

Injection Practices and Sexual Behaviors Among Persons with Diagnosed HIV Infection Who Inject Drugs — United States, 2015–2017

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During 2016, 6% of persons in the United States who received a diagnosis of human immunodeficiency virus (HIV) infection had their HIV infection attributed to injection drug use (1). Injection practices and sexual behaviors among HIV-positive persons who inject drugs, such as injection equipment sharing and condomless sex, can increase HIV transmission risk; nationally representative estimates of the prevalences of these behaviors are lacking. The Medical Monitoring Project (MMP) is an annual, cross-sectional survey that reports nationally representative estimates of clinical and behavioral characteristics among U.S. adults with diagnosed HIV (2). CDC used MMP data to assess high-risk injection practices and sexual behaviors among HIV-positive persons who injected drugs during the preceding 12 months and compared their HIV transmission risk behaviors with those of HIV-positive persons who did not inject drugs. During 2015–2017, approximately 10% (weighted percentage estimate) of HIV-positive persons who injected drugs engaged in distributive injection equipment sharing (giving used equipment to another person for use); nonsterile syringe acquisition and unsafe disposal methods were common. Overall, among HIV-positive persons who injected drugs, 80% received no treatment, and 57% self-reported needing drug or alcohol treatment. Compared with HIV-positive persons who did not inject drugs, those who injected drugs were more likely to have a detectable viral load (48% versus 35%; $p = 0.008$) and engage in high-risk sexual behaviors ($p < 0.001$). Focusing on interventions that reduce high-risk injection practices and sexual behaviors and increase rates of viral suppression might decrease HIV transmission risk among HIV-positive persons who inject drugs. Successful substance use treatment could also lower risk for transmission and overdose through reduced injection.

MMP uses a two-stage sampling method. In the first stage, 23 jurisdictions are sampled from all U.S. states, the District of

Columbia, and Puerto Rico. Next, simple random samples of adults with diagnosed HIV infection from sampled jurisdictions are selected from the National HIV Surveillance System, a census of persons with diagnosed HIV infection (1). During June 2015–May 2017, face-to-face or telephone interviews were conducted with participants, during which demographic characteristics, injection practices and sexual behaviors, and need for, and receipt of, medical services were assessed for the preceding 12 months. Response rates for 2 cycle years of data were 100% (jurisdictions) and 40%–44% (adults with diagnosed HIV infection).

Among HIV-positive persons who injected drugs, behaviors during the preceding 12 months were self-reported. Injection practices included distributive sharing of syringes and other injection equipment,* injection before or during

* Includes frontloading/backloading into a syringe, a process in which one syringe is used to prepare a drug solution that is then divided into one or more syringes for injection.

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sex, and methods for injection syringe acquisition and disposal. Participants self-reported need for, and receipt of, alcohol or drug treatment. Persons who reported receiving, or not receiving but needing, drug or alcohol treatment were considered to have a need for this service. Enrollment in a medication-assisted treatment program for opioid use disorder was also assessed. Sexual behaviors were assessed, including 1) condomless sex; 2) exchange of sex for money or goods; and 3) a dichotomous measure indicative of high risk for sexual HIV transmission (defined as having one or more detectable viral loads in the past 12 months and having high-risk sex). High-risk sex was defined as condomless sex with an HIV-negative partner or a partner whose HIV status was unknown and who was not known to be on preexposure prophylaxis (PrEP).[†] Viral loads from the preceding 12 months were abstracted from medical records.

Weighted percentages of characteristics with corresponding 95% confidence intervals (CIs) were reported to account for complex survey design using standard methodology (2). Rao-Scott chi-square tests were used to compare characteristics associated with a high risk for sexual HIV transmission between HIV-positive persons who injected drugs (233) and those who did not inject drugs (7,397); $p < 0.05$ indicated statistical significance. All analyses were conducted using SAS (version 9.4; SAS Institute).

An estimated 3% (95% CI = 2%–3%) of persons with diagnosed HIV infection injected drugs in the preceding

12 months. Among HIV-positive persons who injected drugs, 11% engaged in distributive sharing of syringes, and 10% engaged in distributive sharing of other injection equipment; 61% injected before or during sex (Table). Common sources of injection syringes included a pharmacy or drug store (63%); a friend, relative, or sex partner (50%); a syringe services program (SSP) (32%); or a needle or drug dealer, shooting gallery, or off the street (21%). Common methods for syringe disposal were in the trash, on the street, or in a nonmedical waste container (53%); a medical waste container (50%); an SSP (30%); or keeping the syringe to reuse it (29%). An estimated 57% percent of HIV-positive persons who injected drugs reported needing alcohol or drug use treatment; 80% of HIV-positive persons who injected drugs did not obtain treatment in the preceding year. Eight percent of HIV-positive persons who injected drugs enrolled in a medication-assisted treatment program.

A higher percentage of HIV-positive persons who injected drugs had a detectable viral load than did those who did not inject drugs (48% versus 35%; $p = 0.008$) (Figure). Condomless sex, exchange sex, and high-risk sex were all more prevalent among HIV-positive persons who injected drugs (63%, 17%, and 18%, respectively), than among those who did not inject drugs (31%, 2%, and 6%, respectively) ($p < 0.001$).

Discussion

Substantial high-risk injection practices and sexual behaviors associated with HIV transmission were observed among

[†] <https://www.cdc.gov/hiv/risk/prep/index.html>.

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TABLE. Injection behaviors and substance use treatment in the preceding 12 months among persons with diagnosed human immunodeficiency virus (HIV) who injected drugs (n = 233) — Medical Monitoring Project, 2015–2017

Behavior/Treatment	HIV-positive persons who injected drugs	
	No.	Weighted % (95% CI)
Distributive sharing of syringes*		
Yes	22	11 (6–17)
No	204	89 (83–94)
Distributive sharing of other nonsyringe injection equipment		
Yes	28	10 (6–14)
No	198	90 (86–94)
Injection before or during sex		
Yes	141	61 (53–69)
No	87	39 (31–47)
Reported sources of syringes†		
Syringe services program	89	32 (20–44)
Pharmacy/Drug store	136	63 (54–72)
Doctor's office/Clinic/Hospital	15	5 (3–8)
Friend, relative, sex partner	111	50 (42–58)
Needle or drug dealer, shooting gallery, or off the street	50	21 (15–26)
Disposal of syringes†		
Trash/Street/Container not for medical waste	119	53 (43–63)
Kept it to reuse it	58	29 (22–35)
Put in a medical waste container	126	50 (39–61)
Took it to a syringe services program	76	30 (19–41)
Need for drug or alcohol treatment‡		
Yes	134	57 (50–64)
No	99	43 (36–50)
Obtained drug or alcohol treatment		
Yes	40	20 (13–26)
No	193	80 (74–87)
Enrolled in medication-assisted treatment program		
Yes	25	8 (4–12)
No	208	92 (88–96)

* Defined as giving used injection equipment to another person for use.

† Participants could report more than one response; thus, categories are not mutually exclusive and percentages might sum to >100%.

‡ Yes responses included all persons who self-reported a need for treatment, whether or not they received it.

HIV-positive persons who injected drugs. Nonsterile syringe acquisition and unsafe disposal methods were common and demonstrate the need for additional outreach for harm reduction. Although a considerable need for drug and alcohol treatment was reported, 80% of HIV-positive persons who injected drugs did not obtain services, which highlights the need to expand access and referral to treatment services to reach these persons.

These findings underscore the importance of implementing a multipronged intervention approach to reducing HIV transmission among HIV-positive persons who inject drugs, including expanding access to sterile injection equipment and education regarding harm reduction and condom use (3). Improving access to substance use treatment might decrease HIV transmission

risk through reduced need for injection. Medication-assisted treatment is one evidence-based option for opioid use disorder treatment (4). Viral suppression is essential for reducing HIV transmission risk and improving long-term outcomes among persons with diagnosed HIV infection (5). Continuing to improve retention in care and adherence to antiretroviral therapy among HIV-positive persons who inject drugs could increase the prevalence of viral suppression in this population.

