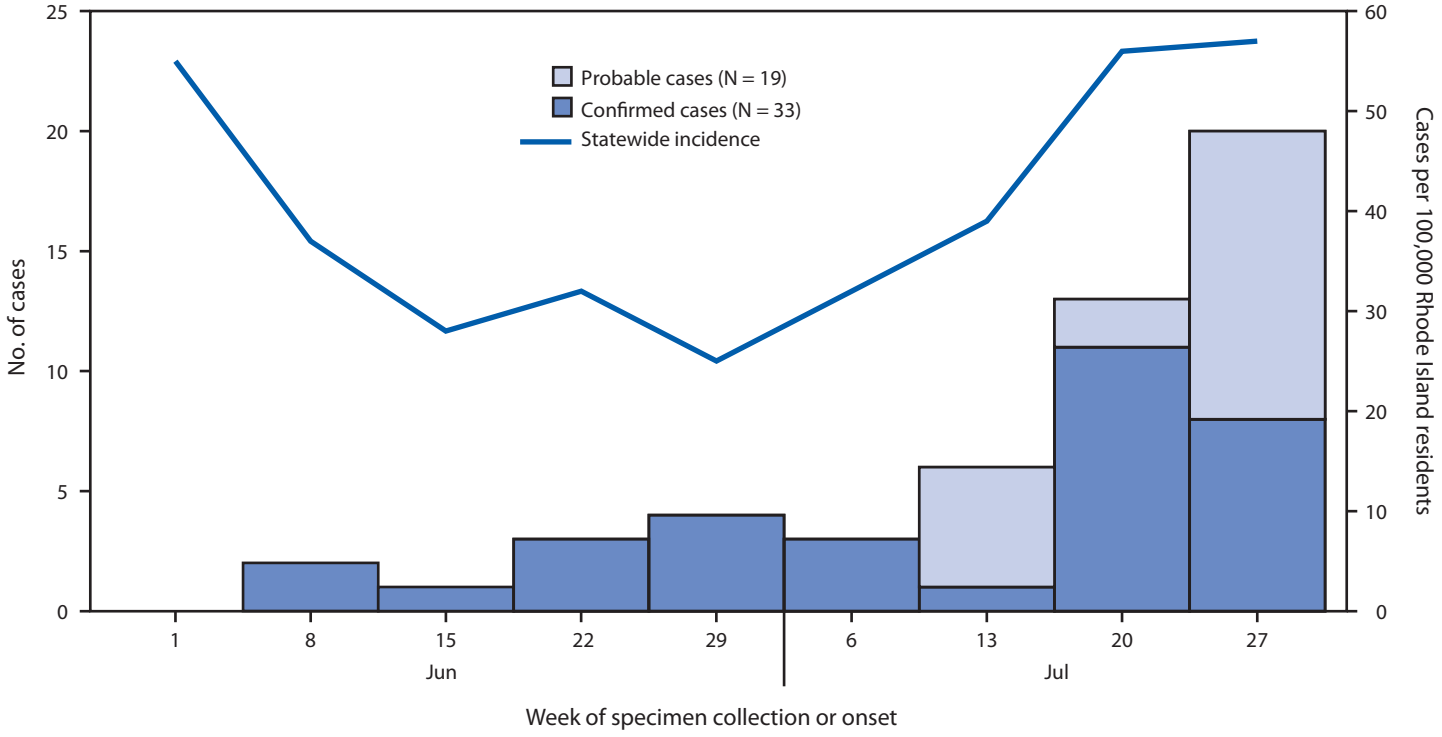
¶https://reopeningri.com/wp-content/uploads/2020/07/Child-Care-Playbook-07232020_vShared_5-002-2.pdf.

**TABLE. Child care–associated confirmed and probable COVID-19 cases (N = 52)* — Rhode Island, June 1–July 31, 2020**

| Characteristic | Case classification, no. (%) | | | | | |
|---|---|---|---|---|---|---|
| | Children, n = 30 (58) | | | Adults, n = 22 (42) | | |
| | All cases | Confirmed | Probable | All cases | Confirmed | Probable |
| **No. of cases** | 30 | 17 (57) | 13 (43) | 22 | 16 (73) | 6 (27) |
| **Sex** | | | | | | |
| Female | 16 (53) | 11 (64) | 5 (38) | 21 (95) | 15 (94) | 6 (100) |
| Male | 14 (47) | 6 (36) | 8 (62) | 1 (5) | 1 (6) | 0 (0) |
| **Age, yrs, median (range)†,§,¶** | 5 (0.5–12) | 5 (0.5–12) | 4 (1–5) | 30 (20–63) | 32 (20–60) | 30 (20–63) |
| **Days from specimen collection to report to RIDOH, median (range)** | 2 (0–8) | 2 (0–8) | N/A | 3 (0–11) | 3 (0–11) | N/A |

**Abbreviations:** COVID-19 = coronavirus disease 2019; N/A = not applicable; RIDOH = Rhode Island Department of Health.
* Includes all cases considered index and secondary transmission. Reported cases were classified as confirmed if a person received a positive reverse transcription–polymerase chain reaction SARS-CoV-2 test result or probable if a person met clinical and epidemiologic criteria, with no laboratory testing.
† Age was missing for three children with probable COVID-19.
§ Age was missing for two adults with probable COVID-19.
¶ In Rhode Island, children up to age 12 years are permitted to attend child care programs during the summer; use of a mask is not currently required for any child in child care.

**FIGURE. Child care–associated confirmed (N = 33) and probable (N = 19) COVID-19 cases,* by specimen collection or onset week† and incidence of confirmed COVID-19 cases§ — Rhode Island, June 1–July 31, 2020**




**Abbreviation:** COVID-19 = coronavirus disease 2019.
* Confirmed cases were defined as a positive reverse transcription–polymerase chain reaction test result for SARS-CoV-2, the virus that causes COVID-19; probable cases met clinical and epidemiologic criteria, with no laboratory testing.
† Probable cases did not have specimens collected and are therefore listed by symptom onset date.
§ Data on incidence were sourced via Rhode Island Department of Health and include confirmed cases only.

confirmed cases were identified from a single classroom; 26 students and 17 staff members were quarantined. The third program had two cases with symptom onset dates indicating potential transmission; however, no epidemiologic link was identified. The fourth program had two cases, one in a staff member and the other in a child contact of the staff member. The staff member moved among all classrooms, exposing adults and children in the entire program, which was subsequently closed; 37 students and 16 staff members were quarantined.