Colocating HIV prevention services, such as provision of PrEP, condoms, sterile injection equipment, and HIV medical care, might also reduce the burden for patients by addressing complex public health issues in a single setting (3). SSPs are an important HIV prevention strategy among persons who inject drugs and could be a setting for provision of these services (6). Recent guidance from the U.S. Department of Health and Human Services specifies allowance of federal funds to support SSPs when there is a documented need and when the SSPs are in compliance with local laws.[§] However, many states require legislative action to permit implementation and operation of SSPs.[¶]

A large proportion of HIV-positive persons who injected drugs received syringes from sources that provided sterile equipment, such as an SSP or a pharmacy or drug store; however, potentially nonsterile sources were also commonly used. Receipt and use of nonsterile syringes can increase the risk for acquisition of hepatitis C virus (HCV) infection among persons with HIV infection; co-infection with HCV can result in poorer clinical outcomes (7).^{**}

In addition, a large proportion of HIV-positive persons who injected drugs disposed of syringes unsafely, increasing the risk of needle-stick injuries and transmission of HIV and HCV to others (8). Instead of disposing of syringes after first use, nearly 30% kept syringes to reuse them, which increases the risk for serious bacterial infections, including endocarditis and skin abscesses (9). Improving access to sterile injection equipment and harm reduction education might help to decrease the occurrence of these infections, as well as the transmission of HIV and viral hepatitis through injection equipment sharing (6).

The findings in this report are subject to at least three limitations. First, all characteristics ascertained through interview are based on self-report and might be subject to information bias. Second, not all sampled persons participated in MMP, but results were adjusted for nonresponse using standard methodology. Even with suboptimal response rates, results obtained using unbiased sampling methodology have value.^{††} Finally,

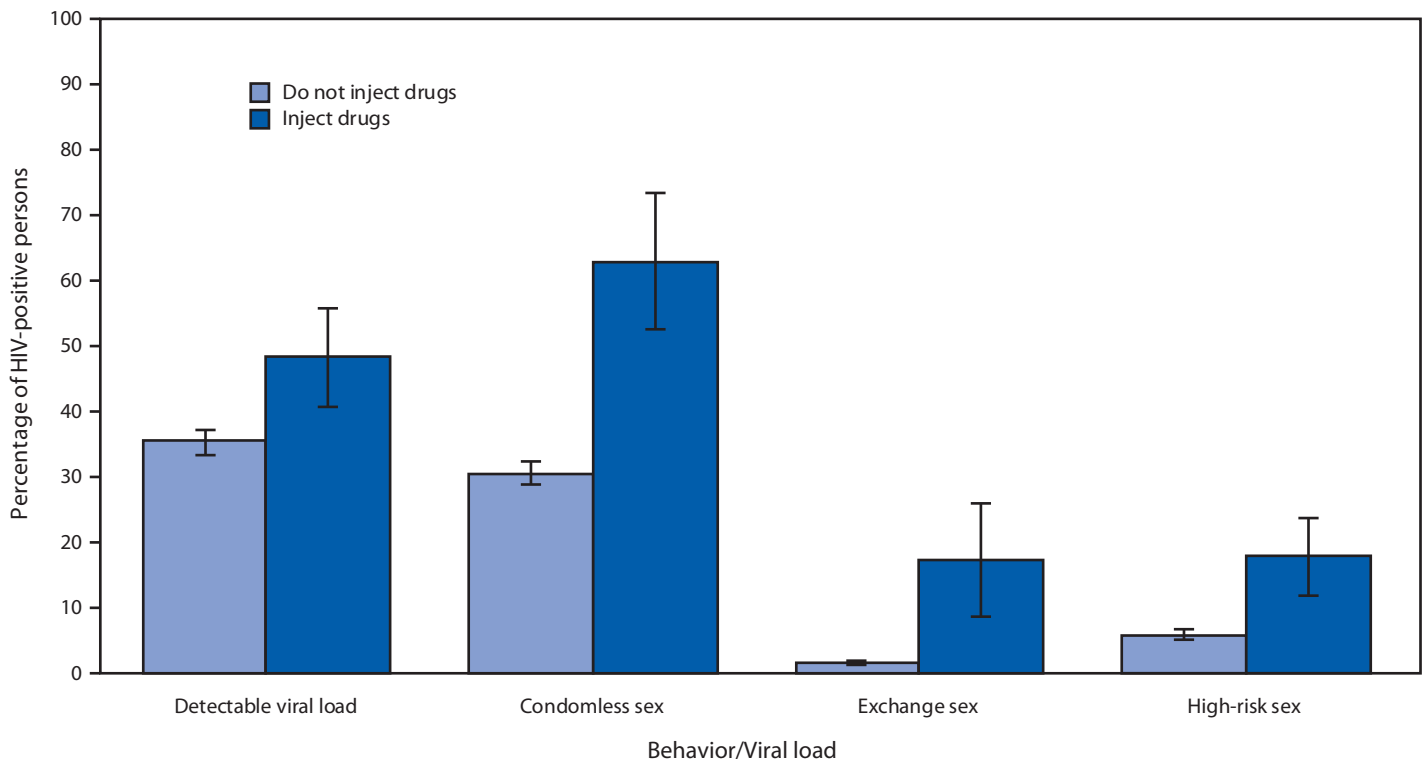
[§] <https://www.hiv.gov/sites/default/files/hhs-ssp-guidance.pdf>.

[¶] <https://www.nastad.org/maps/syringe-service-program-policy-environments-across-united-states>.

^{**} <https://www.cdc.gov/hepatitis/hcv/cfaq.htm>.

^{††} <https://www.sciencedirect.com/science/article/pii/S2352146515002987>.

FIGURE. Percentage of persons with diagnosed human immunodeficiency virus (HIV) (n = 233) who engaged in high risk sexual behaviors or had a detectable viral load — Medical Monitoring Project, United States, 2015–2017*[†]



* With 95% confidence intervals indicated with error bars; all percentages are weighted.

[†] Exchange sex was defined as exchanging sex for money or goods in the preceding 12 months; high-risk sex was defined as having one or more detectable viral loads in the preceding 12 months and having condomless sex with an HIV-negative or HIV-unknown partner who was not known to be on preexposure prophylaxis.

the sample size of HIV-positive persons who injected drugs was limited; as additional data are collected in future MMP cycles, reliability of estimates should improve.

Focusing HIV prevention strategies on both high-risk sexual behaviors and injection practices among HIV-positive persons who inject drugs might reduce HIV transmission risk. Through collaborations with state and local health departments, CDC supports projects to prioritize HIV prevention strategies for persons who inject drugs. One such project, Community PROMISE,^{§§} uses peer advocates to reach persons who inject drugs and communicate public health messages around risk reduction. CDC has also expanded efforts to work with state and local health departments to detect clusters of HIV infection among important populations, including persons who inject drugs, and provides support in local investigations of these clusters.^{¶¶} CDC recommends that all persons with diagnosed HIV infection receive partner services, which includes interviews regarding sexual behaviors and injection practices, education about harm reduction interventions, and identification of

sexual and injection equipment-sharing contacts, so that HIV and sexually transmitted disease testing can be offered (10).^{***} Ensuring safe methods for acquisition and disposal of syringes could decrease risks of acquiring bloodborne pathogens. CDC supports the use of SSPs as part of a comprehensive HIV prevention strategy and provides guidance on support of SSP activities (10). Continued efforts to reduce sexual and injection HIV transmission risk through support for expanding access to sterile injection equipment, drug treatment services, PrEP, and education around harm reduction and condom use might strengthen HIV prevention programs and directly support the national initiative to end the HIV epidemic.^{†††}

*** <https://www.cdc.gov/mmwr/preview/mmwrhtml/rr57e1030a1.htm>.

††† <https://www.hiv.gov/federal-response/ending-the-hiv-epidemic/overview>.

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^{§§} <https://effectiveinterventions.cdc.gov/Files/promiseoverview.pdf>.

^{¶¶} <https://www.cdc.gov/hiv/funding/announcements/ps18-1802/index.html>.

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

Certain injection and sexual behaviors among human immunodeficiency virus (HIV)-positive persons who inject drugs (PWID) can increase HIV transmission risk. Successful substance use treatment could lower risk of infection and overdose through reduced injection.

What is added by this report?

Approximately 10% of HIV-positive PWID engaged in distributive injection equipment sharing; nonsterile syringe acquisition and unsafe disposal methods were common. HIV-positive PWID were also more likely to have engaged in high-risk sexual behaviors. Eighty percent did not receive treatment for substance use.

What are the implications for public health practice?

Increasing access to sterile injection equipment, drug treatment services, and education around harm reduction and condom use might reduce HIV transmission among sexual and injection partners of HIV-positive PWID.

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Threefold Increases in Population HIV Viral Load Suppression Among Men and Young Adults — Bukoba Municipal Council, Tanzania, 2014–2017

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Reducing HIV-related morbidity and mortality, and effectively eliminating HIV transmission risk, depends on use of antiretroviral therapy (ART) to achieve and maintain viral load suppression (VLS)* (1,2). By 2020, sub-Saharan African countries are working to achieve VLS among 90% of persons using ART and 73% of all persons living with HIV infection (1). In Tanzania, a country with 1.4 million persons with HIV infection, 49.6% of HIV-positive persons aged 15–49 years had achieved VLS in 2017, including only 21.5% of men and 44.6% of women aged 25–29 years (3). To identify interventions that might increase VLS in Tanzania, and reduce VLS-associated sex and age-group disparities, the Bukoba Combination Prevention Evaluation (BCPE) scaled up new HIV testing, linkage to care, and retention on ART interventions throughout Bukoba Municipal Council (Bukoba), Tanzania, during October 2014–March 2017 (4,5). Located on the western shore of Lake Victoria, Bukoba is a mixed urban and rural municipality of 150,000 persons and capital of Kagera Region. Of the 31 regions of Tanzania, Kagera has the fourth highest prevalence of HIV infection (6.8%) among residents aged 15–49 years (3). CDC analyzed data from BCPE preintervention and postintervention surveys and found that VLS prevalence among HIV-positive Bukoba residents aged 18–49 years increased approximately twofold overall (from 28.6% to 64.8%) and among women (33.3% to 67.8%) and approximately threefold among men (20.5% to 59.1%) and young adults aged 18–29 years (15.6% to 56.7%). During 2017, BCPE facility-based testing and linkage interventions were approved as new service delivery models by the Tanzania Ministry of Health, Community Development, Gender, Elderly and Children (4,5). After a successful rollout to 208 facilities in 11 regions in 2018, BCPE interventions are being scaled up in all regions of Tanzania in 2019 with support from the United States President's Emergency Plan for AIDS Relief (PEPFAR).[†]

BCPE interventions were implemented when national ART eligibility guidelines expanded from CD4 count <350/ μ L (October 2014–November 2015) to \leq 500/ μ L (December 2015–September 2016) to any CD4 count (Test and Start)[§] [October

2016–March 2017]). HIV testing[¶] was routinely offered at 11 participating health care facilities, in homes, and at community venues (Supplementary Figure, <https://stacks.cdc.gov/view/cdc/80050>) (4). Linkage case management** (services to help persons with HIV infection enroll early in HIV care) was offered to HIV-positive persons referred for care at participating facilities (5). Defaulter tracing^{††} (services to help patients resume HIV care among those who had stopped) was initiated for patients who defaulted from care during October 2014–March 2017 at nine participating facilities providing ART.

Household surveys conducted before (November 2013–January 2014) and after (June–September 2017) the interventions used identical methods to assess prior diagnosis of HIV infection, current ART use, and VLS among persons with HIV infection. In Bukoba census enumeration areas randomly selected in proportion to ward^{§§} population, all household members aged 18–49 years were eligible for an in-person interview and HIV testing. Specimens obtained from HIV-positive participants were tested at the national laboratory for HIV-1 viral load. Preintervention and postintervention prevalence, VLS prevalence ratios (PRs), and adjusted prevalence ratios (aPRs) were estimated using SAS (version 9.3; SAS Institute). All estimates were census-weighted by sex, age group, and geographic area, and adjusted for clustering within enumeration areas.

[¶] All patients seeking outpatient department medical services at three faith-based and all eight government health care facilities (excluding police and military) were routinely screened and offered HIV testing if eligible by national guidelines. HIV testing was offered at least once at all homes throughout Bukoba and at 79 venues frequented by men (e.g., businesses, bars, community events, and high-traffic urban areas). <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0215654>.

** Includes the following peer-delivered services recommended by CDC and the World Health Organization provided for \leq 90 days: 1) point-of-diagnosis psychosocial support and counseling on the benefits of early enrollment in HIV care and ART; 2) escort and treatment navigation at HIV-care facilities; 3) periodic telephone calls and appointment reminders; and 4) follow-up in-person counseling on disclosure of HIV infection status, HIV testing of partners and family members, and identifying and resolving real and perceived barriers to HIV care. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0208919>.

†† Includes telephone, home visit, escort, and treatment navigation services to help patients who had not received care in >90 days return to care and initiate or reinstate ART if eligible. Electronic medical records were reviewed quarterly during July 2016–April 2017 to identify defaulters. Patients not contacted or contacted but who did not return to care were retraced in subsequent quarters.

§§ Bukoba Municipal District is composed of 14 administrative wards. (Supplementary Figure, <https://stacks.cdc.gov/view/cdc/80050>).

* HIV-1 RNA concentration <1000/ μ L on a viral load assay.

[†] <https://www.pepfar.gov/documents/organization/285852.pdf>.

[§] Provision of ART for all persons living with HIV infection, regardless of CD4 count. <https://www.pepfar.gov/documents/organization/250048.pdf>.

Among residents aged 18–49 years in sampled enumeration areas, 4,795 (73%) of 6,532 residents participated in preintervention survey interviews and HIV testing, and 5,067 (74%) of 6,844 residents participated in postintervention survey interviews and HIV testing. For both surveys, proportionally fewer men than women were contacted, interviewed, and tested for HIV infection (Figure).