Rhode Island reopened child care programs in the context of low SARS-CoV-2 transmission relative to other U.S. states. Possible secondary transmission was identified in four of the 666 programs that had been allowed to reopen, all in the last 2 weeks of July, when community transmission in Rhode Island increased. The apparent absence of secondary transmission within the other 662 child care programs was likely the result of RIDOH response efforts to contain transmission and child care programs' adherence to RIDHS requirements, in particular maximum class sizes and use of face masks for adults (*1*). However, case ascertainment among children is challenging, given high rates of asymptomatic infection or mild disease (*2*,*3*), and SARS-CoV-2 infections were likely undetected. Despite limited identified secondary transmission, the impact on child care programs was substantial, with 853 children and staff members quarantined, which highlights the importance of community mitigation efforts to safeguard child care programs. Adherence to current CDC recommendations remains critical to reducing transmission in child care settings, including wearing of masks by adults, limiting mixing between established student-teacher groups, staying home when ill, and cleaning and disinfecting frequently touched surfaces.** Timely public health action, including case investigation and contact tracing, is critical to minimizing outbreaks in child care programs.††

** https://www.cdc.gov/coronavirus/2019-ncov/downloads/php/open-america/community-mitigation-quicklinks.pdf.

†† https://www.cdc.gov/coronavirus/2019-ncov/php/contact-tracing/contact-tracing-plan/contact-tracing.html.

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# Primary Indicators to Systematically Monitor COVID-19 Mitigation and Response — Kentucky, May 19–July 15, 2020

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State and local health departments in the United States are using various indicators to identify differences in rates of reported coronavirus disease 2019 (COVID-19) and severe COVID-19 outcomes, including hospitalizations and deaths. To inform mitigation efforts, on May 19, 2020, the Kentucky Department for Public Health (KDPH) implemented a reporting system to monitor five indicators of state-level COVID-19 status to assess the ability to safely reopen: 1) composite syndromic surveillance data, 2) the number of new COVID-19 cases,* 3) the number of COVID-19–associated deaths,† 4) health care capacity data, and 5) public health capacity for contact tracing (contact tracing capacity). Using standardized methods, KDPH compiles an indicator monitoring report (IMR) to provide daily analysis of these five indicators, which are combined with publicly available data into a user-friendly composite status that KDPH and local policy makers use to assess state-level COVID-19 hazard status. During May 19–July 15, 2020, Kentucky reported 12,742 COVID-19 cases, and 299 COVID-19–related deaths (*1*). The mean composite state-level hazard status during May 19–July 15 was 2.5 (fair to moderate). IMR review led to county-level hotspot identification (identification of counties meeting criteria for temporal increases in number of cases and incidence) and facilitated collaboration among KDPH and local authorities on decisions regarding mitigation efforts. Kentucky's IMR might easily be adopted by state and local health departments in other jurisdictions to guide decision-making for COVID-19 mitigation, response, and reopening.

On March 6, Kentucky reported its first COVID-19 case and declared a state of emergency. During subsequent weeks, mitigation efforts included temporarily closing schools for in-person instruction, ceasing elective medical procedures, and limiting visitors to long-term care facilities; an executive order was issued on March 22 that temporarily closed all nonessential businesses. The number of cases during March 6–May 8 peaked during the week of May 4, when 1,446 cases were reported (*1*). Kentucky commenced reopening on May 9 through the phased "Healthy at Work" plan.§ During reopening, KDPH and other officials sought to monitor changes in rates of reported COVID-19 and health care resource utilization to inform mitigation and reopening policies (*2*). KDPH epidemiologists developed the IMR after recognizing the need for a plain language assessment that could facilitate reopening and ongoing response decision-making addressing multiple stakeholders. The five primary indicators were selected based on available data and in consultation with KDPH syndromic surveillance and emergency preparedness subject matter experts and academic advice from the University of Kentucky and the Kentucky Injury Prevention and Research Center. Metrics were developed in consultation with CDC COVID-19 Response task force modeling experts. KDPH implemented the IMR process on May 19. The IMR describes five state-level primary indicators (syndromic surveillance data, case counts, deaths, health care capacity data, and contact tracing capacity), which are scored individually. Scores are combined into a composite categorical state-level status indicator to assess COVID-19 disease prevalence and severity (syndromic surveillance data, cases, deaths) and readiness (health care capacity and contact tracing capacity). Daily IMRs are standardized and produced with publicly available data (*3*) using spreadsheets and R statistical software (version 3.6.3; The R Foundation). Reports are produced and results are disseminated Monday through Saturday. Reports include data through the report date.¶

The slope of the 7-day moving average for seven separate variables constituted the indicator for syndromic surveillance data (*4*). These state-level variables were inpatient admissions, outpatient visits, and emergency department (ED) visits attributed to COVID-19–like illness (variables 1–3); inpatient admissions, outpatient visits, and ED visits attributed

* Reported cases include all laboratory-confirmed and probable COVID-19 cases reported to the Kentucky Department for Public Health, using the Council of State and Territorial Epidemiologists case definition. https://cdn.ymaws.com/www.cste.org/resource/resmgr/2020ps/Interim-20-ID-01_COVID-19.pdf.

† A COVID-19 death was defined as any death determined to be caused directly by COVID-19 or for which COVID-19 was listed as a contributing cause on the death certificate. COVID-19 deaths include deaths with or without laboratory confirmation if the decedent met the CSTE probable case definition or through autopsy or epidemiologic findings of the coroner's investigation. Death certificates are examined by the COVID-19 Mortality Review Team on a weekly basis to determine if COVID-19 is listed as a primary or contributing cause of death. For any cases in question, medical records are obtained, and the case is adjudicated by the COVID-19 Mortality Review Team.

§ https://governor.ky.gov/covid19.

¶ Monday IMR included cumulative Sunday cases, deaths, and syndromic surveillance data. Sunday contact tracing capacity and health care capacity data were not reported.

to COVID-19 diagnostic codes (variables 4–6); and ED visits attributed to influenza-like illness (variable 7).

The case count indicator was assessed as a composite of the number of new COVID-19 cases per 100,000 population reported to KDPH during the preceding 2 weeks (incidence) and the slope of the 7-day moving average (incidence trend). State-level incidence was categorized as low (≤10 per 100,000 population), moderate (>10–49.99), moderately high (≥50–100), and high (>100). The slope of the 7-day moving average was categorized as decreasing (≥4 days with slope <0) or increasing (≥4 days with slope ≥0).

Similarly, the COVID-19–associated death indicator was a composite of COVID-19-associated mortality per 100,000 in the preceding 2 weeks and the slope of the 7-day moving average. The state-level mortality rate was categorized as low (≤1.5 per 100,000), moderate (>1.5–2.99), moderately high (≥3–5), and high (>5). As with cases, the slope of the 7-day moving average was categorized as decreasing (≥4 days with slope <0) or increasing (≥4 days with slope ≥0).

The health care capacity indicator was a composite measure that included 1) state-level hospital utilization as the percentage of intensive care unit beds in use and the percentage of ventilators in use as reported daily by Kentucky health care facilities to WebEOC (https://www.juvare.com/webeoc/), an emergency management software application used by the KDPH Public Health Preparedness Branch, and 2) the supply of personal protective equipment as measured by state-level N95 respirator availability, which is based on information collected by KDPH in a state-level supply database. Finally, the contact tracing capacity indicator was measured as the daily percentage of contact tracing teams deployed to each of the 16 public health regions in Kentucky.

Each of the five indicators was scored using a 3-point scale (3 = excellent, 2 = moderate, 1 = poor) (Supplementary Table, https://stacks.cdc.gov/view/cdc/91982). A daily state-level composite COVID-19 status was determined by the number of individual indicators that were excellent. Each indicator was weighted equally and accounted for 20% of the composite status. This daily composite COVID-19 status was described by a user-friendly, descending 5-point rating system developed around reopening recommendations (5 = excellent [reopen/remain open]; 4 = good [monitor, continue reopening/remain open], 3 = moderate [caution, enhance monitoring], 2 = fair [increase mitigation], 1 or 0 = poor [reopening risky, slow reopening or close]). The daily IMR included the five indicators, the composite state-level COVID-19 status, and data to support the score for each indicator. County-level incidence hotspot maps were compiled in the IMR to help focus investigation efforts on hotspots as they were identified.

The mean scores for each indicator during May 19–July 15, 2020, were calculated by summing the products of the scores multiplied by the number of days with that score and dividing by the total number of days assessed. The same method was used to calculate means for the IMR composite COVID-19 status.

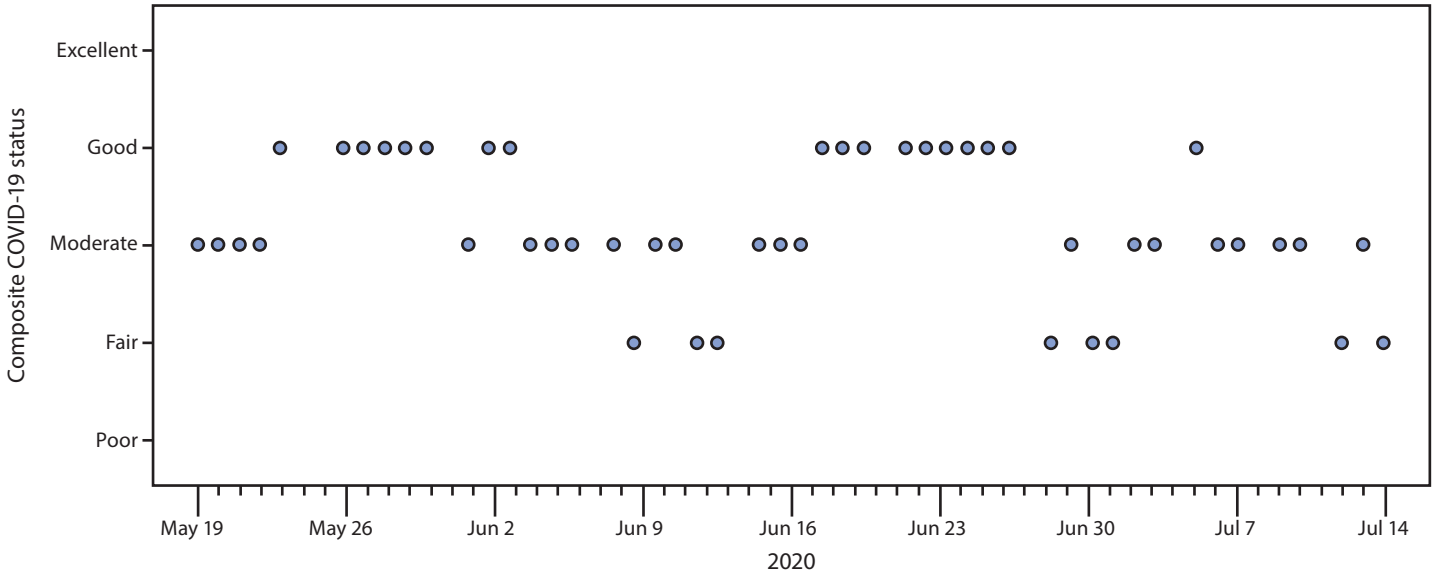
KDPH reported 12,742 incident COVID-19 cases and 299 COVID-19–related deaths during May 19–July 15, 2020; 5,705 (44.8%) cases occurred in males, and the median age was 41 years (range = 0–107 years). During this period, the mean COVID-19 status was 2.5 (fair to moderate) (range = 2–4) (Figure). The composite status was 4 (good) for 19 days (38.7%) and 3 (moderate) for 22 days (44.8%). Eight days were rated as 2 (fair); five of these occurred after June 29. No days were rated as 5 (excellent), 1 (poor), or 0 (poor). During May 19–June 16, the mean state-level composite status was 3 (moderate); during June 17–July 15, the mean composite status was 2.5 (fair to moderate).

During May 19–July 15, 2020, the mean score for syndromic surveillance data was 2.0 (moderate) (range = 1–3), with 20 consecutive days of excellent during May 19–June 12, followed by periods of nonconsecutive days where the score was excellent (17 days), moderate (6 days), and poor (6 days), with scores of poor on three consecutive days during July 13–July 15 (Table). The mean score for the case count indicator was 2.5 (poor to moderate) (range = 1–3), with scores of poor on 22 consecutive days from June 20 to July 15. Mean death indicator was 2.5 (moderate to excellent) (range = 2–3). Death indicator score changes most frequently resulted in a change in the composite COVID-19 status (13 instances). Mean health care capacity was 3.0 (excellent) (range = 3), remaining unchanged throughout the period. Mean contact tracing capacity was 2.0 (moderate) (range = 1–3). As of June 2, contact tracing capacity increased from 0% to 100% when all 16 Regional Epi Contact Tracing Teams were deployed to assigned regions and available to conduct case and contact investigations.

## Selected Example of IMR Use

On July 7, 2020, the COVID-19 status score in Kentucky was 3 (moderate), prompting additional review of county-level incidence rate maps included in the IMR by KDPH epidemiologists. A suspected hotspot (defined by KDPH as a county with a 7-day average daily incidence rate of >25 cases per 100,000 population) was identified in Bell County, a county that had had a low incidence until that time. The state epidemiologist contacted the regional epidemiologist to confirm that case investigations were underway. Case investigations revealed four specific clusters but did not indicate increased community transmission. The regional epidemiologist reported that appropriate contact tracing and quarantine measures had occurred within 12 hours of notification, and, because

**FIGURE. State-level composite COVID-19 status*,† — Kentucky, May 19–July 15, 2020**




**Abbreviation:** COVID-19 = coronavirus disease 2019.

* Kentucky's state-level composite COVID-19 status assesses the ability to safely reopen and remain open. COVID-19 status was reported at five levels: 5 = excellent (reopen/remain open); 4 = good (monitor); 3 = moderate (caution); 2 = fair (increase mitigation); 1 = poor (reopening risky, slow reopening or close); 0 = poor (reopening risky, slow reopening or close).