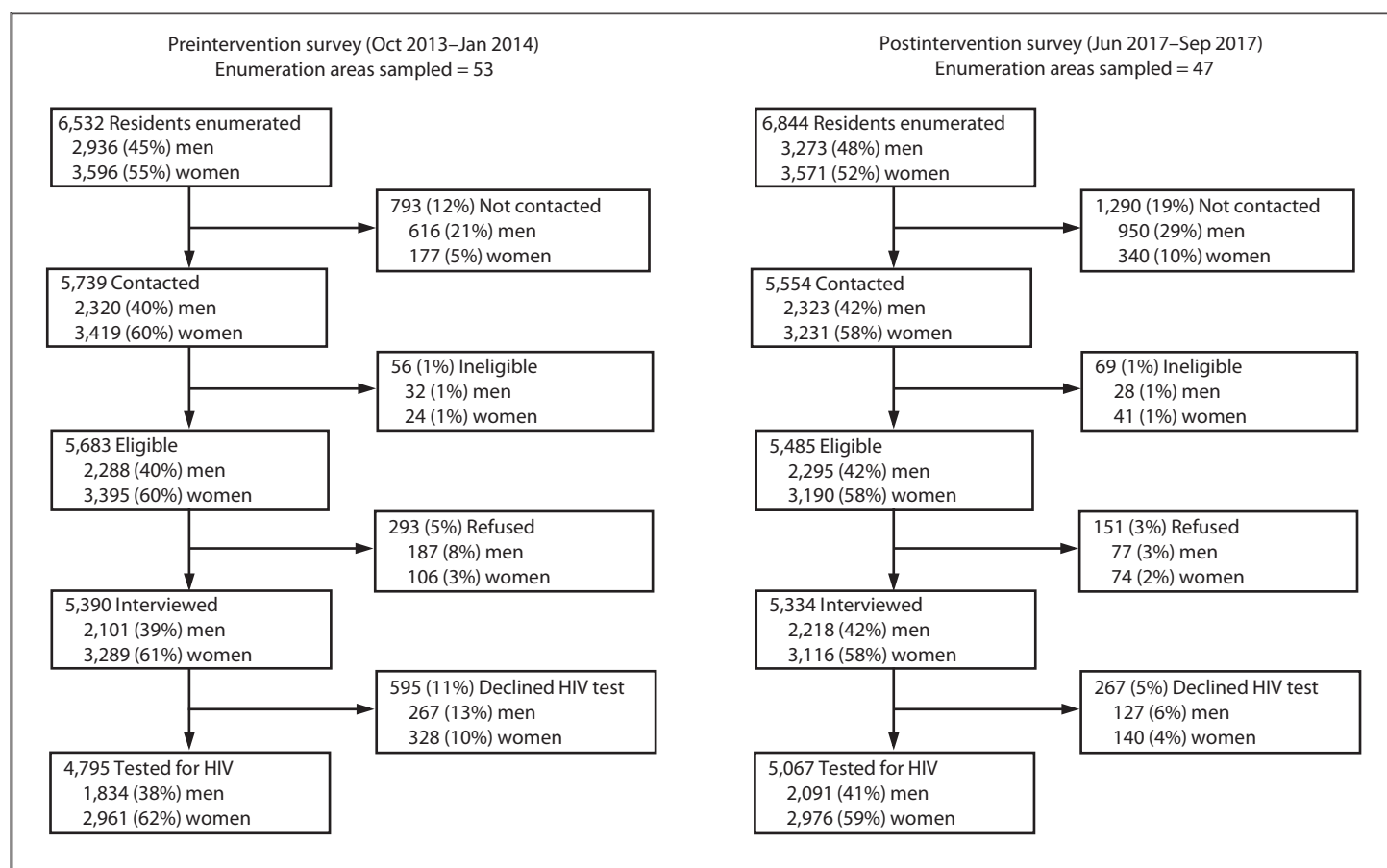
Before the intervention in 2014, among an estimated 66,134 residents aged 18–49 years, prevalence of HIV infection was 8.9%. Among the estimated 5,903 HIV-positive residents aged 18–49 years, 47.4% had previously received an HIV diagnosis, 40.8% were currently in HIV care, and 32.2% were using ART, 88.7% (95% confidence interval [CI] = 83.5–93.9) of whom had achieved VLS. Thus, an estimated 3,107 residents aged 18–49 years were unaware of their HIV infection and needed diagnosis, and 3,493 needed HIV care and ART if eligible, which served as intervention targets (Table 1).

During the intervention (October 2014–March 2017), BCPE conducted 133,695 HIV tests; 4,731 clients of all ages

tested positive for HIV and needed HIV care, 4,143 (88%) of whom received a new HIV diagnosis. Among 4,206 HIV-positive clients of all ages referred to participating facilities and who received BCPE linkage case management services, 3,918 (93%) enrolled in HIV care (3,186 before Test and Start), 2,521 (64%) of whom initiated ART within 3 months of diagnosis.

Among linkage case management clients who enrolled in care, an increasing proportion initiated ART within 3 months of diagnosis as national ART eligibility guidelines expanded: $CD4 < 350 = 52%$ (1,057), $CD4 \leq 500 = 70%$ (815), and Test and Start = 89% (649). Of 820 patients who stopped HIV care and received BCPE defaulter-tracing services, 604 (74%) returned to care, and 573 (70%) initiated or reinitiated ART; an additional 830 patients were lost to follow-up (85% [706] before Test and Start). By the end of the intervention, BCPE achieved 109% and 100% of HIV diagnostic and enrollment-in-care targets for HIV-positive persons aged 18–49 years overall, and $\geq 91%$ and $\geq 86%$ for all sex and age groups, respectively (Table 1).

FIGURE. Participation in preintervention and postintervention household surveys to assess effectiveness of new HIV testing, linkage to care, and retention on antiretroviral therapy interventions — Bukoba Combination Prevention Evaluation, Bukoba Municipal Council, Tanzania, 2014–2017



Abbreviation: HIV = human immunodeficiency virus.

TABLE 1. Preintervention prevalence of human immunodeficiency virus (HIV) infection among residents aged 18–49 years; preintervention prevalence of prior diagnosis of HIV infection, current enrollment in HIV care, and current use of antiretroviral therapy (ART) among HIV-positive residents aged 18–49 years; and intervention targets and outcomes — Bukoba Combination Prevention Evaluation, Bukoba Municipal Council, Tanzania, 2014–2017*

Characteristic	Preintervention prevalence estimates (Nov 2013–Jan 2014) [†]				Intervention targets and outcomes (Oct 2014–May 2017) [§]				
	HIV-positive	Prior HIV diagnosis	Currently in HIV care	Currently using ART	HIV-positive (total residents)	Need HIV diagnosis	HIV infection diagnosed [¶]	Need HIV care	Enrolled in HIV care ^{¶¶}
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	No. (no.)	No. (%)**	No. (%) ^{††}	No. (%)**	No. (%) ^{§§}
Total	8.9 (7.5–10.4)	47.4 (41.3–53.4)	40.8 (34.9–46.8)	32.2 (26.4–38.0)	5,903 (66,134)	3,107 (53)	3,381 (109)	3,493 (59)	3,488 (100)
Sex									
Men	6.8 (5.2–8.4)	36.8 (28.0–45.5)	28.3 (20.0–36.6)	23.0 (14.9–31.1)	2,193 (32,435)	1,387 (63)	1,269 (91)	1,573 (72)	1,346 (86)
Women	11.0 (9.2–12.8)	53.6 (47.5–59.8)	48.3 (42.2–54.3)	37.7 (31.2–44.1)	3,710 (33,699)	1,720 (46)	2,112 (123)	1,920 (52)	2,142 (112)
Age group (yrs)									
18–24	3.9 (3.0–4.7)	28.8 (18.0–39.5)	23.2 (12.9–33.6)	15.4 (7.2–23.5)	856 (22,199)	609 (71)	809 (133)	657 (77)	737 (112)
25–49	11.5 (9.6–13.4)	50.5 (44.1–56.9)	43.8 (37.8–49.9)	35.1 (29.0–41.2)	5,047 (43,935)	2,498 (49)	2,572 (103)	2,836 (56)	2,751 (97)

Abbreviation: CI = confidence interval.

* A community-wide combination prevention intervention was implemented throughout Bukoba Municipal Council during October 2014–March 2017 (Supplementary Figure, <https://stacks.cdc.gov/view/cdc/80050>). New interventions included comprehensive medical outpatient department and home- and venue-based HIV testing services; peer-delivered linkage case management for all consenting HIV-positive persons referred to 11 participating health care facilities; and defaulter-tracing services for patients at participating facilities who had not received HIV care in the prior 90 days during October 2014–March 2017. Recruitment into linkage case management ended March 30, 2017, and management services ended May 31, 2017.

[†] The preintervention survey was conducted in census enumeration areas of Bukoba Municipal Council randomly selected in proportion to ward population in each of the 14 administrative wards. All household members aged 18–49 years were eligible to participate in a personal interview and test for HIV infection by the national rapid HIV test algorithm. Prevalence outcomes were estimated with SURVEYFREQ procedures, weighted by sex, age group, and geographic area of the Bukoba Municipal Council census and adjusted for clustering within census enumeration areas using SAS (version 9.3; SAS Institute). Prior diagnosis of HIV infection, and current enrollment in HIV care and use of ART (conditions) included persons with HIV infection who either 1) reported these conditions as part of the standard survey interview; 2) were confirmed by medical record to have these conditions; or 3) had achieved viral load suppression (<1,000 HIV RNA copies/ μ L). Conditions included viral load suppression because of low sensitivity (77%) of self-reported ART use (<https://www.ncbi.nlm.nih.gov/pubmed/29194115>) and that only 1% of persons with HIV achieve durable viral load suppression in the absence of ART adherence (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3904947/>). Percentages of conditions are of persons with HIV infection.

[§] Bukoba Municipal Council census estimates were obtained from the Tanzania National Bureau of Statistics (<https://www.nbs.go.tz/index.php/en/>). Total residents = estimated census of residents aged 18–49 years. No. of HIV-positive residents = total residents multiplied by point HIV prevalence estimate. No. who need HIV diagnosis and no. who need HIV care = no. of HIV-positive residents minus (no. of HIV-positive residents multiplied by [point-prevalence estimates of prior HIV diagnosis and current enrollment in HIV care, respectively]). ART intervention targets were not established in 2014 because only HIV-positive persons with a CD4 count <350/ μ L were eligible for ART.

[¶] HIV diagnosed = clients aged 15–49 years who tested HIV-positive as part of combination prevention services (October 2014–March 2017), reported never previously testing positive for HIV infection, and were referred to Bukoba Municipal Council participating health care facilities. Enrolled in HIV care = linkage case management clients aged 15–49 years confirmed by medical record to have received HIV care at least once at participating health care facilities during October 2014–May 2017. Data on clients who received a new HIV diagnosis and enrolled in HIV care were collected by government-required age group intervals: 15–24 and 25–49 years. The percentage of clients aged 15–17 years is unknown; approximately 1% of ART patients at participating facilities are aged 15–17 years.

** Percentages are of estimated HIV-positive residents in 2014.

^{††} Percentages are of estimated HIV-positive residents in need of HIV diagnosis in 2014. Percentages >100% indicate that more HIV-positive persons aged 18–49 years received a new HIV diagnosis than expected based on census and preintervention survey point-prevalence estimates.

^{§§} Percentages are of estimated HIV-positive residents in need of HIV care in 2014. Percentages >100% indicate that more HIV-positive persons aged 18–49 years were enrolled in HIV care than expected based on census and preintervention survey point-prevalence estimates.

After the intervention in 2017, estimated prevalence of HIV infection among residents aged 18–49 years was 8.4% (95% CI = 6.9–9.9). Among HIV-positive residents aged 18–49 years, 76.2% (95% CI = 71.8–80.6) had previously received an HIV diagnosis, and 70.9% (95% CI = 65.6–76.3) were using ART, 91.3% (95% CI = 88.5–94.2) of whom had achieved VLS.

VLS prevalence among all persons with HIV infection increased approximately twofold overall (from 28.6% to 64.8%), among women (33.3% to 67.8%), and among those who had lived in their home for >2 years (34.4% to 70.4%). VLS prevalence increased approximately threefold among men (20.5% to 59.1%), persons aged 18–29 years (15.6% to 56.7%), and those who had unprotected sexual intercourse (17.7% to 54.9%) (Table 2). VLS sex and age group disparities

in 2014 (aPR = 1.5–2.7) were nearly eliminated by 2017 (aPR = 1.1–1.3). With the exception of cell phone or television ownership, VLS prevalence disparities were not observed in 2017 for other sociodemographic characteristics (Table 2).

Discussion

After implementation of a new community-wide combination prevention intervention in Bukoba during a 2.5-year period of expanding ART eligibility, VLS prevalence among HIV-positive residents aged 18–49 years increased approximately twofold overall and approximately threefold among men and young adults aged 18–29 years, two groups known to have low VLS coverage in Tanzania and elsewhere (1,3). Although benefiting from only 6 months of Test and Start (ART for all HIV-positive persons), BCPE nearly achieved

TABLE 2. Preintervention and postintervention household survey participant characteristics, population prevalence of viral load suppression (VLS)* among persons with human immunodeficiency virus (HIV) infection aged 18–49 years, and VLS prevalence ratios — Bukoba Combination Prevention Evaluation, Bukoba Municipal Council, Tanzania, 2014–2017†

Characteristic	Preintervention HIV survey [§] (Nov 2013–Jan 2014)					Postintervention HIV survey [§] (Jun 2017–Sep 2017)					Intersurvey VLS prevalence ratio [¶]
	Total	HIV- positive	VLS prevalence and prevalence ratios [¶]			Total	HIV- positive	VLS prevalence and prevalence ratios [¶]			
	No. (%)	No.	% (95% CI)	PR (95% CI)	aPR (95% CI)	No. (%)	No.	% (95% CI)	PR (95% CI)	aPR (95% CI)	
Total	4,795 (100)	436	28.6 (23.0–34.2)	N/A	N/A	5,067 (100)	435	64.8 (59.4–70.2)	N/A	N/A	2.3 (1.8–2.8)
Sex											
Men	1,834 (38.2)	113	20.5 (12.4–28.7)	Referent	Referent	2,091 (41.3)	112	59.1 (50.9–67.4)	Referent	Referent	2.9 (1.9–4.4)
Women	2,961 (61.8)	323	33.3 (27.2–39.5)	1.6 (1.1–2.4)	1.5 (1.1–2.1)	2,976 (58.7)	323	67.8 (61.8–73.8)	1.1 (1.0–1.3)**	1.1 (1.0–1.3)**	2.0 (1.7–2.5)
Age group (yrs)											
18–29	2,749 (57.3)	163	15.6 (8.6–22.5)	Referent	Referent	2,832 (55.9)	136	56.7 (47.9–65.4)	Referent	Referent	3.6 (2.3–5.7)
30–39	1,385 (28.9)	180	26.3 (20.0–32.7)	1.7 (1.1–2.7)	1.7 (1.1–2.8)	1,461 (28.8)	172	65.0 (57.9–72.2)	1.1 (1.0–1.3)**	1.2 (1.0–1.4)	2.5 (1.9–3.2)
40–49	661 (13.8)	93	52.5 (39.4–65.5)	3.4 (2.3–5.0)	2.7 (1.7–4.3)	774 (15.3)	127	72.8 (62.3–83.3)	1.3 (1.0–1.6)	1.3 (1.0–1.5)	1.4 (1.1–1.8)
Duration of current home residence (yrs)											
<1	1,559 (32.5)	137	19.9 (14.2–25.7)	Referent	Referent	1,519 (30.0)	142	57.1 (48.6–65.6)	Referent	Referent	2.9 (2.1–3.9)
1–2	1,059 (22.1)	99	28.0 (17.3–38.8)	1.4 (1.0–2.0)**	1.3 (0.9–1.9)	1,226 (24.2)	89	64.2 (54.0–74.4)	1.1 (0.9–1.4)	1.1 (0.9–1.3)	2.3 (1.5–3.4)
>2	2,177 (45.4)	200	34.4 (26.4–42.4)	1.7 (1.2–2.4)	1.3 (0.9–1.8)	2,322 (45.8)	204	70.4 (63.9–76.9)	1.2 (1.1–1.4)	1.1 (1.0–1.3)**	2.0 (1.6–2.6)
Ownership of cell phone or television											
No	364 (7.6)	68	22.4 (13.8–31.0)	Referent	Referent	209 (4.1)	44	46.7 (31.8–61.7)	Referent	Referent	2.1 (1.3–3.5)
Yes	4,431 (92.4)	368	29.8 (23.8–35.8)	1.3 (0.9–1.9)	1.2 (0.9–1.7)	4,858 (95.9)	391	67.2 (62.1–72.3)	1.4 (1.1–2.0)	1.4 (1.0–1.9)	2.3 (1.8–2.8)
Trouble satisfying household food needs^{††}											
Sometimes/ Often/Always	250 (5.2)	46	25.7 (12.8–38.6)	Referent	—	637 (12.6)	108	67.8 (58.0–77.7)	Referent	—	2.6 (1.6–4.3)
Seldom	1,822 (38.1)	196	28.1 (21.0–35.1)	1.1 (0.6–1.9)	—	2,118 (42.0)	206	64.7 (57.8–71.7)	1.0 (0.8–1.1)	—	2.3 (1.7–3.0)
Never	2,707 (56.6)	193	29.9 (21.6–38.2)	1.2 (0.7–2.0)	—	2,285 (45.3)	120	62.0 (52.0–71.9)	0.9 (0.7–1.1)	—	2.1 (1.5–2.8)
Highest level of education completed^{††}											
None/Some primary	556 (11.6)	92	24.5 (15.6–33.4)	Referent	Referent	532 (10.5)	83	66.4 (56.6–76.1)	Referent	—	2.7 (1.8–4.0)
Completed primary	2,596 (54.2)	279	31.7 (24.2–39.1)	1.3 (0.9–1.9)	0.8 (0.5–1.3)	2,546 (50.3)	276	64.6 (58.4–70.8)	1.0 (0.8–1.1)	—	2.0 (1.6–2.6)
Post primary	1,640 (34.2)	65	21.3 (11.8–30.8)	0.9 (0.5–1.6)	1.1 (0.7–1.5)	1,987 (39.2)	76	63.6 (52.2–75.0)	1.0 (0.8–1.2)	—	3.0 (1.9–4.7)
Sexual behavior in the past 6 mos^{§§}											
Unprotected intercourse	3,019 (63.0)	234	17.7 (12.3–23.2)	Referent	Referent	3,380 (66.7)	192	54.9 (46.9–63.0)	Referent	Referent	3.1 (2.2–4.3)
Protected intercourse	1,122 (23.4)	106	41.3 (30.6–52.0)	2.3 (1.6–3.4)	1.9 (1.3–2.7)	1,067 (21.1)	151	73.7 (66.5–80.8)	1.3 (1.1–1.6)	1.3 (1.1–1.6)	1.8 (1.4–2.3)
No sexual partners	654 (13.6)	96	42.0 (29.3–54.6)	2.4 (1.7–3.4)	1.9 (1.3–2.7)	620 (12.2)	92	72.7 (60.4–84.9)	1.3 (1.1–1.6)	1.2 (1.0–1.5)	1.7 (1.2–2.4)