† COVID-19 status is based on indicator monitoring reports (IMRs), which are produced daily by the Kentucky Department of Public Health, Monday through Saturday, and include data through the report date. The five key indicators used to generate the composite COVID-19 status include 1) syndromic surveillance data; 2) the number of new COVID-19 cases; 3) the number of COVID-19–associated deaths; 4) health care capacity data; and 5) public health capacity for contact tracing. No data are reported on Sundays. The Monday IMR includes cumulative Sunday cases, deaths, and syndromic surveillance data. Sunday contact tracing capacity and health care capacity data were not reported.

§ No IMR was produced on May 25 because of the Memorial Day holiday; the May 26 IMR included May 25 data.

**TABLE. COVID-19 hazard status indicator score results, based on indicator monitoring reports* — Kentucky, May 19–July 15, 2020**

| Indicator | No. of days with score† | | | Average daily score | No. of times status changed because score changed | Max. no. of days§ with poor score (date range) |
|---|---|---|---|---|---|---|
| | Excellent | Moderate | Poor | | | |
| Syndromic surveillance data | 37 | 6 | 6 | 2.0 | 6 | 3 (Jul 13–Jul 15) |
| COVID-19 cases | 5 | 13 | 31 | 1.5 | 6 | 22 (Jun 20–Jul 15) |
| Associated deaths | 29 | 20 | 0 | 2.5 | 13 | 0 (—) |
| Health care capacity | 49 | 0 | 0 | 3.0¶ | 0 | 0 (—) |
| Public health capacity for contact tracing | 37 | 1 | 11 | 2.0 | 3 | 11 (May 19–Jun 1) |

**Abbreviation:** COVID-19 = coronavirus disease 2019.

* Indicator monitoring reports compiled by the Kentucky Department of Public Health.

† Excellent = score of 3; moderate = score of 2; poor = score of 1.

§ Days were consecutive.

¶ The average daily score for health care capacity remained unchanged (score = 3) during May 19–July 15, 2020.

additional state-level public health action was not warranted, resources could be directed elsewhere.

## Discussion

Kentucky's IMR and composite state-level COVID-19 status scores were produced to facilitate decisions regarding reopening and ongoing COVID-19 response decision-making among various stakeholders. The IMR is a tool that combines multiple data elements to systematically assess reopening efforts in the state as measured by a daily composite state-level status score. Kentucky's COVID-19 status is reported Monday through Saturday to approximately 90 stakeholders within and outside state government, including the Kentucky Governor's Office and local health department directors. Officials reported monitoring the status daily as a plain language summary of multiple critical indicators to describe the current COVID-19 hazard status in Kentucky. Local health departments also reported COVID-19 status monitoring to track statewide status and maintain vigilance for worsening conditions to inform their local decision-making. Reports such as the IMR, geared toward a broader audience of decision-makers, are important tools for informing and guiding public health policy as the COVID-19 pandemic continues.

During May 19–July 15, the Kentucky composite COVID-19 status worsened. During this period, the COVID-19 status was 3 (good: recommend monitoring) or 2 (moderate: recommend caution) 83% of the time. In certain instances, the composite COVID-19 status was moderate or good despite increasing incidence, which was attributed to all indicators receiving equal weight in the composite status scoring system. However, more recent IMR data indicate declining ratings, with the majority of days having a status of fair (fair: recommend increased mitigation efforts) occurring during June 17–July 15. In Kentucky, incidence has continued to increase, death rates have fluctuated, and syndromic surveillance data have demonstrated increases in ED visits and hospitalizations attributed to COVID-19–like illness and COVID-19. These results are consistent with identified hotspot counties and regions and increasing transmission statewide (*1*). Timely dissemination of easily understood surveillance data are critical to a rapid and effective public health response (*5*). The IMR has supported implementation of mitigation efforts to reduce transmission, including the July 9, 2020, executive order mandating face coverings in certain settings.**

The findings in this report are subject to at least five limitations. First, changes in data reporting or health care utilization might influence interpretation of the five indicators (e.g., increased use of telehealth) (*6*). Second, health care capacity might be affected by unaccounted factors such as the number of patients per nurse in intensive care units. Third, after implementation of the IMR, modifications were made to improve the scoring methods for cases, deaths, and syndromic surveillance data, which might affect comparability over time. Fourth, additional updates might be needed, including a more detailed assessment of levels for contact tracing capacity†† that includes turnaround time for test results or additional indicators, as response needs change. Finally, because the composite score was derived in consultation with multiple subject matter experts across disciplines, a field assessment is needed to validate the scoring system.

Jurisdictions such as state and local health departments might benefit from use of IMRs to guide decision-making for continued COVID-19 mitigation and response. Data sources included in Kentucky's IMR are publicly available, data are analyzed with familiar software, and a standardized method is used to compile the report, suggesting IMR might easily be adopted by other jurisdictions.

** https://chfs.ky.gov/agencies/dph/covid19/FAQsFaceCoverings.pdf.

†† A more detailed assessment for contact tracing capacity might include percentage of case and contact investigations that occur within a recommended time period with the current number of contact tracers deployed to each of the 16 public health regions of Kentucky and the current incidence in each region.

**Summary**

**What is already known about this topic?**

State and local health departments use various indicators to identify local and regional changes in the number of COVID-19 cases and severe outcomes, including hospitalizations and deaths.

**What is added by this report?**

Kentucky's indicator monitoring report (IMR) is a useful tool that combines multiple data elements to generate a daily COVID-19 status score that allows systematic assessment of the state's mitigation, response, and reopening efforts. The Kentucky Department for Public Health analyzes publicly available data sources and compiles the IMR using standardized methods.

**What are the implications for public health practice?**

State and local health departments in other jurisdictions might benefit from implementation of systematic indicator monitoring to guide decision-making for COVID-19 reopening, mitigation, and response efforts.

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# Notes from the Field

## Universal Statewide Laboratory Testing for SARS-CoV-2 in Nursing Homes — West Virginia, April 21–May 8, 2020

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Outbreaks of coronavirus disease 2019 (COVID-19) in nursing homes can severely affect older adults. During March 17–April 16, 2020, seven nursing homes in West Virginia reported 307 COVID-19 cases among both residents and staff members; four of the nursing homes reported outbreaks involving 20–40 residents. On April 17, the governor of West Virginia issued Executive Order 27–20* directing the West Virginia Bureau for Public Health (WVBPH) to coordinate universal testing for SARS-CoV-2, the virus that causes COVID-19, among residents and staff members of all 123 West Virginia nursing homes, irrespective of symptoms. During April 21–May 8, universal testing was conducted in all 123 West Virginia nursing homes, with 42 COVID-19 cases identified in 28 (23%) nursing homes; the 42 cases occurred in 11 residents (0.1% of residents tested) and 31 staff members (0.2%).