Abbreviations: aPR = adjusted prevalence ratio; CI = confidence interval; N/A = not applicable; PR = prevalence ratio.

* HIV-1 RNA concentration <1,000/μL on a viral load assay.

† A community-wide combination prevention intervention was implemented throughout Bukoba Municipal Council during October 2014–March 2017 (Supplementary Figure, <https://stacks.cdc.gov/view/cdc/80050>). New interventions included comprehensive medical outpatient department, and home- and venue-based HIV testing services; peer-delivered linkage case management for all consenting HIV-positive persons referred to 11 participating health care facilities; and defaulter-tracing services for patients at participating facilities who had not received HIV care in the prior 90 days during October 2014–March 2017.

§ Preintervention and postintervention household surveys were conducted with identical survey methods and instruments. In census enumeration areas of Bukoba Municipal Council randomly selected in proportion to each of the 14 administrative ward populations, all household members aged 18–49 years were eligible to participate in a personal interview and test for HIV infection by the national rapid HIV test algorithm. Specimens of HIV-positive participants were tested at the national laboratory for HIV-1 viral load.

¶ VLS prevalence among persons with HIV infection, VLS PRs, and VLS aPRs were estimated with SURVEYFREQ and GENMOD procedures, weighted by sex, age group, and geographic area of the Bukoba Municipal Council census, and adjusted for clustering within census enumeration areas using SAS (version 9.3, SAS Institute). Variables noted with a dash for aPR were not included in the multivariate GENMOD model. Unless otherwise indicated, all PRs with a lower bound of the 95% CI ≥1.0 are statistically significant (p<0.05).

** p≥0.05.

†† Subtotals do not sum to total participants or total HIV-positive because of missing responses.

§§ Unprotected = condom use for <100% of sexual intercourse acts; protected = condom use for 100% of sexual intercourse acts.

the 73% VLS prevalence target for women, persons aged 40–49 years, and residents living in their current home >2 years. Findings from BCPE suggest that comprehensive medical outpatient department and community-based HIV

testing strategies, combined with Test and Start and recommended linkage and defaulter-tracing services, can substantially increase VLS prevalence and reduce VLS-associated sex and age group disparities in a relatively short time.

Although not measured in BCPE, reduction in incidence of HIV infection in Bukoba since 2014 is possible based on the large increase in VLS prevalence, including a threefold increase in VLS among HIV-positive persons who had unprotected sexual intercourse (2). In a community-randomized trial in Botswana, annual incidence of HIV infection was reduced approximately 30% in intervention communities with a smaller net increase, but higher VLS prevalence, compared with BCPE (6).

A Test and Start trial conducted in 16 rural communities of approximately 5,000 residents each in Kenya and Uganda increased VLS prevalence among HIV-positive residents by an absolute difference of 35.5% (from 44.7% to 80.2%) (7). In a 2-year period, ART was provided to all persons with HIV infection through community health campaigns and home-based HIV testing services, an intervention strategy that might not be as effective in larger urban communities such as Bukoba (7). BCPE interventions met or exceeded overall targets for diagnosis of HIV infection and enrollment-in-care, helping to increase VLS prevalence by a similar absolute difference of 36.2% (from 28.6% to 64.8%). However, the 73% VLS prevalence target was not met, in part, because most (81%) BCPE HIV-positive clients were enrolled in care before Test and Start and many patients had defaulted from HIV care. Although comprehensive defaulter-tracing services included retracing defaulters, many patients were lost to follow-up (706 before Test and Start). Implemented under nonexperimental, real-world conditions, BCPE findings are consistent with reports of low retention in HIV care in sub-Saharan Africa before Test and Start (8). Thus, achieving $\geq 73\%$ VLS prevalence among persons with HIV infection in Tanzania might not only depend on optimizing HIV testing and ART linkage services, but also on concerted efforts to improve retention and identify and return to ART care many patients who might have defaulted before Test and Start (8).

Notably, exceeding the preintervention target for testing HIV-positive persons in need of diagnosis (109%) should have resulted in a higher postintervention prevalence of prior diagnosis of HIV infection (76%). Beyond uncertainty of census and sample survey prevalence estimates, two reasons likely explain this difference. First, although intervention target counts of clients who received a new HIV diagnosis were restricted to those referred to Bukoba facilities, some of these clients might not have resided in Bukoba (which is home to the regional referral hospital and two health centers known to provide medical services to residents from other districts). Second, because comprehensive testing, linkage, and retention interventions were not scaled up in other districts, fewer

Summary

What is already known about this topic?

Achieving and sustaining viral load suppression (VLS) reduces illness and death associated with human immunodeficiency virus (HIV) infection and effectively prevents sexual transmission of HIV.

What is added by this report?

In Bukoba, Tanzania, scale-up of new testing, linkage to care, and retention on antiretroviral therapy interventions over 2.5 years helped increase VLS among HIV-positive persons approximately twofold overall (from 28.6% to 64.8%) and threefold among men (20.5% to 59.1%) and adults aged 18–29 years (15.6% to 56.7%).

What are the implications for public health practice?

During 2019, these interventions are being scaled up across Tanzania with support from the U.S. President's Emergency Plan for AIDS Relief to help increase VLS among all persons with HIV infection.

persons who had previously received an HIV diagnosis might have moved into than out of Bukoba during the 2.5-year intervention (differential migration). Differential migration might have contributed to potentially lower VLS prevalence in 2017 among persons with HIV infection who reported living in their home for <1 year (57%) compared with >2 years (70%).

The findings in this report are subject to at least four limitations. First, because the evaluation did not include control communities, the effect of BCPE interventions on population VLS prevalence could not be estimated. Second, although prevalence estimates were weighted to the census population, residual bias might reduce the validity of estimates for men who were underrepresented in both surveys. Third, residence of clients who received BCPE testing and linkage services was not collected and is unknown. Finally, despite adjustment for VLS, estimated prevalence of prior diagnosis of HIV infection and ART use might be underestimated because of low sensitivity of self-report (9).

In 2017, BCPE facility-based HIV testing and linkage case management interventions were approved as new service delivery models by the Ministry of Health, and were implemented in 2018 by four nongovernmental organizations in 208 health care facilities and as part of community-based services in 11 regions of Tanzania (4,5). PEPFAR is supporting the nationwide scale-up of BCPE interventions in Tanzania in 2019 and recommends optimized provider-initiated HIV testing services and peer-delivered, linkage case management as potential strategies for countries to help achieve $\geq 73\%$ prevalence of VLS among all persons with HIV infection by the end of 2020 (10).

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Candida auris in a U.S. Patient with Carbapenemase-Producing Organisms and Recent Hospitalization in Kenya

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Candida auris is an emerging drug-resistant yeast that causes outbreaks in health care facilities; cases have been reported from approximately 30 countries. U.S. cases of *C. auris* are likely the result of importation from abroad followed by extensive local transmission in health care settings (1). Early detection of *Candida auris* is key to preventing its spread. *C. auris* frequently co-occurs with carbapenemase-producing organisms (CPOs), like carbapenem-resistant Enterobacteriaceae (CRE), organisms for which testing and public health response capacity substantially increased beginning in 2017. In September 2018, the Maryland Department of Health (MDH) was notified of a hospitalized resident with CPO infection and colonization and recent hospitalization in Kenya. In light of this history, the patient was screened for *C. auris* and found to be colonized. Public health responses to CPOs can aid in the early identification of *C. auris*. As part of CPO investigations, health departments should assess whether the patient has risk factors for *C. auris* and ensure that patients at risk are tested promptly.

First identified in Japan in 2009, *C. auris* is an emerging drug-resistant yeast that has now been reported in approximately 30 countries (2). *C. auris* has been associated with outbreaks in health care facilities, where its spread is facilitated by challenges with identification, persistent contamination of the health care environment, and limited effectiveness of some standard hospital disinfectants. In the United States, outbreaks have most frequently occurred in high-acuity postacute care facilities, including nursing homes that care for mechanically ventilated patients. Co-infection or co-colonization with *C. auris* and other emerging multidrug-resistant organisms, including CPOs, has been observed regularly.

In September 2018, the MDH was notified about a patient who had recently been medically evacuated from Kenya to an acute care hospital in Maryland. The patient was a U.S. resident who did not work in health care and who had a cerebral hemorrhage while visiting Kenya. During the subsequent month-long hospitalization in Kenya, the patient underwent several operations and other procedures, including arterial clipping and placement of a tracheostomy and feeding tube. Hospital treatment was complicated by sepsis, pneumonia, and a urinary tract infection, requiring treatment with broad-spectrum antibiotics and at least one course of antifungal medications.

In light of the patient's history of receiving health care abroad, the Maryland hospital placed the patient on contact precautions

in a private room immediately upon admission (3). Specimens collected at admission to evaluate ongoing fevers grew several highly drug-resistant organisms, including oxacillinase-48-like-producing carbapenem-resistant *Klebsiella pneumoniae* in urine and New Delhi metallo-beta-lactamase-producing carbapenem-resistant *Pseudomonas aeruginosa* in sputum.

At the time of the investigation, *C. auris* had been reported from one major hospital in Kenya, although not from the facility where the Maryland patient had been hospitalized (4). MDH had previously identified *C. auris* colonization in a patient infected with multiple CPOs and who had had a recent prolonged hospitalization in India. Based on the current patient's prolonged hospitalization in a country with known *C. auris* cases, the patient's colonization and infection with CPOs, and MDH's previous experience, MDH, in consultation with CDC, recommended that the hospital evaluate the patient for *C. auris* colonization. On hospital day 12, a single skin swab of the patient's bilateral axilla and groin areas (one swab for all four areas) was obtained for fungal culture; resulting growth was identified as *C. auris* by matrix-assisted laser desorption/ionization time-of-flight mass spectrometry, indicating colonization in the absence of clinical signs and symptoms. Consistent with *C. auris* detection representing colonization rather than infection, the patient did not receive antifungal therapy while hospitalized in the United States and was ultimately discharged to a rehabilitation facility. Because of the potential for *C. auris* to be transmitted in health care settings (5), 21 patients located on the same hospital unit as the index patient were evaluated for *C. auris* colonization. All screening swabs were negative for *C. auris*.

Discussion

C. auris colonization was identified in a hospitalized patient with a recent history of hospitalization in Kenya and CPO infection and colonization. Transmission of *C. auris* and CPOs to other patients was likely prevented because of the hospital's rapid recognition of the patient's high risk for multidrug-resistant organism colonization and immediate use of appropriate contact precautions upon admission. In facilities where patients with *C. auris* have not been immediately identified, and specific infection control measures were not implemented, transmission to other patients has occurred: in one long-term care facility ventilator unit, nearly half of patients became colonized with

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

Candida auris is an emerging drug-resistant yeast of high public health concern.

What is added by this report?

A Maryland resident with hospitalization in Kenya and carbapenemase-producing organism (CPO) colonization/infection was screened and found to be colonized with *C. auris*, demonstrating that CPO investigations can facilitate early identification of *C. auris*.

What are the implications for public health practice?

Health care exposure outside the United States and CPO colonization/infection are *C. auris* risk factors. CPO case investigations can provide opportunities to identify patients with overnight hospitalization outside the United States during the previous year, enabling early detection of *C. auris* if CDC recommendations to screen such patients for *C. auris* colonization are followed.

C. auris within months of the index patient's admission to the facility (6). This case highlights the importance of a high level of suspicion for *C. auris* in persons admitted to U.S. health care facilities with a history of health care abroad, even if *C. auris* is not known to be widespread in that location. Early identification of *C. auris* is critical to preventing further transmission.

To date, 11 other patients with *C. auris* infection or colonization have been identified in the United States who had a recent history of hospitalization abroad, including in India, Pakistan, South Africa, the United Arab Emirates, and Venezuela. At least six of the 11 patients were also colonized with CPOs; co-colonization might have been higher because not all patients were assessed for CPO colonization. Whole genome sequencing demonstrated that the *C. auris* isolates from these 12 patients, including the patient described in this report, were in the same clades as isolates from the countries where the patients received health care (1).

CDC recommends screening for *C. auris* colonization for patients who have had an overnight stay in a health care facility outside the United States in the preceding 12 months, especially if care occurred in a country with documented *C. auris* infections (7). This is in addition to the 2013 CDC recommendation that facilities place patients who have had overnight stays in health care facilities outside the United States within the past 6 months on contact precautions and perform screening for CPOs like CRE (8). Health care facilities should develop strategies to consistently and reliably obtain patients' travel histories for medical care received outside of the United States in order to identify patients to be screened, and patients should inform their health care providers about any health care received abroad to inform their care (3).

As exemplified by this episode and other *C. auris* outbreak investigations, co-colonization with *C. auris* and CPOs is common in critically ill patients (50% of patients with *C. auris* are also colonized with a CPO) (9). CPO detection capacity has increased in the United States since 2017, and CDC recommends a public health response to even single cases of unusual resistance, including most CPOs (10). The public health investigation of CPOs should include an assessment of whether the patient had overnight health care exposures in countries where *C. auris* has been identified; patients not previously screened for *C. auris* should be promptly tested. In addition, if yeast is identified on any clinical cultures in such patients, it should be identified to the species level regardless of body site source. Confirmatory testing for *C. auris*, carbapenemase testing for Enterobacteriaceae, *Pseudomonas aeruginosa*, and *Acinetobacter baumannii*, and colonization screening for CPOs and *C. auris* is available free of charge through the Antibiotic Resistance Laboratory Network.* Globally, it is critical to prevent the emergence and spread of highly drug-resistant organisms like *C. auris* and CPOs. Public health investigations of CPOs could facilitate early detection of *C. auris* and might lead to earlier detection of this organism, thus preventing its spread.

* <https://www.cdc.gov/drugresistance/solutions-initiative/ar-lab-network.html>.