Beginning April 21, nasopharyngeal or nasal swabs were collected from residents by in-house staff members, local health departments, or the West Virginia National Guard. Specimens were tested at a private laboratory using a statewide contract or at other commercial laboratories arranged by the nursing homes, using real-time reverse transcription–polymerase chain reaction. In nursing homes with active outbreaks, all persons received testing who had previously tested negative or had not been tested. An outbreak was defined as the detection of two or more laboratory-confirmed COVID-19 cases within 14 days among staff members or residents in a nursing home. All residents with positive SARS-CoV-2 test results were isolated in private rooms, and transmission-based precautions were implemented by WVBPH in alignment with CDC guidance.† Health care workers with positive test results were required to isolate at home until they met the criteria to discontinue home isolation following CDC guidance and were monitored by public health officials through daily text messaging. Health care workers with negative test results who were close contacts of residents or other staff members with confirmed COVID-19 were instructed to quarantine at home for 14 days from their last exposure. Following universal testing, nursing homes screened staff members and residents daily and tested anyone with signs or symptoms of COVID-19. If additional cases were identified, testing was also performed for close contacts of patients, including all residents cared for by the same health care worker. WVBPH monitored nursing homes' adherence to infection prevention and control measures through conference calls, and facilities twice weekly submitted line lists of residents and staff members who were symptomatic or who had a positive SARS-CoV-2 test result.

During April 21–May 8, universal testing was conducted in all 123 West Virginia nursing homes. Receiving testing was declined by 1.3% (115 of 9,026) of residents and 1.7% (239 of 13,926) of staff members. Among the 8,911 residents and 13,687 staff members who were tested, 42 COVID-19 cases were identified in 28 (23%) nursing homes, none of which had previously experienced an outbreak. The 42 cases occurred in 11 residents (0.1% of residents tested) and 31 staff members (0.2% of tested staff members). The 42 identified cases represented 20 single cases from 20 facilities and 22 outbreak-associated cases, representing new outbreaks (ranging in size from two to six persons) in eight facilities (Table). The prevalence of positive SARS-CoV-2 test results was lower in nursing homes with COVID-19 outbreaks during universal testing (0.9% of residents and 1.9% of staff members) than it was during earlier outbreaks when testing was triggered by daily symptom-based resident screening (38.1%) and preshift employee screening (16.3%). Before universal testing, 32 COVID-19–associated nursing home deaths had been reported; however, no deaths occurred among residents with COVID-19 who were identified during universal testing.

In six of the eight nursing homes with newly identified COVID-19 outbreaks where cohorting of residents with positive SARS-CoV-2 test results and exclusion of staff members with positive test results were implemented, daily follow-up symptom screening of all residents and staff members for 28 days (the upper bound of two incubation periods) found that further transmission did not occur. Two facilities experienced minimal transmission beyond the initial cases detected during universal testing.

Universal testing identified eight outbreaks with 17 staff members and five residents who tested positive for SARS-CoV-2, including six staff members and two residents who were asymptomatic (Table). The testing likely prevented the occurrence of ongoing transmission and larger outbreaks, had the asymptomatic infections gone undetected. Proactive universal testing prevented additional infections, as illustrated by the lower percentages of residents and staff members with positive

* https://governor.wv.gov/Documents/2020%20Executive%20Orders/Executive-Order-April-17-2020-Nursing-Home-Testing.pdf.
† https://www.cdc.gov/coronavirus/2019-ncov/hcp/nursing-homes-responding.html.

**TABLE. Characteristics of COVID-19 outbreaks in nursing homes before and during implementation of universal testing* of all residents and staff members — West Virginia, March 17–May 8, 2020**

| Characteristic | No. (%)† | | | | | |
|---|---|---|---|---|---|---|
| | Total at nursing home | Tested | Refused | Positive results | Asymptomatic | Deaths |
| **Outbreaks identified before implementation of universal testing (March 17–April 16, 2020) (N = 7)** | | | | | | |
| Staff members | 793 (100) | 736 (92.8) | 57 (7.2) | 129 (16.3) | 29 (22.5) | 0 (0.0) |
| Residents | 467 (100) | 463 (99.2) | 4 (0.9) | 178 (38.1) | 129 (72.5) | 32 (18.0) |
| **Total** | **1,260 (100)** | **1,199 (95.2)** | **61 (4.8)** | **307 (24.4)** | **158 (51.5)** | **32 (10.4)** |
| **Outbreaks identified during implementation of universal testing§ (April 21–May 8, 2020) (N = 8)** | | | | | | |
| **Outbreak 1** | | | | | | |
| Staff members | 80 (100) | 80 (100) | 0 (0.0) | 2 (2.5) | 0 (0.0) | 0 (0.0) |
| Residents | 54 (100) | 54 (100) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| **Outbreak 2** | | | | | | |
| Staff members | 70 (100) | 70 (100) | 0 (0.0) | 2 (2.9) | 0 (0.0) | 0 (0.0) |
| Residents | 58 (100) | 58 (100) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| **Outbreak 3** | | | | | | |
| Staff members | 110 (100) | 110 (100) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| Residents | 72 (100) | 72 (100) | 0 (0.0) | 2 (2.8) | 0 (0.0) | 0 (0.0) |
| **Outbreak 4** | | | | | | |
| Staff members | 110 (100) | 110 (100) | 0 (0.0) | 3 (2.7) | 0 (0.0) | 0 (0.0) |
| Residents | 46 (100) | 46 (100) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| **Outbreak 5** | | | | | | |
| Staff members | 106 (100) | 106 (100) | 0 (0.0) | 1 (0.9) | 0 (0.0) | 0 (0.0) |
| Residents | 49 (100) | 49 (100) | 0 (0.0) | 1 (2.0) | 0 (0.0) | 0 (0.0) |
| **Outbreak 6** | | | | | | |
| Staff members | 107 (100) | 107 (100) | 0 (0.0) | 2 (1.9) | 0 (0.0) | 0 (0.0) |
| Residents | 43 (100) | 43 (100) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| **Outbreak 7** | | | | | | |
| Staff members | 163 (100) | 163 (100) | 0 (0.0) | 5 (3.0) | 5 (100) | 0 (0.0) |
| Residents | 121 (100) | 121 (100) | 0 (0.0) | 1 (0.8) | 1 (100) | 0 (0.0) |
| **Outbreak 8** | | | | | | |
| Staff members | 157 (100) | 157 (100) | 0 (0.0) | 2 (1.3) | 1 (50.0) | 0 (0.0) |
| Residents | 108 (100) | 107 (100) | 1 (0.9) | 1 (0.9) | 1 (100) | 0 (0.0) |
| **All 8 outbreaks** | | | | | | |
| Staff members | 903 (100) | 903 (100) | 0 (0.0) | 17 (1.9) | 6 (35.2) | 0 (0.0) |
| Residents | 551 (100) | 550 (99.8) | 1 (0.2) | 5 (0.9) | 2 (40.0) | 0 (0.0) |
| **Total** | **1,454 (100)** | **1453 (99.9)** | **1 (0.0)** | **22 (1.5)** | **8 (36.4)** | **0 (0.0)** |