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Notes from the Field

Clinical *Klebsiella pneumoniae* Isolate with Three Carbapenem Resistance Genes Associated with Urology Procedures — King County, Washington, 2018

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On December 31, 2018, Public Health — Seattle & King County (PHSKC) was notified by the Antibiotic Resistance Laboratory Network regarding a carbapenem-resistant *Klebsiella pneumoniae* (CR-Kp) isolate cultured from the urinary tract in a man aged 65 years. The specimen was collected on December 17, 2018. It tested positive for carbapenemase activity by the modified carbapenem inactivation method and positive for genes encoding the carbapenemases New Delhi metallo-beta-lactamase, Verona integron-encoded metallo-beta-lactamase, and OXA-48-type beta-lactamase, by polymerase chain reaction. Antimicrobial susceptibility testing by broth microdilution showed resistance to 15 antibiotics tested* but low minimum inhibitory concentrations (MIC) to colistin (MIC ≤ 0.25) and tigecycline (MIC = 1). CDC recommends a public health response when organisms with emerging forms of antibiotic resistance, such as the metallo-beta-lactamases this isolate harbored, are identified[†] because such organisms are often difficult to treat and have the potential to spread rapidly in health care settings (1).

Since September 2017, the patient had been treated at a local outpatient urology clinic (facility A) in King County, Washington, for lower urinary tract symptoms that included urinary retention and benign prostatic hyperplasia. Procedures at facility A before identification of CR-Kp included cystoscopy, urinary catheter placement, and computed tomography scan of the urinary tract. On November 1, 2018, he underwent outpatient urodynamic studies at a hospital in Punjab, India (facility B), where urinary and rectal catheters were placed for cystometric and pressure flow studies; he did not undergo cystoscopy and was not hospitalized. Lower urinary tract symptoms persisted, and upon the patient's return to the United States, a urinalysis at facility A on December 17 revealed an elevated white blood cell count and presence of leukocyte esterase,

which led to the urine culture that identified CR-Kp. The patient's chronic symptoms and signs remained unchanged, and he was not treated at the time of CR-Kp identification per standard guidelines (2,3). Urinary and rectal specimens to screen for carbapenem-resistant Enterobacteriaceae (CRE) were collected on February 18, 2019; both specimens were negative by polymerase chain reaction (rectal swab) and culture (urine).

After identification of CR-Kp, education was provided to the patient and his family about preventing spread of the organism in the home and sharing this medical history with future medical providers (4). Facility A flagged the patient record for contact precautions. Staff members from PHSKC and the Washington Department of Health inspected facility A to ensure infection control procedures were in place. CRE identifications are notifiable conditions in Washington (2), and no other patients with matching CR-Kp strains have been identified from facility A. PHSKC recommended that facility A maintain contact precautions for the patient, pending results of rescreening for CRE 6 months after the positive culture.

This case highlights two important considerations for preventing antibiotic resistance spread. First, when responding to emerging antibiotic resistance, health departments should consider on-site standardized infection control assessments[§] in outpatient settings associated with an elevated risk for transmission, such as those that perform procedures involving the digestive tract, urogenital tract, and wounds. Second, providers should obtain thorough travel histories for any medical care received outside of the United States during the previous 6 months (5). Patients who had overnight hospital stays or underwent outpatient medical procedures abroad should be considered at risk for colonization or infection with CRE. To quickly identify and prevent CRE transmission, providers should consider CRE screening for patients who have undergone medical procedures abroad and who will be hospitalized or undergo invasive procedures in the United States. Carbapenem-resistant organisms from patients with this history should be tested for carbapenemases. Carbapenemase testing for CRE and carbapenem-resistant *Pseudomonas aeruginosa* and screening for carbapenemases in suspected isolates may be requested by state health departments through the Antibiotic Resistance Laboratory Network.[¶]

* amikacin, aztreonam, cefepime, ciprofloxacin, doripenem, doxycycline, ertapenem, gentamicin, imipenem, levofloxacin, meropenem, minocycline, piperacillin/tazobactam, tobramycin, and trimetho/sulfa.

[†] <https://www.cdc.gov/hai/containment/guidelines.html>.

[§] <https://www.cdc.gov/infectioncontrol/pdf/icar/outpatient.pdf>.

[¶] <https://www.cdc.gov/drugresistance/solutions-initiative/ar-lab-network.html>

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Erratum

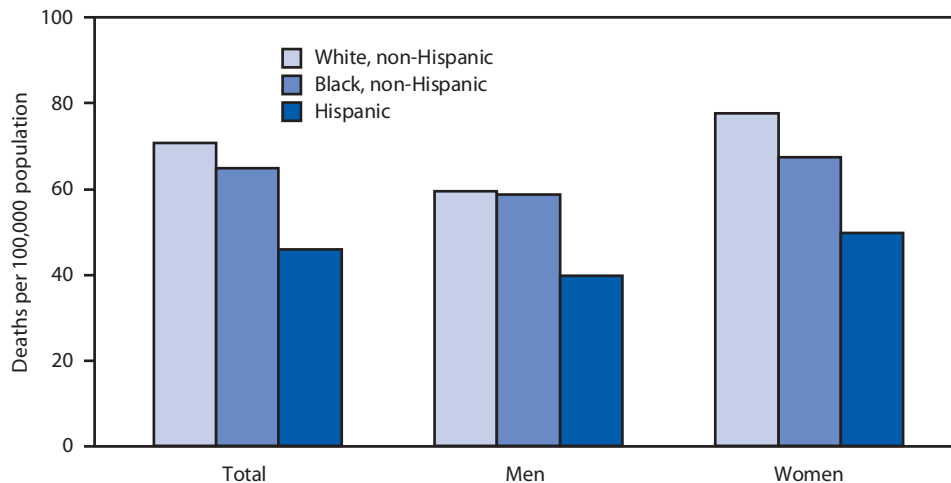
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In the report “Notes from the Field: Live Poultry Shipment Box Sampling at Feed Stores as an Indicator for Human *Salmonella* Infections — Michigan, 2016–2018,” on page 407, the sentence “**These findings corroborate previously published results that found a positive correlation between the *Salmonella* molecular strains found in shipment boxes and those serotypes associated with human illnesses (7).**” should have been included at the end of the fourth paragraph. In addition, on page 408, the reference “**7. Sharma A, Erdman MM, Munoz-Vargas L, Mollenkopf DE, Habing GG. Changes in the prevalence, genotypes and antimicrobial resistance phenotypes of non-typhoidal *Salmonella* recovered from mail-order hatchling poultry sold at US feed stores, 2013–2015. *Zoonoses Public Health* 2018;65:e102–12,**” should have been included in the list of references.

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Age-Adjusted Death Rates* from Dementia,[†] by Sex, Race, and Hispanic Origin — National Vital Statistics System, United States, 2017



* Age-adjusted death rates are per 100,000 population and are based on the 2000 U.S. standard population.

[†] Dementia deaths are identified according to the *International Classification of Diseases, Tenth Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer's disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).

In 2017, age-adjusted death rates for dementia were higher among non-Hispanic white persons compared with non-Hispanic black and Hispanic persons (70.8 per 100,000 compared with 65.0 and 46.0, respectively). Also, among women, the rates were highest among non-Hispanic white women (77.6) compared with non-Hispanic black women (67.4) and Hispanic women (49.8). The age-adjusted death rate for non-Hispanic white men was not statistically different from the rate for non-Hispanic black men (59.4 compared with 58.8). Age-adjusted death rates were higher for women than men among non-Hispanic white, non-Hispanic black, and Hispanic populations.

Sources: National Vital Statistics System. Underlying cause of death, 2017. <https://wonder.cdc.gov/ucd-icd10.html>.

Kramarow EA, Tejada-Vera B. Dementia mortality in the United States: 2000–2017. *National Vital Statistics Reports*, volume 68, number 2. https://www.cdc.gov/nchs/data/nvsr/nvsr68/nvsr68_02-508.pdf.

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