**Abbreviation:** COVID-19 = coronavirus disease 2019.

* Universal testing was defined as facility-wide viral testing of all residents and staff members in a nursing home, irrespective of symptoms; Executive Order 27–20 (https://governor.wv.gov/Documents/2020%20Executive%20Orders/Executive-Order-April-17-2020-Nursing-Home-Testing.pdf) was issued on April 17, 2020, directing SARS-CoV-2 testing in all West Virginia nursing homes.

† Percentages tested, refused, and positive are percentages of total; percentage asymptomatic and percentage of deaths are percentages of persons with a positive test result.

§ 20 additional isolated (nonoutbreak–associated) COVID-19 cases were identified at 20 nursing homes during universal testing.

test results in outbreaks identified through universal testing compared with those identified through symptom screening. Universal testing helped estimate the prevalence of COVID-19 in a population at increased risk for serious COVID-19 outcomes (*1*) so that public health resources could be allocated to prevent further spread (*2*). Statewide universal testing enabled rapid implementation of infection prevention and control measures that likely prevented the occurrence of larger outbreaks. Since completing universal screening, West Virginia has maintained symptom screening in nursing homes, revised its outbreak case definition to constitute a single case in a nursing home, and adopted universal testing of all residents and staff members in response to an outbreak with weekly testing for a period of at least 14 days since the most recent positive result.

For the period May 8–July 26, following completion of universal testing and under the new procedures, 18 COVID-19 outbreaks were identified in West Virginia nursing homes, 12 of which involved five or fewer cases. Although universal testing is resource-intensive, it has proven essential to limiting COVID-19 transmission in nursing homes and has reduced the impact of the pandemic on this vulnerable population in West Virginia.

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# Notes from the Field

## *Candida auris* and Carbapenemase-Producing Organism Prevalence in a Pediatric Hospital Providing Long-Term Transitional Care — Chicago, Illinois, 2019

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*Candida auris* is an emerging fungal pathogen that is frequently drug-resistant; *C. auris* can be difficult to identify, and it has been associated with outbreaks in health care settings.* The first case of *C. auris* in Chicago, Illinois, was identified in May 2016 (*1*). Additional cases continue to be reported, particularly in high-acuity, postacute–care facilities (*1*), and spread of *C. auris* within this type of facility has been documented nationwide (*2*). To monitor local trends in the prevalence of *C. auris*, point prevalence surveys (PPSs) have been conducted in Chicago since August 2016 (*1*). In addition to *C. auris*, a high prevalence of carbapenemase-producing organisms (CPOs) has also been described in Chicago long-term acute-care hospitals since 2010 (*3*). *C. auris* and CPOs can colonize persons over prolonged periods and, because of antimicrobial resistance, cause invasive infections with limited treatment options (*2*,*3*). Co-colonization with these organisms has been identified (*4*). Adults in long-term acute-care hospitals are at increased risk for acquiring *C. auris* and CPOs because of serious underlying medical conditions, extended lengths of stay, presence of indwelling medical devices, and frequent health care worker contact (*3*,*4*). As of June 2019, among residents of Chicago's four long-term acute-care hospitals, the median prevalences of colonization with *C. auris* and CPO were 31% and 24%, respectively (Chicago Department of Public Health, personal communication, January 3, 2020). Although prevalence among adults is well characterized, prevalence of *C. auris* colonization has not been described among pediatric populations in Chicago, and limited data exist on CPO colonization among children outside of intensive care units (*5*).

To assess *C. auris* and CPO colonization among children, in August 2019, the Chicago Department of Public Health conducted a PPS in a 49-bed pediatric hospital providing long-term transitional care for patients leaving pediatric intensive care units. All hospitalized patients were included unless parental consent could not be obtained. Presence and type of medical devices (i.e., gastrostomy tubes, tracheostomies, mechanical ventilators, and central venous catheters) and lengths of stay were documented for all hospitalized patients. Specimens collected for testing consisted of composite bilateral axillary and inguinal swabs for *C. auris* and rectal swabs for CPO testing. The Wisconsin State Laboratory of Hygiene tested all specimens. Real-time polymerase chain reaction (PCR) assays were used to detect *C. auris* DNA and the carbapenemase genes $bla_{KPC}$, $bla_{NDM}$, $bla_{VIM}$, $bla_{OXA\text{-}48}$, and $bla_{IMP}$ (Xpert Carba-R Assay, Cepheid). All axillary and inguinal swabs were processed by real-time PCR and culture to identify *C. auris*. For CPOs, culture was attempted on real-time PCR-positive specimens. Among all 29 hospitalized patients, 25 (86%) were screened for *C. auris* and CPOs. Two rectal specimens were unsatisfactory and produced invalid CPO test results. Patient census was matched to the Illinois extensively drug resistant organism (XDRO) registry to identify previous reports of *C. auris* and CPO colonization or infection. Facility prevalence of *C. auris* and CPOs was calculated as the number of patients with a PPS-related specimen that was positive or a previous report of these organisms in the XDRO registry divided by the facility census count provided by the facility on the day of PPS.

Among the 29 hospitalized patients, median age was 1.2 years (range = 26 days–17.4 years; interquartile range [IQR] = 289 days–2.6 years), 26 (90%) had a gastrostomy tube, 24 (83%) had a tracheostomy, 20 (69%) required mechanical ventilation, and three (10%) had a central venous catheter. Median length of stay was 35 days (IQR = 13–71 days). No patient had a previous report of *C. auris* or CPO. No patient specimens were positive for *C. auris*, and a specimen from one patient was positive for $bla_{OXA\text{-}48}$, yielding a facility prevalence for CPOs of 3.4%. No organism was recovered from the specimen that tested positive for $bla_{OXA\text{-}48}$.

This PPS is the first documented screening for *C. auris* colonization in a transitional care pediatric hospital in the United States. Despite a high prevalence of *C. auris* and CPOs among patients in adult health care settings of similar acuity in the region, *C. auris* was not identified and CPOs were rare at this pediatric hospital. Biannual assessment of this facility is planned. Because this PPS includes only one facility in a region, additional evaluations in similar pediatric health care settings need to be conducted to improve understanding of *C. auris* and CPO prevalence in this population.

* https://www.cdc.gov/fungal/candida-auris/index.html.

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# Notes from the Field

## CDC Polio Surge Response to Expanding Outbreaks of Type 2 Circulating Vaccine-Derived Poliovirus — Africa and Philippines, September 2019–March 2020

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In April 2016, a resolution by all members of the 68th World Health Assembly* in coordination with the Global Polio Eradication Initiative (GPEI) resulted in the removal of the Sabin-strain type 2 oral poliovirus vaccine (OPV) component from all immunization activities to avert outbreaks of type 2 circulating vaccine-derived poliovirus (cVDPV2). In the first quarter of 2016, house-to-house supplementary immunization activities (SIAs) with trivalent OPV (containing Sabin-strain types 1, 2 and 3) were conducted in 42 at-risk countries† in an effort to close type 2 immunity gaps in countries with chronically weak routine childhood immunization systems. However, the quality of SIAs in some countries was inadequate, and pockets of unimmunized and underimmunized children remained. Sabin-strain monovalent OPV type 2 (mOPV2) was then successfully used in response to many cVDPV2 outbreaks; however, some outbreaks in sub-Saharan Africa were not promptly controlled and spread to other countries. Where mOPV2 SIA quality was low, prolonged Sabin-strain type 2 circulation allowed new cVDPV2 outbreaks to emerge (*1*). In 2019, 358 cVDPV2 cases were reported, representing a fourfold increase over the 71 cases reported in 2018 and more than tripling the number of countries with outbreaks, from five (*2*) to 16. As of August 2, a total of 236 cVDPV2 cases in 17 countries have been reported in 2020. Among 33 cVDPV outbreaks reported during July 2018–February 2020, 31 (94%) were caused by cVDPV2 (*1*).

To complement CDC's ongoing technical assistance, the U.S. CDC's Emergency Operations Center, which activated a Polio Response in December 2011, initiated a "polio surge" in September 2019 to assist country programs. This surge consisted of recruiting CDC volunteers§ with international experience and skills valuable for outbreak response and then providing several iterations of a 3-day training on surveillance, eradication strategies, SIA preparation and implementation, supportive supervision, and country-specific briefings. Countries were selected to receive surge assistance on the basis of active outbreak or at-risk status, field travel accessibility, and availability of other essential team members such as CDC-supported Field Epidemiology Training Program (FETP) residents and Stop Transmission of Polio (STOP) consultants.¶ CDC surge staff members were placed in front-line field positions to strengthen team coordination, planning, and supervision to improve SIA and surveillance quality. Most deployed CDC staff members traveled from duty stations in the United States to countries with active outbreaks across sub-Saharan Africa and in the Philippines; five staff members also supported preparedness efforts in countries deemed to be at high risk for outbreaks because of proximity to outbreak countries (e.g., Namibia, which shares a porous border with Angola). Ultimately, 108 surge staff members deployed to 13 countries** over the course of 6 months (Figure), 12 of which have CDC country offices or staff presence. CDC did not deploy staff members to all countries with active outbreaks because of safety and access issues.

With increasing restrictions on CDC international deployments because of the coronavirus disease 2019 (COVID-19) pandemic, CDC's Emergency Operations Center first recalled deployed staff members back to CDC country offices in capitals of the supported countries to allow for contingency planning. By March 23 however, all 32 polio surge staff members deployed during March had ended their missions early and returned to the United States. On March 26, the GPEI recommended delaying OPV SIAs until at least June 2020†† (*3*). CDC immediately began to identify and contract with additional experienced local FETP or STOP alumni to support polio response activities. With pandemic-prompted limitations in field surveillance and investigations, existing GPEI-supported field staff members redirected substantial time to COVID-19 surveillance and control efforts (*4*).

Disruptions in routine immunization and SIAs because of the COVID-19 pandemic have elevated the risk for increases in vaccine-preventable diseases, including polio (*5*), evident in ongoing confirmations of cVDPV2 spread. Resumption of response mOPV2 SIAs began in late July. When CDC travel restrictions are lifted, allowing mission-critical international travel, polio surge deployments can resume providing technical field support. Although cVDPV2 outbreaks are

* https://apps.who.int/gb/ebwha/pdf_files/WHA68-REC1/A68_R1_REC1-en.pdf#page=15.

† Countries that had achieved <70% routine immunization coverage with the third dose of poliovirus vaccine for at least 1 year during 2010–2015.

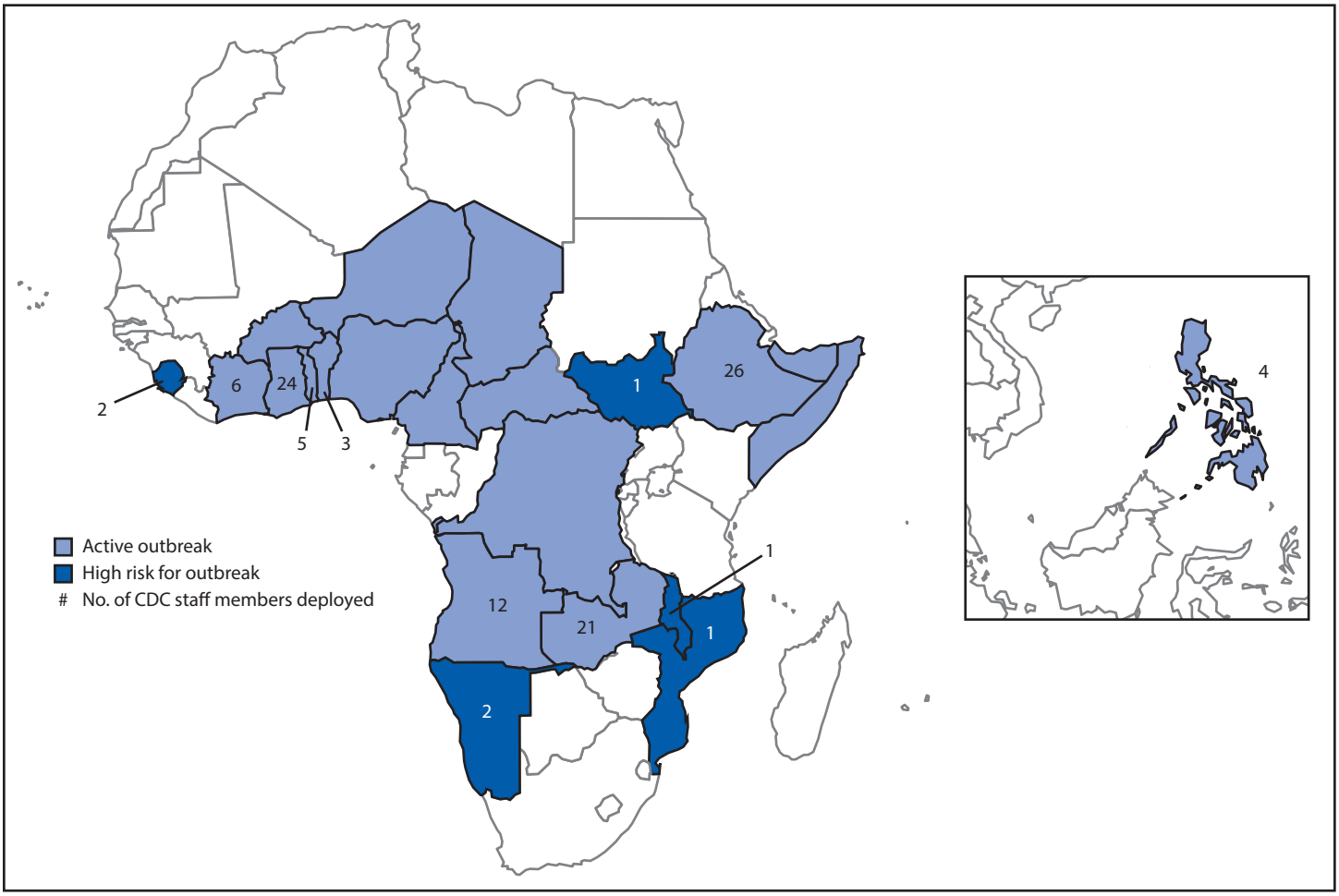
§ Sources of volunteers included Epidemic Intelligence Service and Laboratory Leadership Service Officers, returned Peace Corps volunteers, and the Global Rapid Response Team.

¶ These also included national immunization program and World Health Organization staff members in each country.

** Angola, Benin, Côte d'Ivoire, Ethiopia, Ghana, Malawi, Mozambique, Namibia, Philippines, Sierra Leone, South Sudan, Togo, and Zambia.

†† The Polio Oversight Board of the GPEI has since recommended that response SIAs resume as safely and quickly as possible.

**FIGURE: Circulating vaccine-derived poliovirus type 2 outbreak status and number of CDC polio surge staff members deployed — 13 countries, September 2019–March 2020*,†**




* As of March 11, 2020.
† CDC did not deploy staff members to all countries with active outbreaks because of safety and access issues.

currently challenging GPEI, progress toward eradication of wild poliovirus has continued; on August 25, 2020, the World Health Organization African Region was certified free of indigenous wild poliovirus transmission, joining the Americas, European, South-East Asia, and Western Pacific regions as wild poliovirus-free.

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All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. No potential conflicts of interest were disclosed.

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# Erratum

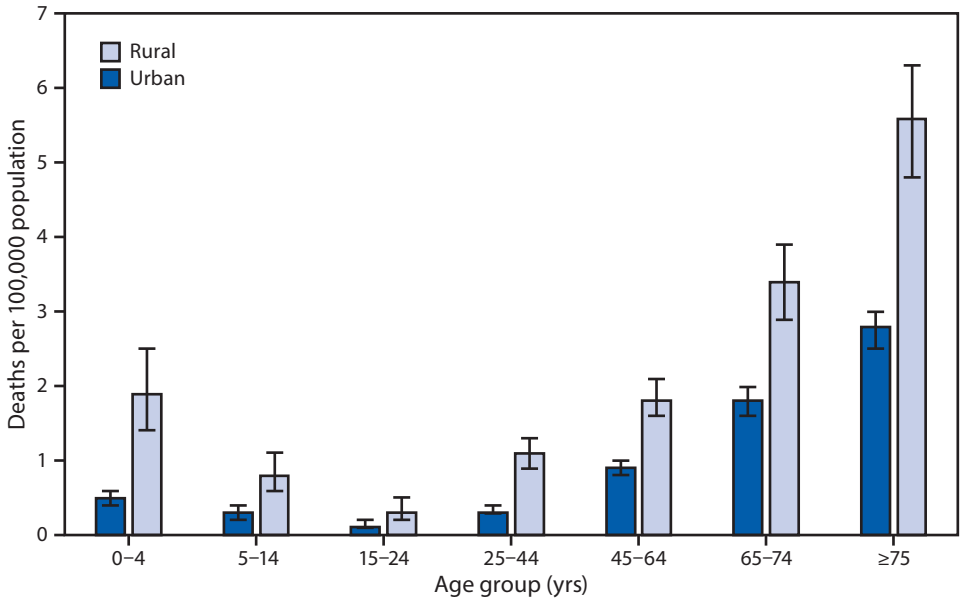
## Vol. 69, No. 31

In the report "Alcohol Use and Co-Use of Other Substances Among Pregnant Females Aged 12–44 Years — United States, 2015–2018," on page 1011, errors occurred in the "Race/Ethnicity" section of Table 1. In the row for "Black, non-Hispanic," the numbers under "Past 30 days binge drinking*" should have read **7.2 (4.6–10.9)**[§] and in the row for "Other," the numbers under "Past 30 days drinking*" should have read **8.4 (4.8–14.4)**[§].

# QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

## Rates* of Deaths Attributed to Unintentional Injury from Fire or Flames,† by Age Group and Urbanization Level§ — National Vital Statistics System, United States, 2018




* Crude rates of deaths per 100,000 population, with 95% confidence intervals indicated with error bars.
† Deaths attributed to unintentional injury from fire or flames were identified using *International Classification of Diseases, Tenth Revision* underlying cause-of-death codes X00–X09.
§ Counties were classified using the 2013 National Center for Health Statistics urban-rural classification scheme for counties (https://www.cdc.gov/nchs/data/series/sr_02/sr02_166.pdf).

In 2018, the death rates attributed to unintentional injury from fire or flames were lowest among those aged 15–24 years and highest among those aged ≥75 years. In rural areas, death rates decreased with age from 2.0 per 100,000 for persons aged 0–4 years to 0.3 for those aged 15–24 years, and then increased with age to 5.6 for those aged ≥75 years. The pattern was similar for urban areas, where rates were 0.5 per 100,000 for persons aged 0–4 years, decreased to 0.1 for those aged 15–24 years, and then increased with age to 2.8 for those aged ≥75 years. Across all age groups, death rates were approximately two to four times higher in rural areas compared with urban areas.

**Source:** National Center for Health Statistics, National Vital Statistics System, mortality data; 2018. https://www.cdc.gov/nchs/nvss/deaths.htm.

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